

WHARRAM

A Study of Settlement on the Yorkshire Wolds, X

WATER RESOURCES AND THEIR MANAGEMENT

by

C. Treen and M. Atkin

With contributions by J.R.B. Arthur, Craig Barclay, James Barrett, Alex Bayliss, Mark Bush, Wendy Carruthers, E. Ann Clark, Peter Didsbury, B. Ellis, Geoff D. Gaunt, Maureen Girling, Alison R. Goodall, Ian H. Goodall, Gordon Hillman, A. Jenner, Julie Jones, Gerry McDonnell, Arthur R. MacGregor, Ailsa Mainman, Emmeline Marlow-Mann, Ruth Morgan, Carole Morris, Quita Mould, Al Oswald, Jane Richardson, Ian Riddler, Mark Robinson, Bryan Sitch, A.M. Slowikowski, J.H. Thornton, J. Vaughan, John G. Watt, Martin Watts, Susan R. Watts, Stuart Wrathmell and J. Young

Illustrations by

Emmeline Marlow-Mann, Mark Chisnall, Alison Deegan, Peter Dunn, Cecily Marshall, Graeme Morris and Al Oswald

York University
Archaeological Publications 12

© Wharram Research Project and Department of Archaeology, University of York, 2005
ISBN 0 904761 72 X

Edited by: E. Ann Clark and S. Wrathmell
Published by: University of York
Typeset by: Archaeological Services WYAS
Printed by: Short Run Press Limited, Exeter

This publication has been made possible by a grant from English Heritage

Wharram: A Study of Settlement on the Yorkshire Wolds
General Editor: S. Wrathmell

- Vol. I: *Domestic Settlement 1: Areas 10 and 6* (1979)
Society for Medieval Archaeology Monograph 8. £7.00
- Vol. II *Wharram Percy: The Memorial Stones of the Churchyard* (1983)
York University Archaeological Publications 1. £4.00
- Vol. III *Wharram Percy: The Church of St Martin* (1987)
Society for Medieval Archaeology Monograph 11. £17.50
- Vol. IV *Two Roman Villas at Wharram le Street* (1986)
York University Archaeological Publications 2. £5.00
- Vol. V *An Archaeological Survey of the Parish of Wharram Percy, East Yorkshire.*
1. The Evolution of the Roman Landscape (1987)
British Archaeological Reports, British Series 172. £12.00
- Vol. VI *Domestic Settlement 2: Medieval Peasant Farmsteads*
York University Archaeological Publications 8. £10.95
- Vol. VII *Two Anglo-Saxon Buildings and Associated Finds* (1992)
York University Archaeological Publications 9. £7.50
- Vol. VIII *The South Manor Area* (2000)
York University Archaeological Publications 10. £18.00
- Vol. IX *The North Manor Area and North-west Enclosure* (2004)
York University Archaeological Publications 11. £22.00
- Vol. X *Water Resources and their Management* (2005)
York University Archaeological Publications 12. £19.50
- Vol. XI *The Churchyard* (in prep.)
- Vol. XII (late and post-medieval vicarage and post-medieval farmstead, in prep.)
- Vol. XIII (synthesis, in prep.)

Available from Oxbow Books, Park End Place, Oxford, OX1 1HN

Cover: Western Hillside Terrace, Phase 4 water channel 1189 from the north

Contents

| | | | | | | | | | | | | | | | | | | |
|------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| Contents | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | iii |
| List of Plates | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | v |
| List of Figures | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | vi |
| List of Tables | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | viii |
| Summaries | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ix |
| Preface and Acknowledgements | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | x |

Part One: The Water-mills of Wharram Percy and Wharram le Street Townships

| | | | | | | | | | | | | | | | | | | |
|---|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| 1 | The Documentary Evidence by S. Wrathmell | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| 2 | The Field Evidence by A. Oswald | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 9 |
| 3 | Discussion by S. Wrathmell | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 19 |

Part Two: The Excavations by C. Treen and M. Atkin with E. Marlow-Mann

| | | | | | | | | | | | | | | | | | | |
|---|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| 4 | Introduction | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 23 |
| 5 | Sites 30 and 71: Phases 1-7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 26 |
| 6 | Site 71 Phases 4-8: Graveyard Boundaries | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 69 |
| 7 | Site 67 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 71 |

Part Three: The Pottery

| | | | | | | | | | | | | | | | | | | |
|---|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| 8 | The Anglo-Saxon and Medieval Pottery by A.M. Slowikowski, with acknowledgements to P. Didsbury, A. Jenner, A. Mainman, J. Vaughan and J. Young | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 73 |
|---|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|

Part Four: The Small Finds edited by E.A. Clark

| | | | | | | | | | | | | | | | | | | |
|----|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 9 | Introduction | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 123 |
| 10 | Stone Objects by E.A. Clark and G.D. Gaunt with Grinding Stones by S.R. Watts | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 123 |
| 11 | Clay Objects by E.A. Clark | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 128 |
| 12 | A Note on the Glass Objects | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 129 |
| 13 | Coins by B. Sitch and C. Barclay | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 129 |
| 14 | Non-Ferrous Metal Objects by A.R. Goodall | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 129 |
| 15 | Iron Objects by I.H. Goodall and E.A. Clark, with spur by B. Ellis | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 132 |
| 16 | Nails by J.G. Watt | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 139 |
| 17 | Wooden Objects by C.A. Morris | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 140 |
| 18 | Bone and Ivory Objects by A. MacGregor and I. Riddler | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 143 |
| 19 | The Leather by Q. Mould, with No. 11 by J.H. Thornton | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 145 |

Part Five: The Environmental Evidence edited by W.J. Carruthers

| | | | | | | | | | | | | | | | | | | |
|----|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 20 | Introduction | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 151 |
| 21 | The Animal Remains by J. Richardson | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 153 |
| 22 | The Mollusca by J. Richardson | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 169 |
| 23 | The Fish Bone by J.H. Barrett | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 169 |
| 24 | The Post-Saxon Vegetational History of Wharram Percy: a palynological account by M.B. Bush | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 175 |

| | | |
|----|---|-----|
| 25 | Charred Plant Remains from Site 30 by G. Hillman and J.R.B. Arthur, revised by W.J. Carruthers | 185 |
| 26 | Plant Macrofossil Remains from Site 71 by J. Jones | 191 |
| 27 | Tree-ring Analysis of Wattling from the Millpond and Graveyard by R. Morgan | 200 |
| 28 | The Insect Assemblages from the Pond Sediments at Site 30 by M. Girling and M. Robinson ... | 210 |
| 29 | Environment and Economy at Wharram Percy: Evidence from the Pond and Dam Samples by W.J. Carruthers | 214 |

Part Six: The Dating and Functions of the Dams and Ponds

| | | |
|----|--|-----|
| 30 | Radiocarbon Dates from the Dam by A. Bayliss | 221 |
| 31 | The Evidence for Milling Sites by M. Watts | 222 |
| 32 | Discussion by S. Wrathmell and E. Marlow-Mann | 225 |

Appendices

| | |
|---|-----|
| Appendix 1: The Animal Remains from Sites 9 and 12 (Houses 10 and 6) by J. Richardson | 229 |
| Appendix 2: A Note on the Burnt Clay | 242 |
| Appendix 3: A Note on the Mortar | 242 |
| Appendix 4: A Note on the Coal and Charcoal | 242 |
| Appendix 5: A Note on the Human Bone | 243 |
| Appendix 6: A Note on the Slag by J.G. McDonnell | 243 |
| Appendix 7: Concordance of the Contexts containing Pottery, Small Finds, Metallurgical and Environmental Remains, and of all Contexts mentioned in this Volume, by Site, Phase and Context | 244 |
| Bibliography | 261 |
| Index by S. Atkin | 269 |

List of Plates

| | | | |
|---|---|----|--|
| 1 | General view of the experimental pond created in July 1970 by a temporary dam constructed of three planks and polythene, filled to a depth of 1m within 36 hours 23 | 8 | Stone footing 44. The subsequent footing 19 and revetment can be seen in section against the baulk, viewed from the south. Phase 4 (Site 30) 61 |
| 2 | General shot of working conditions 26 | 9 | Slots 18, 25, 27 and 26, viewed from the north. Phase 4 (Site 30) 61 |
| 3 | Wattle lines with Line 5 in the foreground and Line 2 in the background, viewed from the east. Phase 1 (Site 30) 27 | 10 | Revetment of chalk blocking 1200 across deep cut 1189, viewed from the south-west. Phase 4 (Site 30) 64 |
| 4 | Erosion hollow 116, viewed from the south. Phase 1 (Site 71) 27 | 11 | General shot of excavation showing the revetment 1200 and chalk rubble trackway, viewed from the south-west. Phase 4 (Site 30) 65 |
| 5 | Wattle posts and planks 131; the <i>in situ</i> wattling is toward the top of the picture, viewed from the south. Phase 1 (Site 71) ... 34 | 12 | Sheepwash and barrel, viewed from the south-west. Phase 7 (Site 30) 68 |
| 6 | Wall 41 blocking channel 65, viewed from the south-west. Phase 2 (Site 71) 40 | 13 | Dump of rubble, ash and carbonised grain, viewed from the south. Phase 4 (Site 71) ... 70 |
| 7 | Wall 202 with centre gap plugged with chalk rubble 217. Ditch 261 is located behind the wall and the disused ditch 265 is in the foreground, viewed from the south-west. Phase 3 (Site 71) 48 | 14 | Gaming board (No. 2) 124 |
| | | 15 | Fractured femur of dog bone (Site 30) ... 167 |

List of Figures

| | | | |
|----|--|----|---|
| 1 | Map of north-east England showing the position of Wharram Percy and other locations mentioned in the text ... xiii | 39 | Pottery: Ceramic Group 5 (Nos 19-30) ... 78 |
| 2 | Plan of the village of Wharram Percy showing relevant sites ... xiv | 40 | Pottery: Ceramic Group 5 (Nos 31-43) ... 80 |
| 3 | Location of watercourses and springs ... 3 | 41 | Pottery: Ceramic Group 5 (Nos 44-49) and Ceramic Group 6 (50-56) ... 82 |
| 4 | Field names and trackways ... 5 | 42 | Histogram of the quantification of fabric types by sherd count: Phase 1 ... 110 |
| 5 | Location of mill sites ... 10 | 43 | Histogram of the quantification of fabric types by sherd count: Phase 2... ... 111 |
| 6 | Wharram Percy dam and pond area in 1971 before excavation ... 11 | 44 | Histogram of the quantification of fabric types by sherd count: Phase 3... ... 112 |
| 7 | Reconstruction of dam and pond ... 12 | 45 | Histogram of the quantification of fabric types by sherd count: Site 30 Phase 4 ... 113 |
| 8 | Further possible dam sites ... 14 | 46 | Histogram of the quantification of fabric types by sherd count: Site 30 Phase 5 ... 114 |
| 9 | Location of mill sites in relation to township boundaries ... 16 | 47 | Histogram of the quantification of fabric types by sherd count: Site 30 Phase 6 ... 115 |
| 10 | Mill sites C and D ... 17 | 48 | Histogram of the quantification of fabric types by sherd count: Site 30 Phase 7 ... 116 |
| 11 | Flooding extents of Dam sites C and D ... 18 | 49 | Histogram of the quantification of fabric types by sherd count: Site 30 Phase 8 ... 117 |
| 12 | Plan of Site 30 and Site 71 excavations ... 24 | 50 | Histogram of the quantification of fabric types by sherd count: Site 71 Phase 4 ... 118 |
| 13 | Schematic plans of Sites 30 and 71 indicating approximate areas of clay dam (top), and chalk and earth dam and Phase 4 features (bottom)... 25 | 51 | Histogram of the quantification of fabric types by sherd count: Site 71 Phase 5 ... 119 |
| 14 | Phase 1 plan ... 28 | 52 | Histogram of the quantification of fabric types by sherd count: Site 71 Phase 6 ... 120 |
| 15 | Section 21 Main north-south section ... 30 | 53 | Histogram of the quantification of fabric types by sherd count: Site 71 Phase 8 ... 121 |
| 16 | Section 24 Main east-west section ... 32 | 54 | Stone objects: Jet object No.1; spindlewhorls Nos 3-4; tool No 5, hones, rubbing stone and cobbles Nos 9-10, 13; grinding stones Nos 16-17 ... 125 |
| 17 | Section 22 east-west section ... 35 | 55 | Clay objects: loomweights Nos 1-2 ... 129 |
| 18 | Phase 1 sections: S.6 and S.142, wattles and timber features ... 36 | 56 | Copper-alloy objects: dress fasteners No 1; buckles and buckle plates Nos 6-8; pin No 10; miscellaneous Nos 15 and 19-21 ... 131 |
| 19 | Detailed plan of wattle features ... 37 | 57 | Iron objects: tools Nos 2-6; knives Nos 7-13; staples Nos 15, 18; collar No 19; hinges and straps Nos 25-26; locks and keys Nos 34-35; spur No. 36; buckle No. 38; vessel No. 43; ... 133 |
| 20 | Phase 2.1 plan ... 38 | 58 | Iron objects: horseshoes Nos 46, 74, 151 and 180 ... 136 |
| 21 | Phase 2.1 sections: S.137, S.116, S.120, S.141, S.130, S.118 and S.40 ... 41 | 59 | Horse fittings Nos 186-7; arrowhead No 188; unclassifiable fragments Nos 194-4 ... 138 |
| 22 | Phase 2.2 plan ... 42 | 60 | Wooden objects: Nos 4, 5, and 7-11 ... 141 |
| 23 | Phase 2.2 sections: S.119 and S.62 ... 45 | 61 | Bone and ivory objects: handles Nos 1-6; perforated pig metapodial No 12 ... 144 |
| 24 | Phase 3 plan ... 46 | 62 | Leather objects: turnshoes Nos 2 and 10; bag panel No 3 and reconstruction ... 146 |
| 25 | Site 71 sections: S.1 and S.3 ... 49 | 63 | Approximate position of samples taken through PP/QQ 170: Section 21 (Fig. 15) ... 151 |
| 26 | Phase 3 sections: S.73, S.70, S.5, S.69, S.78, S.113 and S.72 ... 51 | | |
| 27 | Site 30 Phase 4.1 plan ... 52 | | |
| 28 | Site 30 Phase 4.1 sections; S.49, S.54, S.55, S.48, S.98, S.99, S.89 and S.95 ... 55 | | |
| 29 | Site 30 Phase 4.2 plan ... 56 | | |
| 30 | Site 30 Phase 4.2 section: S.30... ... 59 | | |
| 31 | Site 30 Phase 4.2 sections: S.43, S.125, S.86, S.123, S.37, S.35, S.36 and S.34 ... 60 | | |
| 32 | Site 30 Phase 4.3 plan ... 62 | | |
| 33 | Site 30 Phases 6 and 7 plan ... 66 | | |
| 34 | Site 71 Phase 4 plan ... 69 | | |
| 35 | Site 71 Phase 5 plan ... 70 | | |
| 36 | Site 71 Phases 6-8 plan ... 70 | | |
| 37 | Pottery: Ceramic Group 3 (No. 1) and Ceramic Group 4 (Nos 2-7) ... 74 | | |
| 38 | Pottery: Ceramic Group 4 (Nos 8-18) ... 76 | | |

| | | | | | |
|----|---|---------|----|--|---------|
| 64 | Approximate position of samples taken through UU/VV 170/171: Section 24 (Fig. 16) | 153 | 79 | Age and size distribution of small uprights from 3 lines of wattling | ... 203 |
| 65 | The relative proportions of the main domestic animals by site and phase | ... 157 | 80 | Age and size distribution of horizontal rods from 2 lines of wattle | ... 203 |
| 66 | Relative proportions of the three main 'meat' animals by site | ... 159 | 81 | Size range of the rods and uprights | ... 204 |
| 67 | Fusion data for medieval cattle by site | ... 161 | 82 | Age range of the rods and uprights from the millpond | ... 205 |
| 68 | Dental age data for cattle by site | ... 161 | 83 | Age and size ranges of the hazel, willow and oak serving different functions | ... 207 |
| 69 | Fusion data for medieval sheep by site | ... 162 | 84 | Species groups of Coleoptera from Wharram Percy pond Column 2 | ... 213 |
| 70 | Dental age data for sheep by phase | ... 163 | 85 | Radiocarbon dates from Site 30 | ... 222 |
| 71 | Dental age data for sheep by site | ... 163 | 86 | The relative proportions of the main domestic animals by site | ... 231 |
| 72 | Distribution of skeletal elements: cattle | ... 165 | 87 | Relative proportions of the three main 'meat' animals by site | ... 232 |
| 73 | Distribution of skeletal elements: sheep | ... 166 | 88 | Fusion data for cattle by site | ... 234 |
| 74 | The relative proportions of the main domestic 'species' by phase | ... 168 | 89 | Dental age data for cattle by site | ... 235 |
| 75 | Percentage diagram of the composition of modern pollen | ... 176 | 90 | Fusion data for sheep by site | ... 235 |
| 76 | Percentage diagrams of the fossil pollen from Site 30 | ... 178 | 91 | Dental age data for sheep by site | ... 237 |
| 77 | Detailed plan of sampled wattle features | ... 201 | 92 | Distribution of skeletal elements: Site 9 | ... 240 |
| 78 | Age and size distribution of posts WP1-8 and 10 from lines 1 and 3 | ... 202 | 93 | Distribution of skeletal elements: Site 12 | ... 241 |

List of Tables

| | | | |
|----|--|----|---|
| 1 | Vessels with cross contexts 84 | 29 | NISP by phase based on diagnostic elements 171 |
| 2 | Phase 1 quantification of pottery by context number 88 | 30 | Fish element distribution (diagnostic elements only) 172 |
| 3 | Phase 2 quantification of pottery by context number 88 | 31 | Butchery marks (all specimens) ... 174 |
| 4 | Phase 3 quantification of pottery by context number 89 | 32 | Estimated total length of fish based on comparison of diagnostic elements with reference to specimens of known size... 174 |
| 5 | Site 71 Phase 4 quantification of pottery by context number 93 | 33 | Charred plant remains from Site 30 ... 186 |
| 6 | Site 30 Phase 4 quantification of pottery by context number 94 | 34 | Site 71 Waterlogged and charred plant remains Phases 1 and 2 192 |
| 7 | Site 71 Phase 5 quantification of pottery by context number 106 | 35 | Site 71 Charred plant remains Phase 4 ... 196 |
| 8 | Site 71 Phase 6 quantification of pottery by context number 107 | 36 | Summary of samples and species used in the tree-ring study from the wattle and posts of the millpond and graveyard ... 206 |
| 9 | Recognisable forms by fabric in chronological order 108 | 37 | Summary of age and size figures for the upright posts used in the wattle ... 208 |
| 10 | Comparison of the proportion of jars and jugs throughout the medieval phases ... 109 | 38 | Summary of age and size figures for the rods in the wattle 208 |
| 11 | The distribution of querns and millstones by stone type and phase 126 | 39 | Some records of the age, size and species of rods used in hurdling from archaeological sites 209 |
| 12 | Total of all identifiable nails by type and as a percentage of the total 139 | 40 | Pond samples 210 |
| 13 | Site 30 sample concordance 152 | 41 | Wharram Percy pond insects 211 |
| 14 | Bone preservation and treatment by site ... 154 | 42 | Comparison of cereal data between Wharram Percy sites 218 |
| 15 | The proportion of butchered bones by site for all species and knife and chop marks for cattle, sheep, pig and horse 155 | 43 | Radiocarbon measurements from Site 30 ... 221 |
| 16 | Fragment count by site and phase 156 | 44 | Bone preservation and treatment by site and deposit type 230 |
| 17 | Fusion data for cattle by site 158 | 45 | The proportion of butchered bones by site for all species and knife and chop marks for cattle, sheep, pig and horse ... 230 |
| 18 | Fusion data for sheep by site 158 | 46 | Fragment count by site 230 |
| 19 | Fusion data for pig by site 158 | 47 | Fusion data for cattle by site 233 |
| 20 | Fusion data for horse by site 158 | 48 | Fusion data for sheep by site 233 |
| 21 | Number of cattle jaws at various wear stages by site and phase (after Halstead 1985) ... 160 | 49 | Fusion data for pig by site 233 |
| 22 | Number of sheep jaws at various wear stages by site and phase (after Payne 1973) ... 160 | 50 | Fusion data for horse by site 233 |
| 23 | Number of pig jaws at various wear stages by site and phase 160 | 51 | Number of cattle jaws at various wear stages by site 236 |
| 24 | Number of horse incisors (mandibular and maxillary) at various wear stages by site ... 160 | 52 | Number of sheep jaws at various wear stages by site 236 |
| 25 | Metrical data for sheep and horse by site and period (in millimetres) 164 | 53 | Number of pig jaws at various wear stages by site 236 |
| 26 | The mollusca from Sites 30 and 71 169 | 54 | Number of horse incisors (mandibular and maxillary) at various wear stages by site ... 236 |
| 27 | Common and Latin names of taxa identified at Kaupang 170 | 55 | Fusion data for cattle by element 238 |
| 28 | Bone preservation characteristics by phase ... 171 | 56 | Metrical data for sheep and horse by site and period (in millimetres) 239 |

Summary

The present volume deals with excavations carried out in 1972-83 on the site of a medieval dam and pond at the southern end of the deserted medieval village of Wharram Percy, North Yorkshire. The earliest remains appear to have been associated with a water-powered corn mill, established probably in the 9th or early 10th century. It was one of a series along the Wharram beck, others being documented in the 12th and 13th centuries. This mill became disused perhaps as early as the 13th century, but the pond continued to be used for a variety of other purposes, some evident in the archaeological record. Finds included significant groups of horse bones and horseshoes, marine fish bones and medieval pottery jugs.

Zusammenfassung

Der vorliegende Band handelt von Ausgrabungen, die zwischen 1972 und 1983 auf dem Gelände eines mittelalterlichen Dammes und Teichs am südlichen Ende des verlassenen mittelalterlichen Dorfes Wharram Percy in Nord-Yorkshire stattfanden. Die frühesten Spuren scheinen mit einer wassergetriebenen Getreidemühle, die wahrscheinlich aus dem 9. oder auch frühen 10. Jahrhundert stammt, in Zusammenhang zu stehen. Dieses war eine aus einer Reihe von Mühlen entlang des Wharram Baches; andere sind für das 12. und 13. Jahrhundert dokumentiert. Es mag sein, daß die Mühle schon im frühen 13. Jahrhundert nicht mehr betrieben wurde, während der Teich weiterhin für verschiedene andere Zwecke benutzt wurde, von denen einige archäologisch belegt sind. Zu den Funden gehört eine bedeutende Gruppe von Pferdeknochen, Hufeisen, Gräten von Seefischen und mittelalterliche Keramikkrüge.

Résumé

Ce volume traite de fouilles exécutées entre 1972 et 1983 sur le site d'un étang et d'un barrage médiéval à l'extrémité sud du village médiéval abandonné de Wharram Percy, North Yorkshire. Les vestiges les plus anciens semblent avoir été associés au moulin à eau pour le blé, probablement établi au 9ème siècle ou au début du 10ème. C'était l'un d'une série de moulins le long du ruisseau de Wharram, d'autres étant documentés au 12ème et au 13ème siècle. Ce moulin cessa peut-être d'être utilisé dès le début du 13ème siècle mais l'étang continua à servir à diverses autres fins, dont certaines sont évidentes dans le registre archéologique. Au nombre des découvertes se trouvaient des assemblages significatifs d'ossements de chevaux et de fers à cheval, d'arêtes de poissons de mer et de cruches en céramique médiévales.

Preface and Acknowledgements

This tenth volume in the Wharram series presents the results of excavations carried out between 1971 and 1983 on the area of the pond and dam south of St Martin's church. As with much other work at Wharram, the decision to investigate these particular features was taken for reasons beyond simple research interest. The then Ministry of Works proposed to refill the pond as part of its presentation programme, and the excavations were intended to enable the necessary engineering works to proceed.

These were unquestionably the most difficult and challenging excavations throughout the forty-year campaign at Wharram, for three main reasons. First, a central swathe of the dam could not be fully excavated because of 20th-century waterworks installations (see Fig. 6). Secondly, despite the use of sludge pumps much of the work was carried out in waterlogged conditions, and the mud made it difficult both to recover artefacts and to recognise stratigraphic successions. Thirdly, the short excavation seasons were particularly inappropriate for unravelling the kind of complex and ambiguous stratigraphy evident in the phases of dam construction and modification, and in the layers of pond silt. The vertical record provides a fairly clear picture of the sequences of activity, but it has proved difficult, on the basis of the site records, to track these sequences in plan right across the excavation areas.

Nevertheless, the work has provided valuable insights relating to everyday life in the medieval village. On a wider level, the excavation of the pond silts also provided a unique opportunity to recover environmental evidence relating not only to the vicinity of the pond but also to the broader land-use history of the valley and the plateau. Many of the analyses and reports were prepared during the period of excavations. The long delay in their appearance in print is regrettable, but mitigated by Wendy Carruthers' new general discussion of the environmental data.

The medieval faunal assemblage from the pond and dam sites is of particular interest, and the opportunity has been taken to include here, for comparative purposes, a new analysis of the animal bones recovered from Areas 6 and 10, the medieval farmsteads on the plateau. The excavation of those farmsteads was the subject of *Wharram I*, but a comprehensive faunal report was not at that stage produced.

The excavations described in this report were sponsored by the Department of the Environment, latterly by English Heritage, and were conducted under the auspices of the Medieval Village (now Settlement) Research Group. The project was under the overall direction of John Hurst, and administration was in the hands of Maurice Beresford and Francesca Croft. Once again valuable organisational assistance was provided by the Milner and Veysey families and by Mrs Joan Summerson.

Site 30 was supervised by Colin Treen and Site 71 by Malcolm Atkin, assisted variously by Paul Stamper and

Leslie Abrams. Both supervisors wish to thank all those who were part of the excavation team (known to its members as the SFA), who worked tirelessly and usually cheerfully, often in very adverse conditions. Special thanks are due to John Watt for his technical genius at keeping the pumps going. Site photography was by Richard Daggett, Sebastian Rahtz and Dan Smith, and site survey by R.T. Porter.

The on-site processing of finds was first supervised by Dan Smith, later by Ann Clark. Niki Gilding's work during the post-excavation process was invaluable. English Heritage's Ancient Monuments Laboratory assisted with the small finds and the environmental and technological samples, both on and off this site. Margaret Guido and Terry Manby kindly identified respectively glass and stone objects.

Mark Bush wishes to thank Dr J.R. Flenley for help and encouragement, Keith Scurr for preparing the main pollen diagram, and also Professors R.C. Ward and A.J. Patmore. Ruth Morgan thanks David Haddon-Reece and Jennifer Hillam for their assistance. Martin Watts is grateful to Richard Brown, Oxford Archaeology (Ebbsfleet), and Andy Chapman, Northampton Archaeology (Raunds), for permission to use information prior to publication.

The general editor's thanks go to R.T. Porter for sharing his extensive knowledge of the cartographic evidence in particular and the documentary evidence in general, especially in relation to the location of the medieval Wharram Grange. Christopher Whittick provided expert guidance on the reading and interpretation of the medieval documentary sources. The volume has also drawn on extracts from English Heritage's new earthwork survey of Wharram, initiated and directed by Paul Everson, and carried out by Al Oswald. The survey will be fully published in *Wharram XIII*.

The drawings that appear here are credited individually. The volume has been sub-edited and desk-top published by Chris Philo with the assistance of Alison Whawell. David Weston made alterations and facilitated the transfer of some of the digital images. The line drawings have been scanned in by Emmeline Marlow-Mann, Susanne Atkin created the index and Friederike and Klaus Hammer and Charlette Sheil-Small prepared the foreign language summaries. As well as providing administrative back up, Peggy Pullan prepared the site archive for deposition with Hull City Museums. This publication has been much improved thanks to valuable comments and suggestions from Christopher Dyer and Paul Stamper.

The progress of the Wharram Post-excavation and Publication Project has until recently been monitored on behalf of English Heritage by Kath Buxton. The project team as a whole welcomes this opportunity to thank her for her unfailing support and guidance.

As this volume goes to press, it is with great sadness that we record the death of Maurice Beresford. An appreciation of his life will appear in the next Wharram volume.

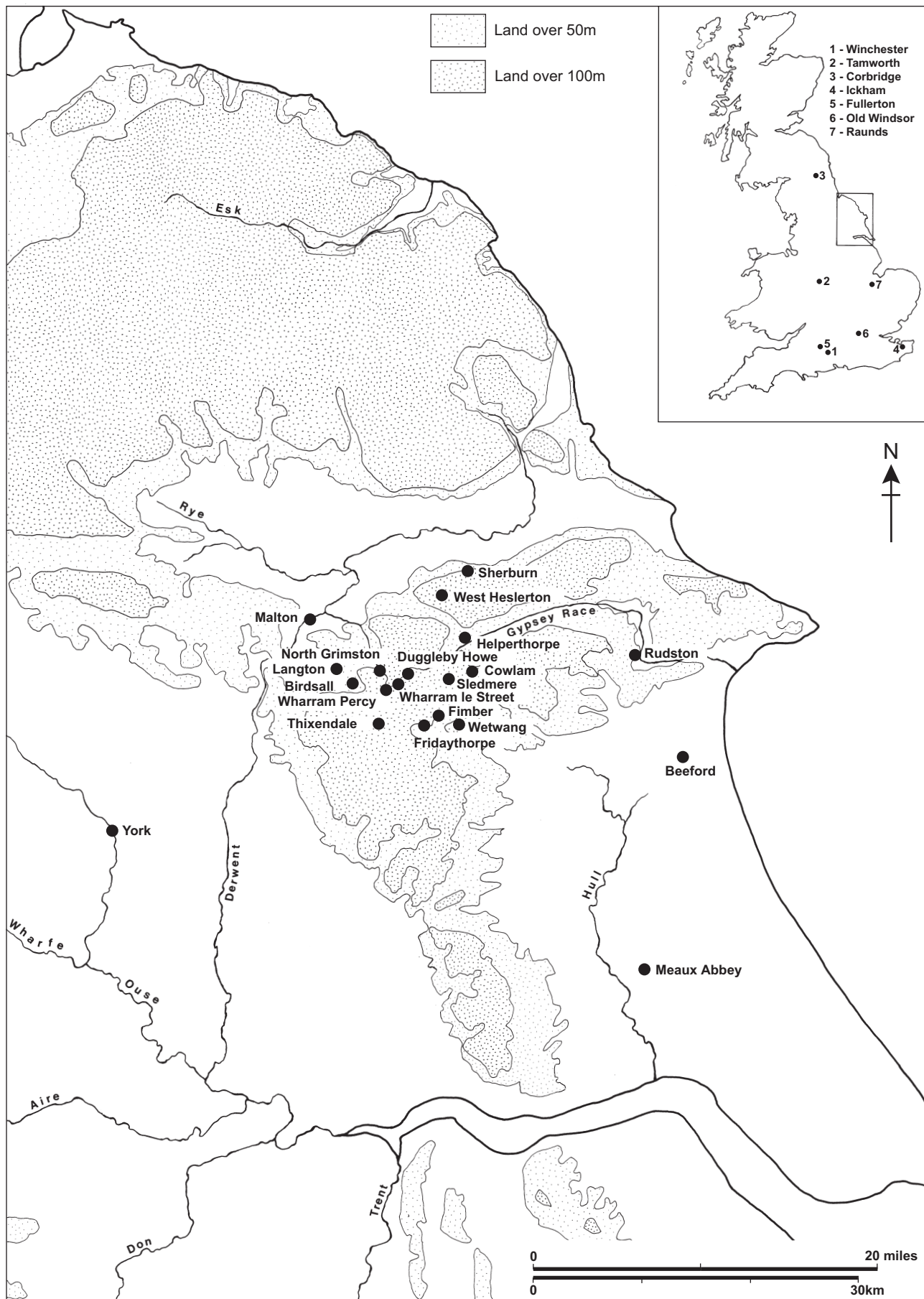


Fig. 1. Map of north-east England showing the position of Wharram Percy and other locations mentioned in the text. (C. Philo)



Fig. 2. Plan of the village of Wharram Percy. (C. Philo)

Part One

The Water-mills of Wharram Percy and Wharram le Street Townships

1 The Documentary Evidence

by S. Wrathmell

Introduction

The chalk Wolds of East Yorkshire are a generally waterless environment, and natural ponds, together with the relatively few surface water courses, must always have been strong attractions for human settlement. Studies by Colin Hayfield and others have explored the significance of ponds on the High Wolds. The Vessey Ponds, for example, some 3km south-west of the Wharram Percy village site, seem to have been a focus for human activity from Mesolithic times onwards (Hayfield *et al.* 1995, 396-401). In the same part of the High Wolds all the villages, until recent centuries, depended for their water supplies upon ponds or meres that were probably in at least some cases created out of natural, clay-filled hollows. The Anglo-Saxon villas of Sledmere and Fimber (formerly Finmer) were themselves named after the meres around which medieval and perhaps earlier settlement came to be concentrated (Hayfield *et al.* 1995, 404-5; Smith 1937, 126-8). A similar phenomenon can be observed on the Wessex chalklands, where hilltop ponds 'have determined the sites of villages from Roman times onwards' (Rackham 1986, 352). By the end of the 18th century such meres were being supplemented by wholly artificial 'dewponds' which became necessary for watering stock as the Wolds were being enclosed (Hayfield and Brough 1986-7).

Meres were, of course, very vulnerable to drought, as well as containing water of questionable quality. The antiquarian J.R. Mortimer recalled that, in the summer of 1826 when all the ponds and cisterns in the vicinity of Fridaythorpe and Wetwang had dried up, the people of Fimber allowed the inhabitants of Fridaythorpe access to the two meres in their village. But when one of the meres had been exhausted, and the other much diminished, they refused them further access. The men of Fridaythorpe came, nevertheless, with their water-carts and cattle, and a battle ensued (Hicks 1978, 3-4). T. Edmondson, who in the mid-19th century attempted to raise a subscription 'to obtain a well of good water' for Fimber, recorded that when a pond there had been cleaned out in 1821, the nucleus of dead matter left in the centre of the mere was ten feet high. Thirty-five years after that cleansing he estimated the extent of subsequent accumulations:

'It is judged by fair competition that not less than 800 cart loads of dead matter are imbedded in the bowels of

this monstrous pond, composed of the worst of materials, such as dead dogs, drowned cats, besides a quantity of filthy matter. And still the inhabitants are constrained to make use of it as a beverage.'
(Edmondson 1857, 13).

The inhabitants of the two Wharram townships were better placed, having access at least intermittently to surface watercourses. One is the Upper Gypsy Race, which rises close to the site of Wharram le Street village, and runs eastwards along a stretch of the Great Wold Valley that was called Crandale in the Middle Ages (Smith 1937, 12-13). Several streams known as 'gypseys' – pronounced with a hard 'g' – spring intermittently from the Wolds in the wet season, run for a distance, sometimes as a torrent, and then cease. The Upper Gypsy Race originates in a number of small 'contact escarpment springs' which coalesce and flow back onto the Chalk outcrop; under average conditions it flows north-eastwards some 10km before disappearing because of stream bed leakage (Foster and Milton 1976, 31-3). The first element of the name 'gypsy' has been related to the OE *gipian*, meaning 'to yawn', and the ME *gayspe*, 'to gasp', reflecting their convulsive and intermittent nature (Smith 1937, 5).

In the Middle Ages their appearance was regarded as portentous. At the end of the 12th century William of Newburgh described 'those famous waters that are commonly called Gipse' and recorded that their cessation was interpreted as a good omen, their reappearance a bad one (see Smith 1937, 5). Their occurrences are said to have presaged more recent catastrophies, including the Great Plague and the two World Wars (Barker 2001, 14). In prehistoric times, they were perhaps the reason for the concentration of 'ceremonial' monuments along the Great Wold Valley, especially Duggleby Howe and the cursus group at Rudston (Stoertz 1997, 25-30).

It is unclear how much reliance the villagers of Wharram le Street placed upon the Race as a source of water. Another watercourse is shown on two plans in the Birdsall estate office, both drawn from an 1810 survey of Wharram le Street by William Rawson (pers. comm. R.T. Porter). They mark a pond in the middle of the village street with a watercourse running northwards from it, along the street, then turning north-westwards through the fields and down into the valley (Fig. 3; see Beresford and Hurst 1990, 93 for one of the plans). There is no indication whether the pond was replenished from springs similar to those that fed the Upper Gypsy Race, or whether it relied entirely on rainfall.

A third watercourse, one that runs through both Wharram townships, was referred to in medieval records simply as *ductus aque*. It originates in Wharram Percy just south of the churchyard, where it formerly supplied the medieval village pond (now recreated: Fig. 3) and runs northwards through Wharram le Street and on to the river Derwent. Besides being a source of water for the inhabitants and their livestock, it was the only stream in the two Wharram townships that was reliable enough to power water-mills. This can be inferred from its identification in a late 12th-century grant, cited below, as *ductum aque super quem molendina sita sunt* – the watercourse on which the mills are sited. The mills along this stream were assets of the manorial lords and other families and institutions that held land freely; therefore their numbers and locations reflect closely the pattern of landholding and tenure. For this reason, the following discussions of the documentary evidence of mills in Wharram le Street and Wharram Percy begin with the descents of the principal manorial interests in each vill.

Manorial interests and mills in Wharram le Street township

Manorial interests

In the middle of the 12th century, when for the first time we have information on the use of water power in Wharram le Street, the lords of the manor and principal landowners were the Fossard family. The Fossard fee originated in the lands held in 1086 by Nigel Fossard from the Count of Mortain (*EYC II*, 325). The vill was rated at 12 carucates, the whole of it forming a single manor. It had been held by Ketilbjorn at the time of the Conquest. By Domesday it had passed as a complete entity to Nigel Fossard (Faull and Stinson 1986, E59). The Count of Mortain's connection with Yorkshire probably ceased in 1088, and from then on the Fossards held the manor directly from the king as tenants in chief (*EYC II*, 326).

The Fossards subinfeudated lands to a number of local families, notably the Barkethorpes, and to institutions such as the Hospital of St John of Jerusalem. Their principal beneficiaries were, however, the monks of Meaux Abbey in Holderness. During the second half of the 12th century, William Fossard I and his son, William II, granted Meaux over seven and a half carucates in the vill. It is the Meaux connection that provides our documentation for mills in Wharram le Street, for the story of these and other donations was assembled in the Meaux Chronicle. The Chronicle, published by E.A. Bond (1866; 1867; 1868), is based upon two MSS, the longer version incorporating more general historical information than the other. A continuator identifies the principal author as Thomas Burton, the 19th abbot, and the Chronicle was largely composed towards the end of the 14th century (Bond 1866, xlv-xlix).

There are two further related MSS. One is a 14th-century cartulary, undoubtedly one of Burton's sources and containing a few entries in his own hand (BL

Lansdowne 424). The other is a register of abstracts of grants of lands and rents under various parishes, with an 'ancient measurement of lands' belonging to the monastery, a rental and an inventory, both dated 1396, and various other documents (BL Cotton Vit. C.vi). This, too, was written by Burton (Bond 1866, lvi-lvii). It contains extracts based on original charters and cartularies such as the Lansdowne MS, and turns the first-person donors of those documents ('I, William Fossard, give...') into the third person ('William Fossard gave us...'). It also draws together, in a single entry, the various documents relating to a particular donation: thus the details of an original grant are followed by references to later confirmations and quitclaims, creating a chronological narrative for each acquisition. The entries in this MS contain some detailed information that has been omitted from the Chronicle's summaries of the same documents. The following discussion therefore contains extracts from both the Chronicle and the Cotton MS.

After the death of William Fossard II, in about 1195, his daughter and heir, Joan, was married to Robert de Turneham who disputed the monks' possession of their Wharram property, at one stage ejecting them from the grange they had built there. When Robert died, in 1211, his heir was also a daughter, Isabel, who was given in marriage to Sir Peter de Mauley (*EYC II*, 327; Bond 1866, 105). The de Mauleys confirmed the grants made by the Fossards to Meaux.

The Burton MSS as a whole appear to indicate the presence in Wharram le Street township of three separate groups of watermills: one at Meaux Abbey's grange, another held or claimed by the Montfort and Percy families, and a third belonging to St Leonard's Hospital at York.

The Meaux Grange and the Grange Mill

Meaux's interest in Wharram le Street was established in the time of the first abbot, between 1150 and 1160, when William Fossard I gave two carucates of land to found a grange there (Bond 1866, 104). The grant included a spring, called *halykeld* or 'holy well', and a watercourse next to the dwelling-house of the grange for making a mill for the sole use of the bretheren staying there. The grant was confirmed later in the century by William Fossard II, and in the 13th century by Peter son of Peter de Mauley:

Extract A

Willelmus Fossardus dedit nobis in liberam elemosinam duas carucatas terre in agris de Wharrom' cum pertinentiis ad edificandam quandam grangiam et fontem dictum halykeld ad occidentem predicte ville et circa eundem fontem locum sufficientem et congruum ad edificacionem eiusdem grangie videlicet etc. deditque nobis ductum aque predicte ville juxta mansionem nostram ad faciendum quoddam molendinum tantummodo ad usum fratrum ibidem manencium et communem pasturam eiusdem ville. Cuius donacionem Willelmus Fossard junior filius suus ac etiam Petrus filius Petri de malo lacu nobis in perpetuam elemosinam confirmarunt (BL Cotton Vit. C. vi, f.42)

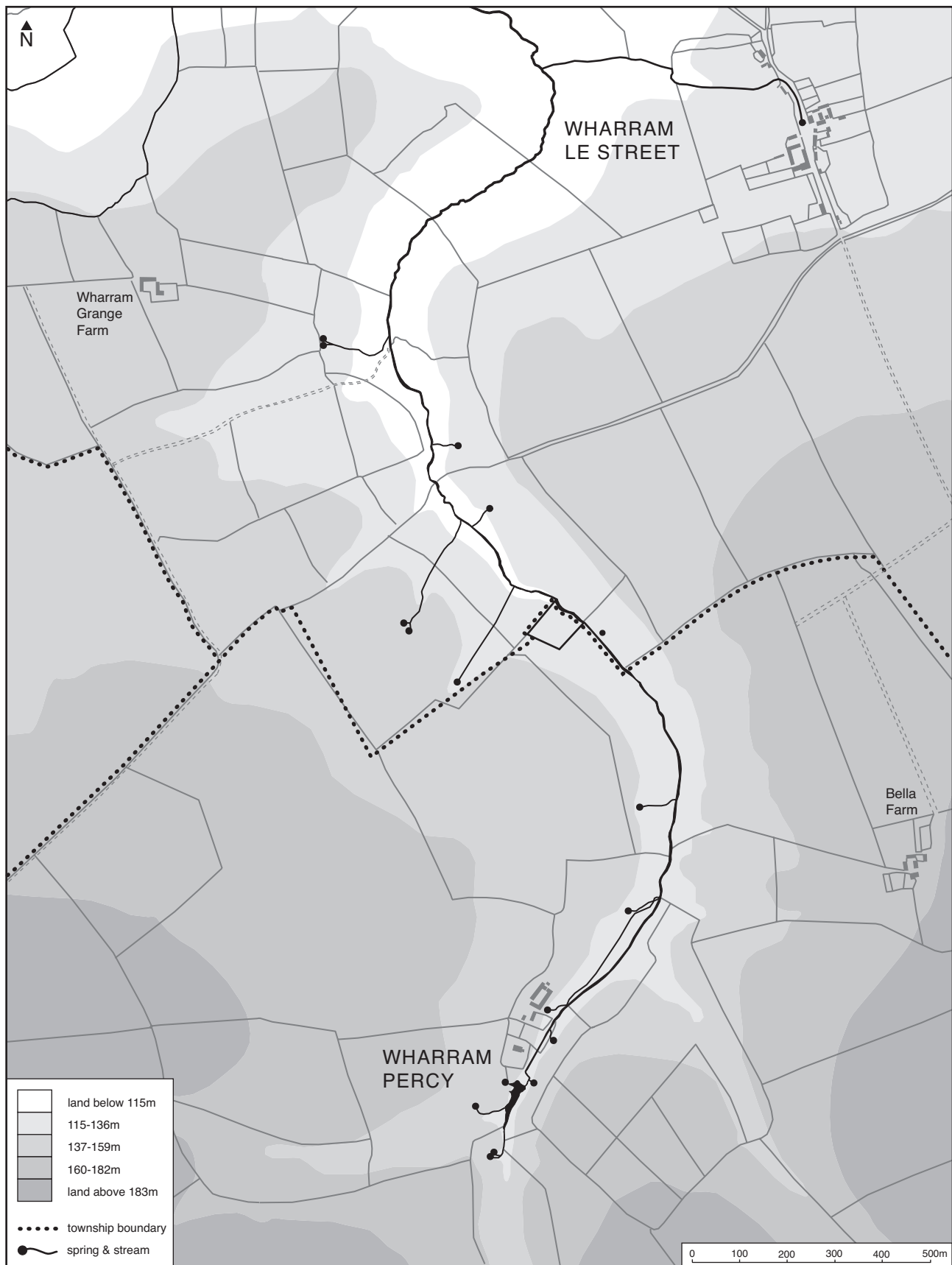


Fig. 3. Location of watercourses and springs. (A. Deegan after Donkin 1838; Dykes 1836; OS 1st Edition 6 inch surveyed 1851)

Burton comments, however, that the monks never had a mill by reason of this grant: *Molendinum tamen ibidem occasione dicte concessionis nunquam habebamus* (Bond 1866, 104). This is the first hint of a century-long dispute over their access to the watercourse, a matter that will be considered later in this chapter.

The Abbey acquired much more extensive holdings in Wharram le Street after the death of William Fossard I, in c.1169. His son William was a minor, and so became ward of the king. Henry II gave him into the custody of William le Gros, earl of Albemarle. Fossard repaid the earl's hospitality, the Chronicle says, by making the earl's sister pregnant, and had to flee the realm. His flight may, however, have had more to do with the rebellion of 1174, since the sheriff dismantled Mount Ferrant, his timber castle at Birdsall. In any event, he evidently did not return until after le Gros's death in 1179 (Bond 1866, 104-5; *EYC II*, 328). Thereafter he sold to Meaux *reliquas terras quas habemus in Wharrom*. In return for Meaux paying his substantial debts to Aaron the Jew, he promised to give Abbot Philip four and a half carucates in Wharram (Bond 1866, 105). This must have been after le Gros's death in 1179 and before the death of Abbot Philip in 1182 (see *EYC II*, 328 and Bond 1866, 174). The donation included all his lands called Lutheworth on the west side of the watercourse on which the mills were located. These lands extended from the road to York on the south, to the bounds of North Grimston on the north, and from the bounds of Birdsall on the west, to the watercourse on the east. The rest of the four and a half carucates were on the east side of the watercourse and included the precincts of the hall – presumably the hall of the grange:

Extract B

Willelmus Fossard junior dedit nobis... quatuor carucatas terre et dimidiam cum pertinenciis in Wharrom' scilicet totam terram que pertinet ad Wharrom' ad occidentalem partem ultra ductum aque super quem molendina sita sunt et nominatim lutheworde scilicet a via que ducit Ebor' usque ad divisam de Grymeston' et a divisa de Byrdsall' usque ad ductum aque in terra arabili in prato et pastura excepto prato quod pertinet ad xxxviiij bovatat terre quas liberi homines tenent in predicta villa qui liberi homines nichil aliud communi habebunt in prefata terra arabili nec in pastura preter Willelmus de Barcthorp' et heredes eius qui octo animalibus pasturam habebunt in Thornlund et nichil amplius. Et ad orientalem partem ductus aque curtem aule et totam terram juxta illam et extra sicut carucate sive culture...

(BL Cotton Vit. C. vi, f.42)

Figure 4 shows some of the territory given by the Fossards to Meaux, including Lutheworth and the other named land, Thornlund, where a dispute with William de Barkethorpe rumbled on for some time (Bond 1866, 174-6). Lutheworth has been identified from the bounds supplied by the grant; and Thornlund (or *placea pasture spinose vocata le Lound*: Smith 1937, 136) from the name Lund Wood which has survived into recent centuries. Figure 4 also shows Banks Hill, the old course of the road

to York as it runs down into the valley westwards from Wharram le Street. After the construction of the Malton and Driffield Junction railway it was diverted southwards towards Wharram Station, and then back to the original stream crossing. Its earlier course is, however, indicated by a substantial and well-defined hollow way that runs down the steep valley side from Wharram le Street village towards the ford at the bottom. The field called Grange Cliff in the early 19th century indicates the location of the Meaux grange precincts, as was recognised many years ago (*Wharram I*, 25). The present Wharram Grange Farm, on the west side of the watercourse, is a post-medieval foundation.

The next relevant grant was made by Henry de Montfort, whose interest in Wharram is documented between 1186 and 1198 (see below). He gave the brethren, in free alms, the whole of the watercourse that descended from Lesser Wharram (i.e. Wharram Percy) 'below the mills', and the right to make a dam three feet high to turn the whole of the watercourse from its old channel through the middle court of the grange, to the grange mills. The version in the Chronicle runs thus:

Extract C

Et Henricus de Montforth dedit nobis cursum totius aque que descendit de minore Wharroma subtus molendina, et ad stagnamentum faciendum tribus pedibus in altum, ad convertendam totam aquam ad nos de antiquo canali et per mediam curtem grangie nostre ad molendina nostra, et ad omnem utilitatem grangie nostre convertendam. (Bond 1867, 62)

This is the only record to suggest that the grange had more than one 'mill', i.e. more than one pair of millstones. If it had, both pairs could well have been housed in the same building, though each would have been driven by its own waterwheel (see Watts 2000, 39-40). The mills which the grange mills were said to be 'below', or downstream from, are discussed in the next section of this chapter.

Comparing Extracts A and C, and taking into account Burton's comment that Meaux never gained a mill by virtue of William Fossard I's original grant, it would appear that the Montfort family had an interest in the watercourse, an interest that blocked this part of the Fossard donation, and that they were unwilling to allow the monks to build a mill on the watercourse itself. The monks were therefore constrained to build their mill within the grange precincts, to one side of the stream, and by the grant recorded in Extract C were permitted to redirect the stream though the precincts to their mill. It is not clear whether the total redirection of the watercourse followed a period in which they had attempted to draw off some, but not all the water from the stream.

Robert de Turneham became lord of Wharram le Street after the death of William Fossard junior, in about 1195. The Chronicle tells us he was a close associate of King Richard I, and that he dispossessed the monks of their grange. His wardens ejected the lay brothers and servants from the grange, and pulled down various buildings,

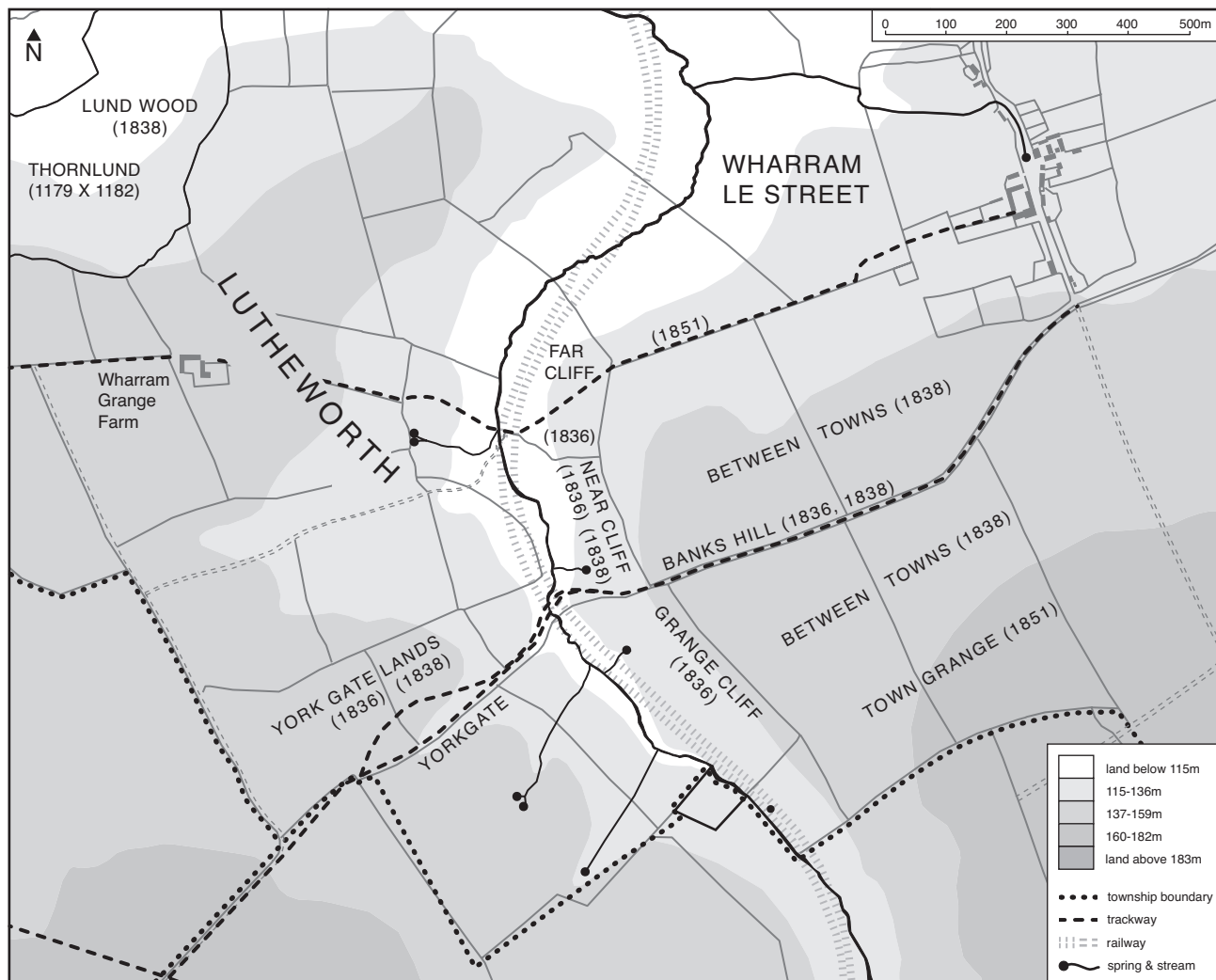


Fig. 4. Field names and trackways. (A. Deegan)

including the mill, in order to use the materials for buildings at Birdsall:

Extract D

Domos etiam, molendinum scilicet, magnum pistrinum et horreum unum pergrande, et reliqua edifica similiter asportaverunt; de quibus domos predicti Roberti apud Byrdsalliam construxerunt.

(Bond 1866, 291)

Immediately after the death of King Richard, however, he restored and quitclaimed the grange to the monks. The mill was presumably re-erected soon afterwards, though the only further reference to it in the Chronicle appears under the years 1396-9, when it was rebuilt: ‘*Molendinum ibidem de novo renovavit*’ (Bond 1868, 243).

The Montfort/Percy Mills

The mills above the grange mill, and above the stretch of the watercourse granted to Meaux by Henry de Montfort, were owned (or claimed) by Montfort, as the Cotton MS (though not the Chronicle: see Extract C), tells us:

Extract E

Henricus de Mumford dedit nobis in liberam elemosinam cursum totius aque que descendit de minore Wharrom’ subtus molendina que W de F de ipso tenuit sita super eandem aquam inter grangiam nostram et predictam Wharrom’ per mediam curtem ipsius grangie nostre ad molendina nostra et ad omnem utilitatem et aisiamenta eisdem grangie ita tamen quod molendina predicta detrimentum non habeant del le rereful aquarum et stagnamentum faciendum tribus pedibus in altum ad convertendam totam aquam ad nos de antiquo canali. Et Petrus filius Petri de Malo Lacu confirmavit nobis idem donum in puram elemosinam. Ac Robertus de Percy filius domini Percy quietamclamavit nobis totum ius et clameum quod ipse vel antecessores suis habuerunt in predicto aque ductu vel in ipsa aqua. Ita quod nec ipse nec heredes sui ipsam aquam a cursu quem tenet per medium grangie nostre trahere nec transvertere nec nobis aliquod gravamen vel disturbance in eadem facere possent imperpetuum.

(BL Cotton Vit. C. vi, f.43)

This record invites a number of questions about the location and ownership of these mills, some of which cannot be answered on the basis of the available documentary evidence alone. The stretch of watercourse granted to Meaux is described as lying between Wharram Percy (township) and the Wharram le Street grange. The course itself seems to have been in Wharram le Street, in view of the later confirmation of the grant by Peter son of Peter de Mauley, successor to the Fossards as tenant in chief. The mills above this stretch of water may have been located in either township: they were undoubtedly on or close to the boundary between the two vills. But what was the Montfort interest in the mills and the watercourse, who was 'W de F' who held them of Henry Montfort, and what was the interest of Robert de Percy who quitclaimed the watercourse?

The Montforts appear to have claimed substantial but undefined interests in 'Wharram' by 1177, when the Pipe Roll records that William de Percy owed the king 200 marks for the right of the land of Wharram against Robert de Montfort (*Pipe Roll Soc* 26 (1905), 78). Payments began in 1186, when Robert's name was superseded by that of Henry de Montfort; they were completed in 1198 (*Pipe Roll Soc* NS 9 (1932), 28). Sir Charles Clay believed the land in question was at Wharram Percy (*ETC* XI, 107-8), but the record does not say this.

The Montforts recorded in the Pipe Roll entries have been identified by Clay as the sons of Thurstan de Montfort. Their mother was Juliana, daughter of Geoffrey Murdac (*ETC* XI, 107-8). In 1208 another Thurstan, son of Henry de Montfort, the younger brother, claimed a moiety of the vill of Langton, adjoining Birdsall, against Eustace de Vescy, as his inheritance from his grandmother Juliana Murdac. He also laid claim to lands in the possession of Nicholas de Stuteville, including, again, lands in Langton (*ETC* IX, 66). The dispute with the Percys over Wharram may have been a further element in this series of claims.

The identification of the watercourse granted by Henry de Montfort in Extract C with part of the land for which William de Percy paid to have his right is indicated by a later record. The Chronicle says that Robert de Percy (great-grandson of William de Percy) claimed the monks' watercourse that came from South Wharram, and on account of this would frequently divert its course to the detriment of the brethren. In 1269-70, however, he allowed the monks to have the watercourse in peace again, and in addition bestowed on them a six-foot wide strip of land beside the wall of the grange, for the whole length of the wall:

Extract F

Interea, Robertus de Percy clamabat ductum aque nostre de Wharroma, que venit de Sowth Wharroma et transit per grangiam nostram. Propter quod, in quantum potuit, cursum ipsius aque pervertendo nos saepius gravare solebat. Sed tandem ductum ipsius aque nobis teneri quietum per chartam renovabat; et insuper sex pedes terre sue in latitudine, juxta murum grangie nostre, et in

longitudine quantum murum se in longum extendit, erogabat.

(Bond 1867, 147)

The equivalent extract in the Cotton MS ends: *et in longitudine quantum se extendit predictus murum iuxta terram suam* (BL Cotton Vit. C vi, f.43v). Extract E confirms that the quitclaim of Extract F relates to the Montfort grant by specifically linking the two. Therefore, the Montfort interest in the watercourse and, presumably, in the mills above it, passed to William de Percy before the end of the 12th century. This means that Burton's dating of the Montfort grant is likely to be wrong. He assigns it to the time of the eighth Abbot (1235-49). It may be that Burton was using the confirmation by Peter son of Peter de Mauley, and that it is this document that dates to the period 1235-49, rather than the original grant. The origins of the Montfort interest are considered further in the discussion of manorial interests in Wharram Percy.

As to the tenant of the mills in Extract E, no-one with the initials 'W de F' appears in the relevant Meaux records, and it may be that there is an error in transcription as well as in dating. The letters might stand for William Fossard, the 'de' being an error resulting from the word after 'F' also being 'de'. Alternatively, they might stand for William de Percy, with the letter 'F' being an error for 'P'. Both solutions seem unlikely, for various reasons. On the other hand they may, simply, refer to an unknown tenant who had no direct part in donations to Meaux.

The Percy resistance to the Abbey's diversion of the watercourse is intelligible in the context of their having paid the king 200 marks to uphold their right at Wharram against the Montforts who had evidently permitted that diversion. The Percys kept restoring the water to its original course by removing the monks' three foot dam. The Cotton version of Extract F implies that the watercourse divided the grange from the lands of Robert de Percy, and that the wall of the grange ran along one side of the stream for part of its course. The strip of land six feet wide along the outside of the grange wall is best interpreted as the bed of the original watercourse, given over at the end of the dispute to prevent any recurrence of the claim.

Finally, it seems probable that the dam turning the water into the grange was not far downstream from the Montfort/Percy mills. This is implied by the condition of the Montfort grant that the work should not cause *le rereful aquarum* (Extract E) or backwash: the backing up of water in the tailrace of the mill, preventing the waterwheel from turning. Had the Montfort mills been a considerable distance upstream from the grange, this would not have been a danger.

The St Leonard's Hospital Mills

The time of the eighth abbot, Michael (1235-49), saw the acquisition by Meaux of additional water-mills. Abbot Michael took to farm from St Leonard's Hospital, York, two water-mills and the sites of two other water-mills,

with ponds, at an annual rent of four marks. The Chronicle says that St Leonard's had acquired these by the gift of William Fossard (neither senior nor junior is specified), and so they, too, were in existence in the later 12th century:

Extract G

Idem abbas noster Michael cepit ad feodi firmam de magistro hospitalis Sancti Leonardi Eboracensis duo molendina aquatica cum sitibus duorum aliorum molendinorum cum stagnis apud Wharromam que habuerunt ex dono Willelmi Fossard; reddendo sibi quatuor marcas annuatim
(Bond 1867, 62)

The continued payment of the 4 marks, or 53 shillings and fourpence, is recorded in a St Leonard's extent and rental of 1287 (Staffordshire Record Office D30 QQ1). But between then and the death of Roger, thirteenth abbot (1286-1310), Meaux sought to give up these mills altogether, because they were running them at a loss. Eventually they agreed to keep them, after the rent was reduced from four marks to three, though they were still, evidently, a considerable liability rather than an asset (Bond 1867, 224).

The location of these mills is not indicated in the documents. They may have stood downstream from the grange, rather than above it, and the reference to 'millponds' (plural) indicates there were two separate, successive complexes. They were probably the main mills used by the manorial tenants of Wharram le Street, given Burton's further description of them: *Interim vero acquisivimus molendina de Wharrom' cum stagnis eorundem de fratribus hospitalis Sancti Leonardi* (BL Cotton Vit. C. vi, f.116v).

Schirreve Mill

Finally, a mill called 'Schirreve' is mentioned in a grant made between 1197 and 1210. William de Barkethorpe gave to Meaux, as part of an exchange, all his lands of Hallgarth next to a mill called Schyrreve:

Extract H

Willelmusque de Barkethorpia dedit nobis totam terram suam de Halgarth iuxta molendinum quod dicitur Schyrreve; et totam terram quam habuit a via que ducit [ad] Eboracum et vergit per Crandale usque ad divisam minoris Wharrome et a ductu aque usque ad Hevedland Sancti Johannis de Ierosolyma...
(Bond 1866, 321-2)

It is mentioned again in another Meaux grant of land:

Extract I

...in pendente illo in Wharrom' ultra molendinum quod appellatur Schirreve versus supercilium montis usque ad divisam minoris Wharrom' et a superiore supercilio montis usque ad filum aque in valle...
(BL Cotton Vit. C. vi, f.43)

If Hallgarth lay in or adjacent to the village settlement of Wharram le Street, then the mill is likely to have been a windmill or horsemill, rather than water-mill. The land granted with Hallgarth in Extract H is presumably that named 'Town Grange' in the mid-19th century (see Fig. 4). Two of the open-field furlongs that survived into the 16th century were called 'The Furlong between the Grange and the Town' and 'Mill Hedge Furlong' (Beresford and Hurst 1990, 97).

The references to Shirreve mill, presumably one that was built or once owned by a sheriff, are a reminder that water was not the only source of power for mills. Wind and horse power will have been far more important in the other townships of Wharram Percy parish, townships subject to the control of different manorial interests from those outlined in this volume. The only reference found to a medieval mill in those townships is, however, one for Thixendale (pers. comm. M.W. Beresford). It was a windmill, granted to St Mary's Abbey, York in 1383 (Beresford and Hurst 1990, 98-9).

Manorial interests and mills in Wharram Percy township

Manorial interests

Information on Wharram Percy's manorial descent prior to the mid-13th century is very sketchy; and there is nothing on its watercourses or mills until the 14th century, when it was wholly in the hands of the Percy family. At the Conquest its estate composition was more complicated than that of Wharram le Street: there were two manors, held by Lagmann and Karli, which were together assessed at eight carucates. There was, in addition, another carucate held by Ketilbjorn. He is almost certainly the same man who held Wharram le Street as a single manor, and Roffe has suggested that this carucate, recorded in the form of a sokeland entry (i.e. belonging to another manor), could well have belonged to one of Ketilbjorn's manors, which included Birdsall as well as Wharram le Street (*Wharram, VIII*, 1-3).

When first recorded, in 1242-3, the tenancy-in-chief of 'Lesser Wharram' was held by the Chamberlain family, who had probably been enfeoffed in the manor in the later 12th century (*Wharram VIII*, 3). It was one that they finally relinquished in 1254, when Henry the Chamberlain quitclaimed his rights in eight and a half carucates to Peter de Percy. Thereafter, the Percy family held the manor directly from the king. Before then, they had been its mesne tenants, probably since at least 1229 (*Wharram VIII*, 3). This mesne tenancy does not, however, appear to have been their sole interest in Wharram, given their dispute with the Montforts at the end of the 12th century.

Percy interests above and beyond the mesne tenancy of the manor were already in place in the late 12th century, as evidenced by William de Percy's payment to

the king of 200 marks, in instalments, for his right against Robert and Henry de Montfort (see above). These payments should be seen in the context of other Montfort claims in neighbouring villas such as Langton. In 1210 Nicholas de Stuteville, for example, paid the king 300 marks to maintain his father's charter relating to lands claimed by Thurstan de Montfort, Henry's son (*EYC IX*, 66). The size of these payments suggests that the lands in question were valuable. It is tempting to identify the disputed lands at Wharram with the carucate of sokeland recorded at the Conquest, a suggestion in line with that made by Professor Beresford in an earlier volume (*Wharram I*, 25 note 116).

Peter de Percy died in 1267. His son Robert attempted to secure the descent of his estate by taking a life interest and entailing it with successive remainders to his son Peter, to Peter's heirs, and then to his kinsman Henry de Percy, lord of Spofforth (*Cal IPM XII*, 182). The younger Peter pre-deceased his father in about 1315 (*Cal IPM VI*, 83); and when Robert himself died in 1321, it passed to Peter's daughter Eustacia, who was subsequently married to Walter de Heslerton. Walter died in 1349, and the estate passed to his son, also Walter (*Cal IPM IX*, 431-2). The younger Walter died in 1367 without heirs. His widow Eufemia then held a third of the estate in dower. The other two-thirds, and the reversion of the dower third, passed to Henry de Percy of Spofforth - though not before the king's escheator had argued that the original entail was unlicensed (*Cal IPM XII*, 181-2, 221-2). Wharram Percy was sold by the Percys of Spofforth to the Hiltons of Hylton Castle, near Sunderland, at the beginning of the 15th century (*Wharram I*, 20).

Wharram Percy Mills

Wharram Percy contained two mills, first recorded in the Inquisition *post mortem* of Robert de Percy, taken in 1323. At that time, both were out of use and therefore without profit:

Extract J

Et dicunt quod solebant esse ibidem duo molendina aquatica que sunt totaliter deruta, ita quod nullus proficius potest levare.
(PRO C134/75/15 m.3)

The arable lands recorded in the same inquisition, 27 bovates in demesne, four held by a tenant at will and 37 held by the customary tenants, make up the whole eight and a half carucates quitclaimed by the Chamberlains. Of the demesne bovates, only a third were under cultivation at the time of the inquisition.

In 1368, after the death of Walter de Heslerton junior, one corn mill was again working at Wharram Percy, rented out along with the demesne lands to the tenants at will and *nativi*, all returning a total of £20 a year (PRO C135/198/12). The assignment of dower to Walter's widow, Eufemia, provides a little more detail, in that she had 'a third part of the profit of the watermill there... a third part of the profit of a pond called "Milndam" on the north side of the town; a third part of the profit of a pond

on the south side of the town, in common' (*Cal IPM XII*, 183). These two ponds have been interpreted as the ponds of the two mills that had gone out of use by 1323 (*Wharram I*, 12), one mill having been rebuilt by 1368. The assignment of dower implies that it was the northern one that returned to use, and it is presumably this one which is recorded in an Inquisition *post mortem* of Sir William Hilton, in 1436:

Extract K

Et est ibidem unum moledinum aquaticum ad blada quod valet per annum ultra reprisas xiijs iiij
(PRO C139/80/22)

One of these ponds is, in fact, recorded slightly earlier than the mills themselves. In 1320 Robert de Percy quitclaimed to his son Henry, rector of Wharram Percy, the park and the advowson of the church, along with the pool (*stagnum*) that Master William de Skeldergate, former rector, had held of him (Bodleian Library, Dodsworth MS 76, f.162). Henry, presumably younger brother of Peter, had been presented as rector by his father in 1307/8 (Lawrance 1985, 69). When he, in turn, was licensed by the king in 1322 to grant the advowson to Geoffrey le Scrope, Henry included with it eight acres of land, six acres of wood and the pool of the mill (*Cal PR* 1321-4, 136). Geoffrey le Scrope was in turn licensed in 1326/7 to grant in free alms a wood and a fishery at Wharram Percy, with the advowson of the church to the keeper and canons of Haltemprice Priory (*Cal PR* 1327-30, 14). These three documents evidently refer to the same lands and interests.

In an earlier volume it was suggested that the pond granted to Haltemprice was the excavated pond, at the southern end of the village (*Wharram I*, 11, 21, 24). The above documents could, however, be interpreted as referring to the north pond, which was evidently the one that continued to power a mill in the later 14th and 15th centuries. The 6 acres of wood and the 8 acres of land of the Scrope grant were presumably part of the (?former) park granted to Henry de Percy. The valley to the east and north-east of the North Manor has been proposed by R.T. Porter as the location of that park (*Wharram IX*, 4). On this basis the fishery granted to Haltemprice could have been the millpond in or adjacent to that park.

The grant made by Robert de Percy to his son Henry conflicted with the entail of the manor and advowson that Robert had made earlier, in about 1298, in favour of Henry's brother Peter (*Cal IPM XII*, 182). This entail accounts for the later claim by Eufemia, widow of Walter de Heslerton, to a third part of the profits of both ponds, as if both still belonged to the manor. It also accounts for the claim that, when he died in 1368, Henry de Percy of Spofforth had held the advowson of Wharram Percy church, despite its earlier transfer to the canons of Haltemprice (*Cal IPM XII*, 222).

A more fundamental question is why Wharram Percy had contained two mill complexes - on different sites, on the northern and southern sides of the vill - in the first place. This matter is considered further in Chapter 3.

2 The Field Evidence

by A. Oswald

Introduction

As part of the research carried out in preparing this volume, the course of the Wharram stream was investigated over a distance of just over 4kms (2½ miles), between its southernmost springs and the point at which it crosses the northern boundary of Wharram le Street township. Not all the watercourse is readily amenable to field survey: several stretches north of the village have been drastically modified to make way for the Malton and Driffield railway, while much of the remainder is overgrown with dense hawthorn and blackthorn scrub. The fieldwork was not carried out in a single campaign, but rather as an evolving dialogue between different theories and research techniques, in other words, in a manner very much in keeping with the rest of the Wharram Research Project. One strand of the fieldwork was carried out by Ann Clark and Stuart Wrathmell, with assistance from Martin and Sue Watts. The other was undertaken by English Heritage, as an extension of the detailed re-examination completed in 2002 of all the earthworks at Wharram Percy (Oswald 2004).

The fieldwork by Clark and Wrathmell, which was mostly undertaken in the summer of 2002 when the scrub along the watercourse was at its most dense, succeeded in identifying two convincing dams, but not in correlating these satisfactorily with what appeared to be a greater number of mills referred to in the documents. The English Heritage team was, therefore, invited to undertake a more detailed investigation. Their work led to the identification of a further two dams, and to a more detailed correlation between the documents and the field evidence, particularly in respect of the monastic grange mill and that referred to in Chapter 1 as the Montfort/Percy mill. For the sake of completeness, a plan of this particular area, at the same scale as the new plan of village earthworks (1:1,000) was surveyed by English Heritage in October 2003, effectively replacing a more schematic plan surveyed in the previous year (Whittingham 2002).

In total, five certain or very probable mill sites (A to E) have been identified (Fig. 5), along with several other possible candidates. Beyond this, the interactive process of research has resulted in a greatly improved contextual understanding of the excavated mill on the south side of the village and an exceptionally good correlation between the documentary and field evidence. This said, the field evidence for all possible sites is presented here, regardless of the existence of supporting documentary evidence, for despite the proven longevity of some sites, it would be unwise to assume that other mills may not have come and gone without making an appearance in the documents.

A: Wharram Percy's southern mill (SE 8584 6414)

English Heritage's comprehensive re-investigation of the earthworks of Wharram Percy in 2002 necessarily

included a re-examination of the pond south of the church (Site A on Fig. 5), the site of the excavations which are the main subject of this volume (Oswald 2004). Following the excavations, the pond was cleaned out and the dam reconstructed (minus a sheepwash built into the bank at some point between 1850 and 1888 and subsequently modified), to create an ornamental pool and wildlife habitat. The earthwork survey by English Heritage was undertaken more than two decades after the reconstruction of the excavated dam, so there was limited potential for any dramatic advance in understanding. Although the reconstructed dam approximately replicates the earlier earthwork, comparison with the survey undertaken by R.T. Porter prior to the excavations indicates that the reconstruction differs slightly in plan and extent (Figs 6-7).

The sinuous and irregular plan of the pond, in common with most medieval millponds and fishponds of vernacular origin and most of those near Wharram Percy, seems to have owed more to the form of the natural micro-topography than to formal design. A series of historical maps depict the pond: William Dykes' estate map of 1836, the Ordnance Survey First Edition 6-inch scale map surveyed in 1850-51, the First Edition 25-inch scale map surveyed in 1888 (after the addition of the sheepwash) and the Second Edition revised in 1909 (after the extension of the sheepwash) (Dykes 1836; Ordnance Survey 1854; 1890; 1910). All these concur in showing an overflow channel sited, quite typically, at the end of the dam (in this case the eastern end), rather than at its centre where the modern concrete culvert is now sited. There is nothing to indicate that the 19th-century arrangement did not replicate an earlier arrangement. The excavations demonstrated that the dam was faced with sandstone blocks in the late 18th century and the survival of the pond throughout the post-medieval period suggests that it may have been subject to many episodes of repair and refurbishment.

The maps also concur that in the 19th century, the pond was more than twice the present length of the main body of standing water, at the south extending to within 50m of the southernmost springs. The former extent of the pond can be accurately determined by relating the contour model of the terrain to the historical maps. From this, it can also be calculated that the water level would have come nearly to the top of the modern reconstructed dam, or nearly a metre higher than at present. The earlier mill dams, being 1.2m lower, must have retained a pond that stretched no further south than the modern sluice. This earlier phase may account for the bulbous plan of the northern end of the pond, greater width perhaps having compensated for shallower depth. The clay dams that initially retained the pond, though much smaller than the massive earthwork eventually built, were similar in size to all the other dams identified in the vicinity of Wharram Percy. This consistently small size, together with the fact that the Wharram stream provides a fairly constant flow of water all year round, suggests that the regulation of the pressure onto the wheel was a more important

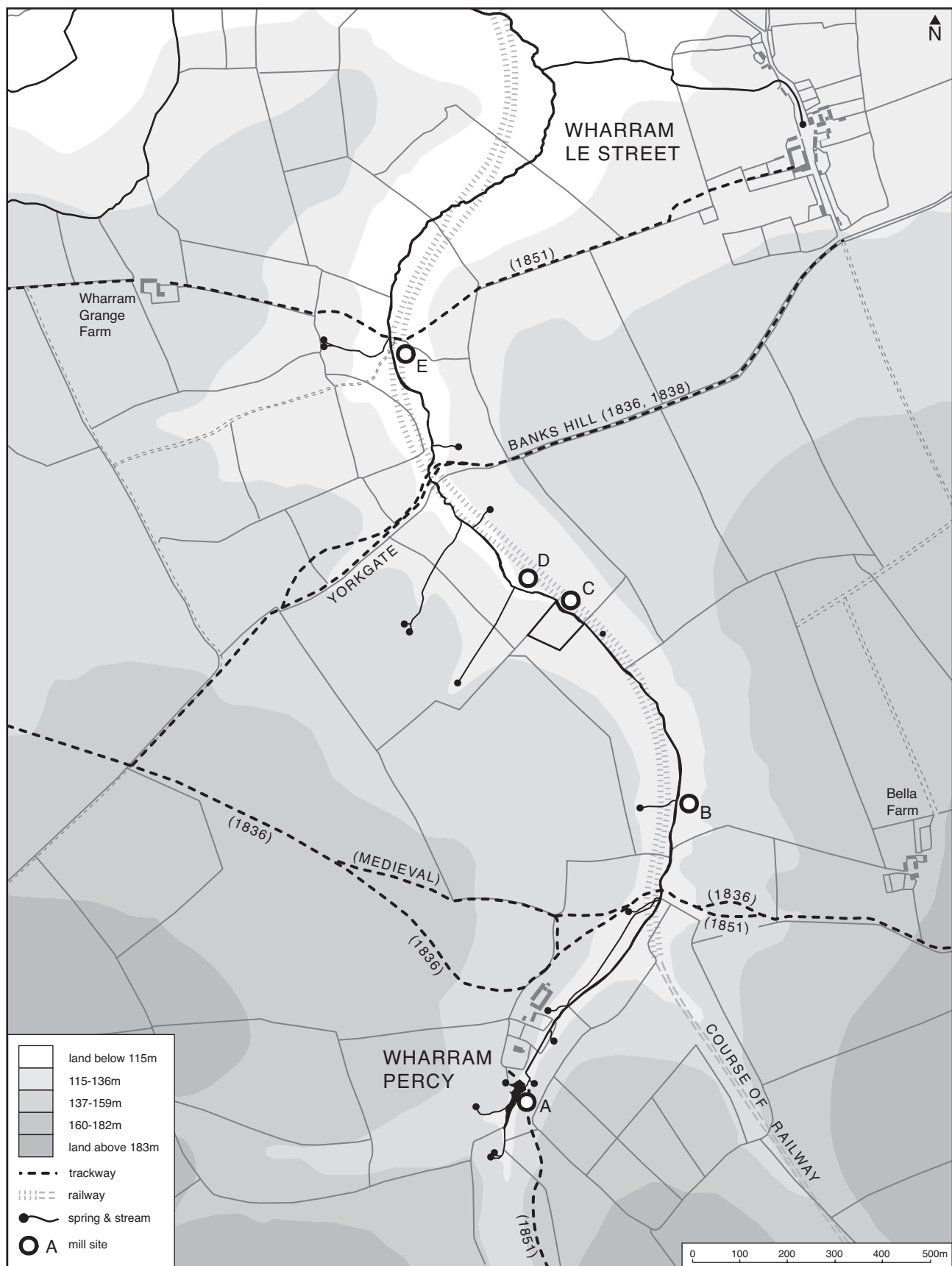
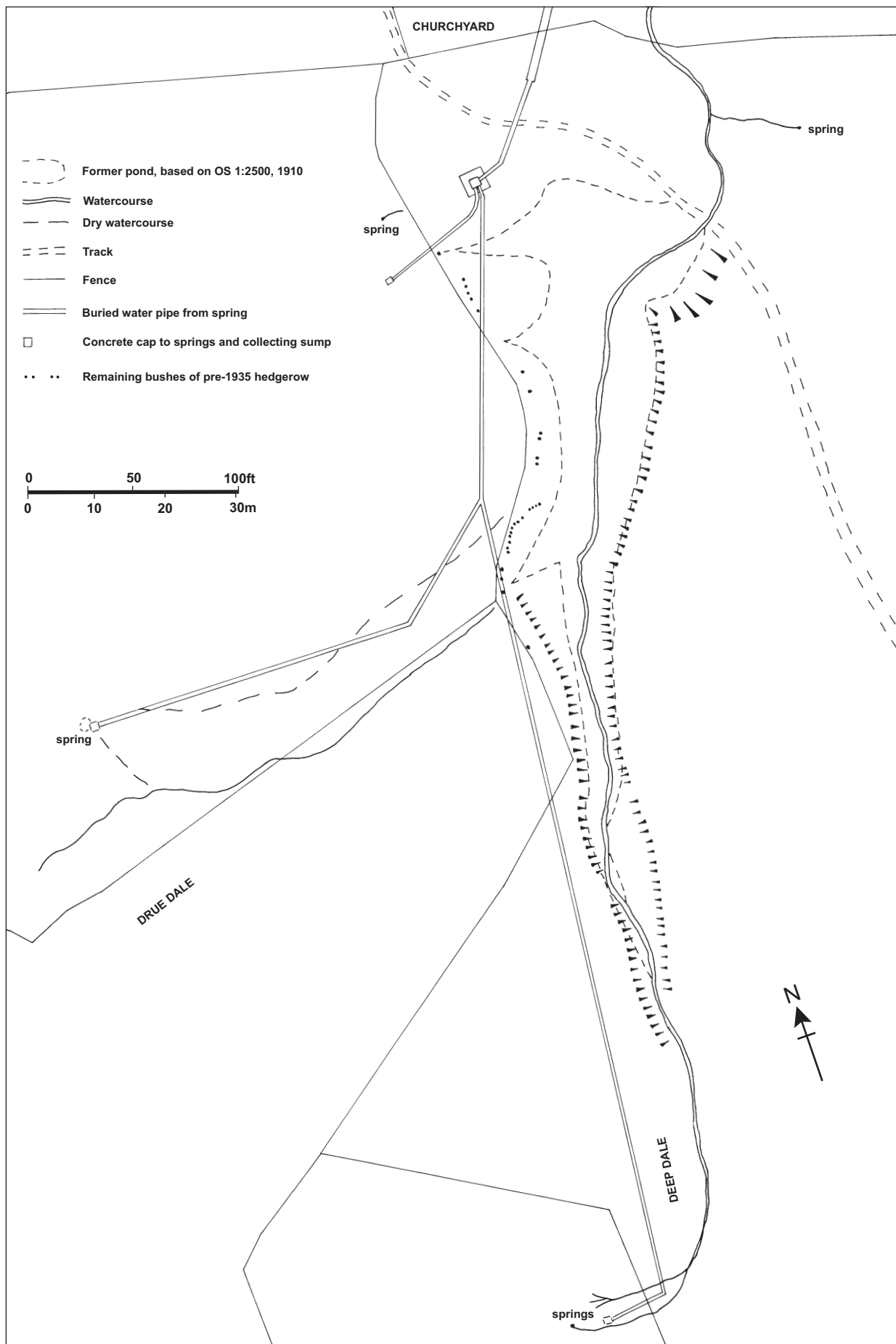


Fig. 5. Location of mill sites. (A. Deegan)



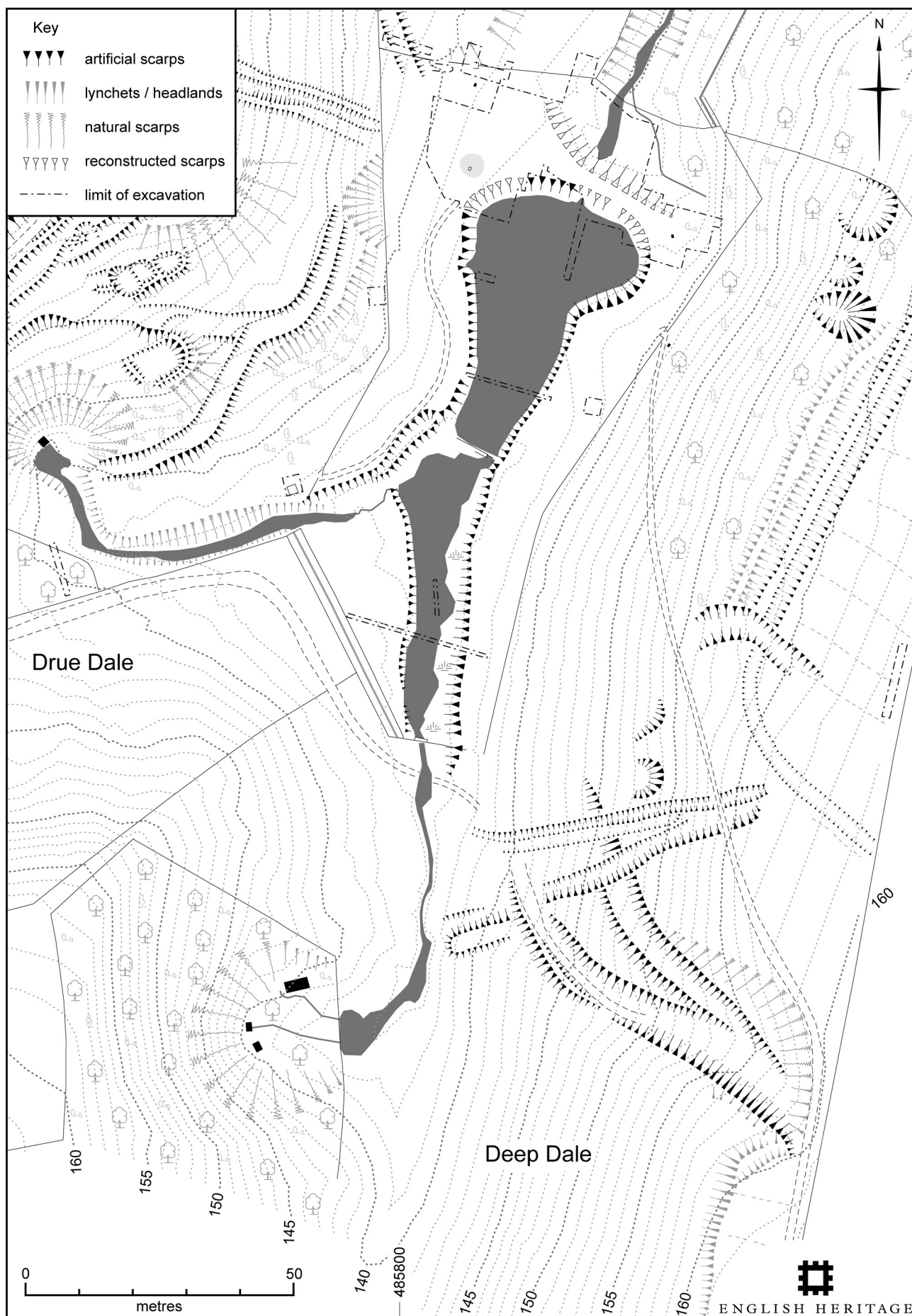


Fig. 7. Reconstruction of dam and pond. (A. Oswald)

consideration than the creation of a large reservoir for the summer months.

The impact of the creation of the millpond and its subsequent expansion on pre-existing routes, and *vice versa*, is an issue that has not been addressed in previous discussions. The footpath now followed by the Wolds Way has long been interpreted as the principal approach to the village from the south in the medieval period. This footpath obliquely descends the eastern side of the valley, running almost straight from the crest of the escarpment to the eastern end of the pond (Fig. 7), at which point it makes use of the top of the dam to cross to the other side of the valley. The track was marked on the Ordnance Survey First Edition 6-inch scale map (Ordnance Survey 1854). It is not shown on the 1836 estate map, but is probably the route shown on Greenwood's map surveyed between 1815 and 1817, although his depiction is necessarily more schematic (Dykes 1836; Greenwood 1818). Clearly, then, the route was in use in the 19th century. However, whatever use the route experienced, only negligible earthworks developed, indicating that it was not used either intensively or for a prolonged period. From the evidence presented below, it seems unlikely to have been used until after the creation of the larger dam that retained the later pond.

Along the valley side slightly further to the south from the footpath are two deeply hollowed and terraced tracks which make use of a natural coomb to descend the slope in a steep curve. The greater size of these earthworks compared to the minor path previously interpreted as the main approach suggests that this was a much more intensively used route, presumably in the medieval period and conceivably earlier. Although part of the upper track has been lost through quarrying and erosion, the curve of the lower suggests that both would have reached the level ground of the valley floor near the former southern end of the enlarged pond. Prior to the enlargement of the pond, the route may well have crossed the stream nearer the point at which the watercourses from the two major springs intersect, that is, near the modern timber sluice that defines its southernmost limit today. Once the enlargement of the pond made this route impassable, the route might have been forced to follow the level ground along the pond's eastern edge for some 100m to the eastern end of the dam, where, like the later footpath, it could have passed across the top of the dam. Alternatively, travellers may have been forced to ford the stream at the extreme southern end of the pond, near the site of the modern ford, and then to reach the village via a track which is no longer discernible as an earthwork.

Possible sites within the village (SE 8586 6421 and SE 8594 6431)

The English Heritage investigation identified two other possible dam sites within the limits of the village, which would also have been well placed in relation to the natural topography, but for which there is no supporting documentary evidence and at best less convincing earthwork evidence. At the northern end of the deep,

steep-sided section of the stream channel immediately to the east of the churchyard, only 80m north of Site A, is an earthwork which might be interpreted as the eroded stump of an earthen dam (Fig. 8A). A bank, some 8m long, 3m wide and up to 1.5m above the present height of the stream at its highest point, projects from the eastern side of the valley. The height of the bank diminishes sharply as it approaches the stream and there is only the slightest possible trace of a corresponding stump on the opposite bank, but none of this is inconsistent with the effects of water erosion. The contour model of the terrain indicates that a dam sited at this point could have retained a pond extending almost to the foot of the dam at Site A, representing a considerable volume of water, despite the relatively small size of the earthwork. The eastern bank of the stream upstream from the possible dam appears to be masked by a series of modern tips, which make it difficult to judge how much water a dam at this point could actually have retained. Some doubt remains, therefore, that the earthwork is genuinely a dam.

The pinch-point in the valley sides adjacent to the pumping station built in 1935 is an equally suitable location for a dam from a topographic point of view. At this point, the northern end of the scallop eroded deep into the western valley side by the spring below Wharram Percy Cottages coincides with the tip of a low spur formed by natural slumping on the eastern side of the valley (Fig. 8A). Ground modelling indicates that the construction of a barrier only a few metres long could have created a sizeable pond in the level area scoured out by the spring. Although there is no visible trace of any actual earthwork, water erosion is often sufficiently severe to leave only the most fragmentary earthwork evidence.

The alleged site of Wharram Percy's northern mill (SE 8611 6453)

In 1368 the pond that was then apparently the site of the village's sole mill, was described as lying 'on the northern side of the town' (although the Latin '*villa*' could alternatively be translated as 'township'). It was inferred from this reference that the mill dam must have lain in the vicinity of the 19th-century railway bridge (Fig. 8B) and therefore that it must have been entirely destroyed by the construction of the railway cutting (Beresford and Hurst 1990, 67). This superficially attractive conclusion was long accepted, in part because it is difficult to prove either way, but the circumstantial evidence gleaned by the English Heritage investigation tends to suggest that it is unlikely that a dam would have been built in this location.

The identification of any possible earthwork evidence for a dam in this area is hampered not only by the railway cutting itself, which affects the natural course of the stream for c. 300m, but also by associated earth-moving. North of the railway bridge, the original ground surface of the valley floor eastwards from the edge of the cutting has been concealed by the dumping of spoil, presumably from the Burdale Tunnel, in a series of long 'finger

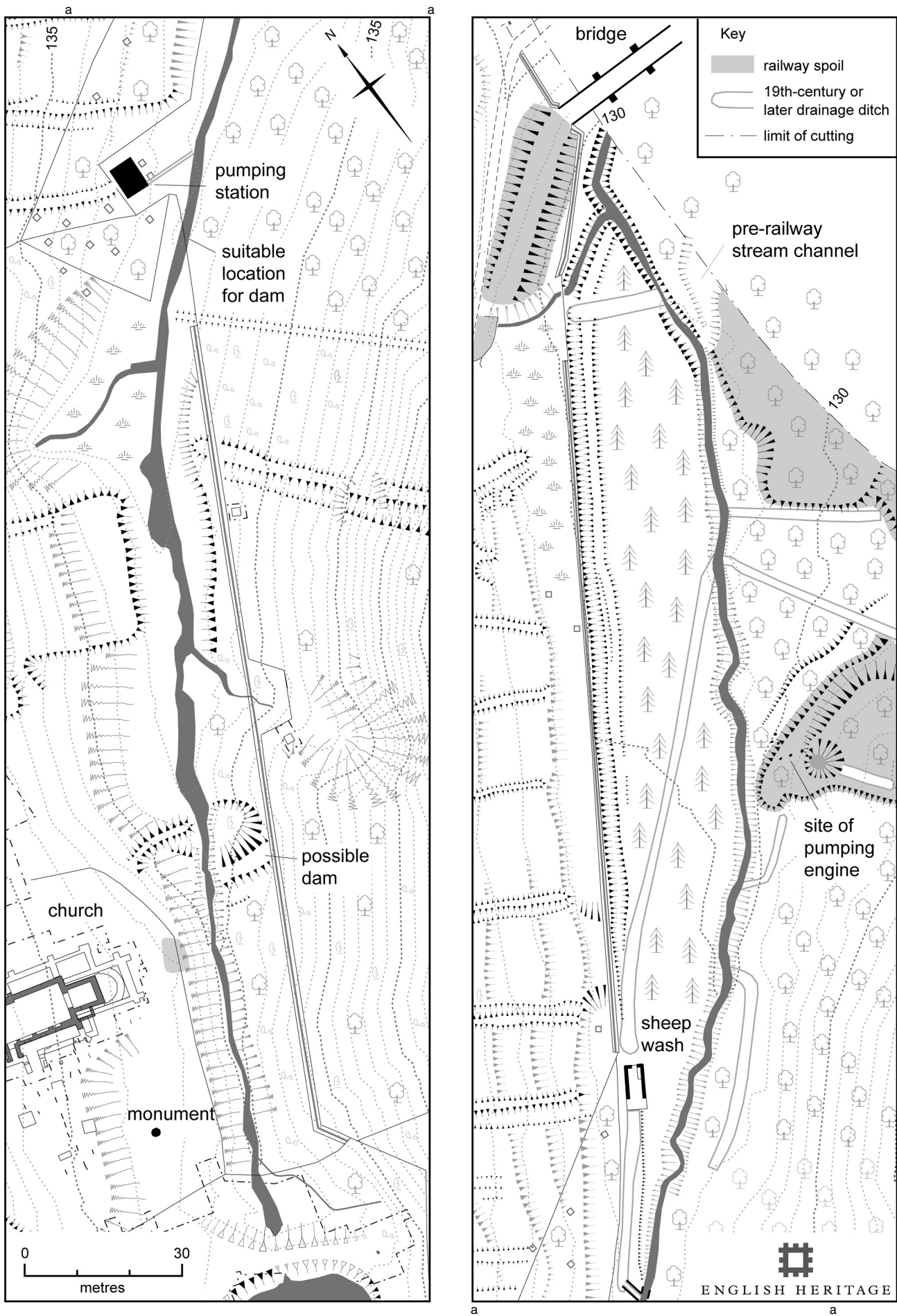


Fig. 8. Further possible dam sites north of the pond shown on Figure 7. (A. Oswald)

dumps' up to c. 1.5m high. To the west of the cutting, dense scrub obscures the valley side. The more easterly of the ramps up to the railway bridge, which at first seems an attractive potential candidate for a modified dam, can be seen on closer inspection to overlie the finger dumps. Large-scale surveys of the proposed route of the railway made in 1845 give no hint of the existence of any earthwork, though they record other minor details of potential importance to the construction of the railway (Bampton and Dykes 1845, plan 5; Birkinshaw and Dickens 1845).

The investigation in 2002 assumed from the outset that on the Wharram stream, as is normally the case elsewhere, the natural micro-topography would be an important influence on the choice of location for dams. Even taking into account the effects of the railway cutting and associated spoil dumping, there is no evidence that there were ever any pronounced 'pinch-points' in this stretch of the valley, which argues against the theory that the railway was responsible for the destruction of the site of any mill. Despite the effects of the earth-moving, it is still possible to gain a fair impression of the earlier lie of the natural land-surface through ground modelling. The volume of the stream channel itself, as it approaches the railway cutting, is relatively small and, if anything, has only increased since the medieval period. The rest of the valley floor would have been relatively level and broad compared to the location of the other dams identified in the survey. Therefore, in such a location, the creation of a body of water of a comparable size to that created by the other dams would have required a relatively long earthwork, though perhaps one of no great height, which would have flooded a broad expanse of the valley floor. There is indeed some evidence which might support the theory that a large area of this section of the valley floor was formerly more boggy than it is today. The eastern boundaries of the crofts of the village's eastern row terminate on the line of a scarp which probably supported a hedge or fenceline, but which seems to have originated as the lowermost of a series of lynchets produced by earlier cultivation on this slope. The interval of up to 35m between the stream and the lynchet/croft tails, especially in the context of the evident lack of space to accommodate regular crofts, hints that the valley floor might have been deliberately avoided. Although the valley floor is now dry, support for the idea that the ground was once much wetter is also provided by the 19th-century maps (Dykes 1836; Bampton and Dykes 1845, plan 5; Birkinshaw and Dickens 1845; Ordnance Survey 1854; 1890). All these, surveyed before the construction of the extant concrete sheep wash c. 1927, depict the ditch that follows the western boundary of Nut Wood as what appears to be a major drainage channel rather than simply a field boundary. Although the broad, shallow channel was evidently recut and diverted when the concrete sheep wash was constructed, it still retains a body of gently flowing water. Its straight, regular course suggests that it may have been constructed in the late 18th century, when Nut Wood and the adjacent field boundary

were also perhaps created. Its existence may well reflect the fact that the valley floor was previously boggy and in need of 'improvement'. Nevertheless, this does not constitute strong evidence that the valley floor was actually flooded at any stage.

The existence of a route across the valley bottom constitutes some of the strongest circumstantial evidence for a dam in this location, for this coincidence can be demonstrated in at least one other instance (see Site E). The maps made prior to the construction of the railway cutting indicate that until that time, the main road from the east crossed the stream immediately north of the timber railway bridge, on the line of the present footpath. The new survey of the village earthworks adds weight to the theory that there was a route that directly crossed the valley at this point long before, perhaps as early as the Iron Age. If the putative millpond was indeed a very small body of water entirely confined within the narrow channel of the stream, which seems unlikely to have been sufficient, it could easily have been crossed via a bridge. If, however, a larger earthwork were necessary, as proposed above, the area occupied by the pond may well have been large enough to influence the course of the route, as was evidently the case with the southern pond, but there is no sign that this was the case. The contrary argument, that a dam was sited on the line of a pre-existing route in order to allow its continued use, cannot be categorically ruled out, but runs contrary to what slight hints are offered by the surviving earthworks of the road.

B: The newly-discovered northern mill SE 8616 6477

The English Heritage investigation in 2002 identified what appears to be a fairly well-preserved remnant of a small earthen dam 240m downstream of the alleged site described above, beyond the area affected by the railway cutting (Site B on Fig. 5). The site also lies beyond the limits of the area surveyed in detail in 2002 and, due to the dense undergrowth, no further measured survey was undertaken in 2003. This dam could plausibly be equated with the northern mill recorded in 1368 as lying on the northern side of the village, discussed above. The probable dam comprises a bank c. 1m high projecting from the western side of the stream channel, with possible traces of an overflow channel at its western end. Most importantly, the probable dam is sited at a natural 'pinch-point' in the topography of the valley sides. As a result, with a length of no more than c. 9m, it could have retained a significant body of water, of similar proportions to that created by the early phases of the dam at Site A and the other dams identified.

C: The Montfort/Percy mill SE 8593 6513

Although the earthwork remains of this dam are entirely convincing in their own right, the location of the mill at Site C (Fig. 5) was initially predicted in relation to that at Site D on the basis of documentary evidence. In his grant to Meaux Abbey, Henry de Montfort permitted the construction of a dam no more than three feet high, in order to prevent the flooding of his own mill upstream

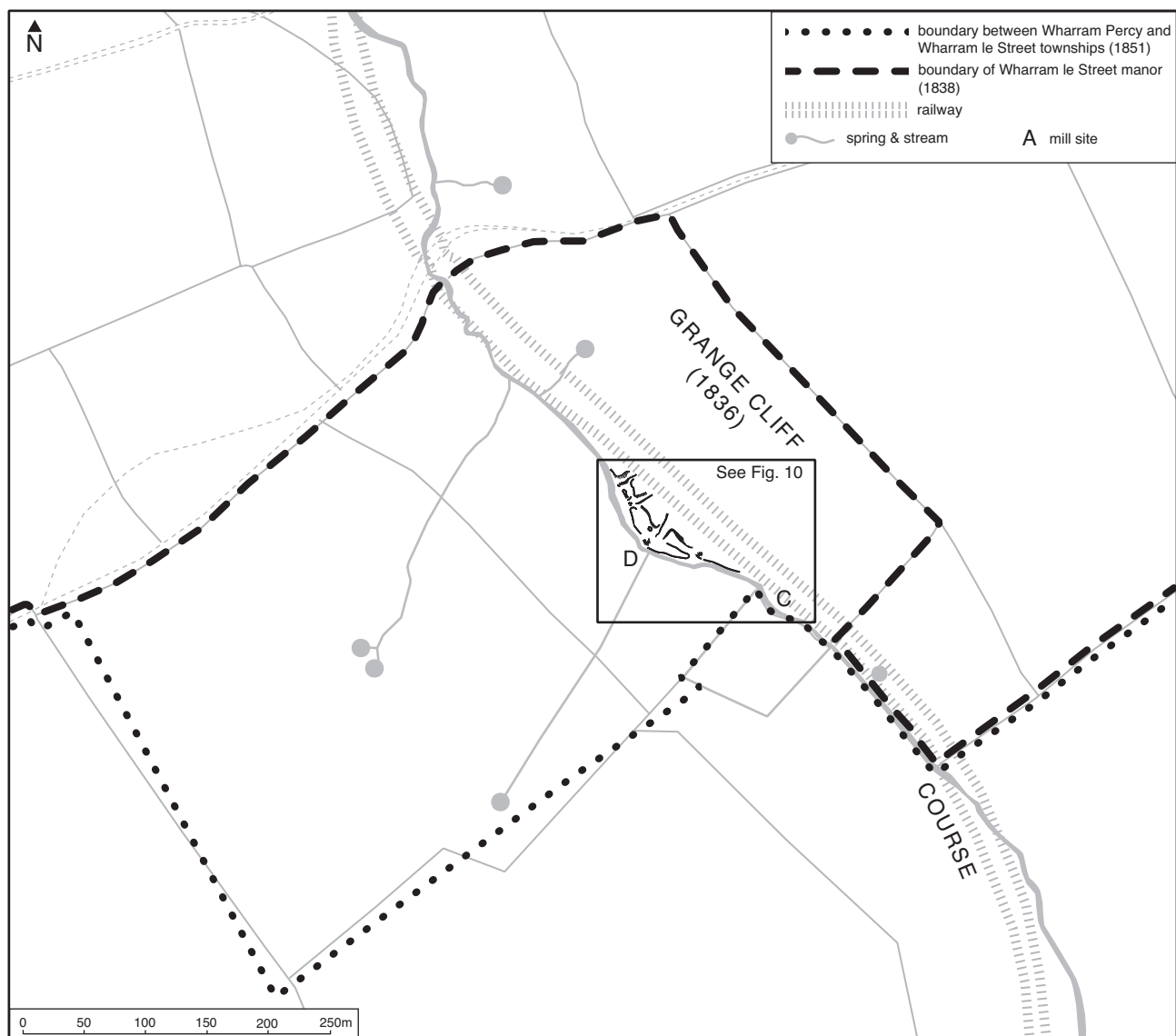


Fig. 9. Location of mill sites in relation to township boundaries. (A. Deegan)

(see Ch.1). The identification of D as the site of the grange mill, and in particular the inference of the likely site of a dam designed to divert the stream into the grange millpond, offered a predictive model for the location of de Montfort's mill which led immediately to its discovery. Subsequent modelling of the topography in the immediate vicinity confirmed that the upstream mill was sited *c.* 1.2m higher than the diversionary dam and would therefore have lain *c.* 15m beyond the flooding caused by the grange's dam (Figs 9-11).

The dam at Site C is almost identical in form to that at Site B: a straight earthen bank originally *c.* 15m long and 1m high. The earthwork has been breached by the stream at its south-western end, causing an abrupt deviation in the current watercourse. Typically, this pattern occurs where water erodes and eventually bursts through a weak point in the dam, such as the millrace itself or an overflow channel. Since there is no evidence for a second channel, the breach may well equate to the position of the millrace, so any structure associated with the mill seems likely to

have stood at the southern end of the dam. It is uncertain whether it stood on top of the dam itself, or on the bank of the stream, but the latter would presumably have been more secure.

D: The mill of Meaux Abbey's grange SE 8583 6519

Downslope from the former Wharram Station (Fig. 10) is a more complex area of earthworks (Site D on Fig. 5), which tallies so well in various respects with the documentary evidence that it can be interpreted with confidence as the site of the mill of the grange of Meaux Abbey (Figs 9-11). Due to the extensive disturbance caused by construction of the railway, and quarrying immediately beyond that to the north-east, what can be detected as earthworks today almost certainly only represents the westernmost fringe of the grange complex; its core must have been destroyed or concealed.

The earthworks of the mill site appear to have been enclosed on three sides by a robbed-out wall, now surviving only as a low bank, which presumably

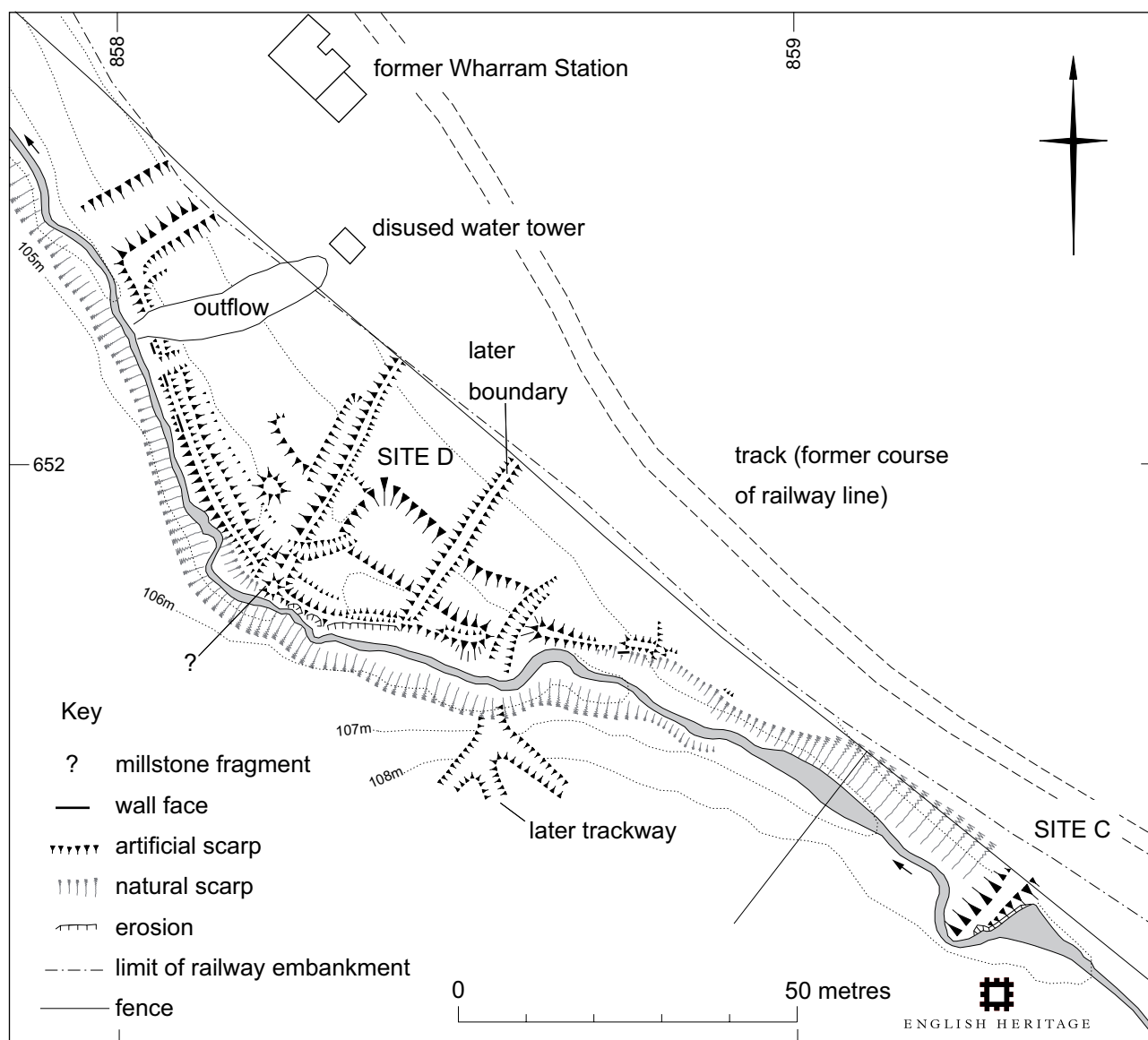


Fig. 10. Mill sites C and D. (A. Oswald)

represents a section of the precinct boundary surrounding the *curia* of the grange. The boundary runs straight, except for a single obtuse angle change, for 110m along the eastern edge of the stream, turning at right angles away from the stream to the north-east at each end. This conceivably defined a 'salient' down to the stream from the main part of the grange. In several places along the stream edge, erosion has exposed short sections of the outer face of the underlying wall, which stands up to three courses high. All the visible stones are large, squared blocks, of higher quality than any other medieval wall-face exposed on the surface at Wharram, with the obvious exception of the church. At the north, the section of the bank running away from the stream is accompanied by a broad external ditch; the north-eastern ends of both features are buried beneath the 19th-century railway embankment. At the south, there is only the slightest earthwork trace of a turn to the north-east; geophysical survey has been of no assistance in tracing its course (Whittingham 2002).

Within the supposed precinct wall lies a sub-rectangular pond, now dry except in exceptionally wet weather, some 30m long by a maximum of 12m wide. A boundary bank, which is one of the clearest features detected by the geophysical survey, runs across the middle of the pond and is likely to be post-medieval. Unlike the other millponds, which were formed by throwing up earthen banks, this pond is cut down into the valley floor to a maximum depth of 0.5m (disregarding the likely depth of silt), the resulting spoil apparently being used to raise the surrounding ground level only slightly. The unusual form of the pond in the context of Wharram, in itself, suggests unusual circumstances surrounding its construction. The pond lies alongside the stream and was evidently filled at its south-eastern (upstream) end via a broad opening connecting with the natural watercourse. This implies the former existence of a diversionary dam across the channel of the stream; only the slightest possible trace of such a dam now survives, in the form of a slight bulge projecting from the boundary

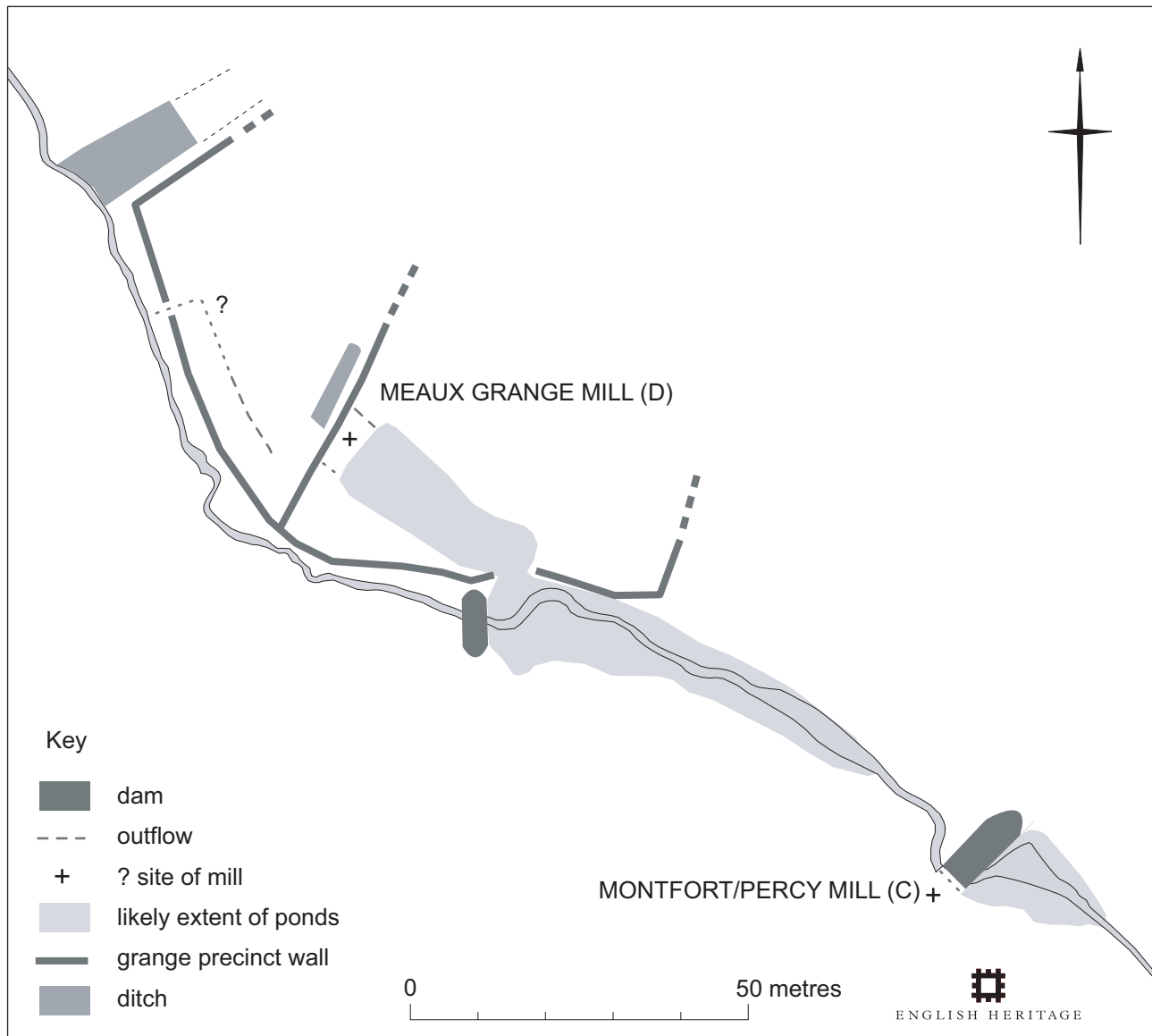


Fig. 11. Flooding extents of Dam sites C and D. (A. Oswald)

earthwork on the eastern bank of the stream. There may have been a sluice arrangement to allow water to be fed along the natural channel whenever the mill was not in use, for there is little evidence for an outflow channel leading from the pond of the size that one might expect if the stream's entire flow usually passed this way. The documentary evidence is ambiguous: the Meaux Chronicle, if taken at face value, suggests that the whole flow was diverted, except on those occasions when the Percy family demolished the dam and allowed the water to resume its former course. Yet the later reference to Robert de Percy's gift of six feet of land alongside the *curia* wall, apparently corresponding to the natural stream course, suggests that the natural channel may have retained some function under normal circumstances (see Ch. 1).

The bank of intact ground at the north-western end of the sub-rectangular pond, which effectively dams the depression cutting created to hold the water, is broad enough to have carried a small mill building, though no

trace is securely identifiable either as an earthwork or from geophysical survey (Whittingham 2002). A broad, shallow ditch immediately in front of the dam may represent an overflow channel, which might imply some form of outflow at the north-east end of the dam. Alternatively, the ditch may have been associated with an adjacent boundary earthwork, now an earthen bank of minimal height, but possibly originally a wall. This boundary runs along the line of the dam from the obtuse angle change in the *curia* wall, and is therefore probably medieval, presumably some form of division within the *curia* of the grange. The position of the actual millrace (or perhaps more than one, since the plural '*molendina*' is used in one reference) is difficult to determine. It may be marked by a slight scarp towards the north-eastern end of the dam. The more obvious channel at the south-western corner of the dam results from a later attempt to drain the pond and is continued by artificial cuttings through both the *curia* wall and the internal boundary. The fact that the *curia* wall had already been levelled by the time the drain

was cut through (to judge from the small quantity of spoil produced by this operation) tends to suggest that the drainage was probably a post-medieval development. However, what appears to be an earlier channel, of minimal depth, can be traced running north-westwards away from this area and parallel to the *curia* wall, so it is possible that the drainage cut disturbed an earlier outflow.

A series of slight hollow ways which cross the stream at the point where the pond intersects with the natural watercourse may be of very recent origin, since bricks and other rubble have been used to create a rough ford. A broad channel eroded by the outflow from the disused water tower (shown as such on historic Ordnance Survey mapping) is certainly of modern origin. It is worth noting, however, that the disturbance of the *curia* boundary at this point was apparently responsible for exposing a large fragment of a medieval milling stone discovered in 2002.

The main function of the apparent 'salient' from the main part of the grange complex seems to have been to give access to the watercourse. The reason why the pond was constructed adjacent to the natural stream channel rather than on its line, as occurred elsewhere, is apparent from the documents: the Fossard grant failed to transfer water rights to Meaux (see Ch. 1).

Possible site SE 8564 6541

Another suitable location for a dam, though with scant positive physical evidence for one, is the point where the road from Wharram le Street to Birdsall and York fords the stream. A crossing in this position predates the construction of the railway by many centuries: this route is described as the road to York in the late 12th century (see Extract B, p. 4), and on the 1836 estate map, the fields on its north side, west of the stream, were called 'York Gate Lands', the 'gate' element deriving from the Norse for 'way' (Dykes 1836; see Fig. 4). The 1836 plan shows the trackway deviating from a straight line to cross the stream, which may reflect a change in its route after the construction of the dam. Any earthworks on precisely the line of the modern track would have been removed at the time of the railway construction, since at this point the trackway had to be accommodated beneath the railway – hence the need for a ford. From a topographic point of view, the most suitable point for a dam lies a few metres further downstream, where any surviving earthwork would have been buried beneath the railway embankment.

E: ?Wharram le Street manorial mill (SE 8555 6569)

A more certain mill site is located a few metres south of a point where the Ordnance Survey First Edition 6-inch scale map surveyed in 1850-51 shows a trackway descending the eastern side of the valley from Wharram le Street (Ordnance Survey 1854; Site E on Fig. 5). When the railway was constructed, the trackway was accommodated in a tunnel through the embankment. Beyond the stream, the track continued on a markedly different course, towards the post-medieval farm called Wharram Grange. The stretch descending from Wharram

le Street village, however, may be medieval in origin. It is therefore tempting to conclude that this is the site of the Wharram le Street manorial mills.

The distinctive feature is a U-shaped bank lying adjacent to the stream on its east, with its open end to the south (upstream). The southern end of the eastern arm is overlain by the railway embankment, while most of the western arm has apparently been eroded away by the present stream. It would therefore appear that the earthwork was a hybrid between a straightforward dam and a sub-rectangular pond, some 5m wide and at least 12m long, though doubtless with a long thin 'tail' upstream. The unusual form of the dam seems to reflect the choice of location, for the natural topography here does not form such a marked pinch-point as at the simpler dams at Sites B and C. Its form and siting alongside the stream are also somewhat reminiscent of the mill of Meaux Abbey's grange (Site D). The present watercourse deviates abruptly around the western edge of the earthwork, suggesting that there may have been a sluice arrangement to allow the flow to be diverted into the pond when necessary. The stream now runs along a deeply eroded channel at a level some 1.8m lower than the top of the earthwork, suggesting that erosion since the medieval period may have been severe in this area. The confluence of the main Wharram stream with a tributary, one of the more major ones, appears always to have lain to the west and downstream of the dam. Traces of a slight channel at the north-east corner of the earthwork may represent the millrace itself.

3 Discussion

by S. Wrathmell

By the end of the 11th century, water-mills were a common feature in the English countryside. Domesday notes more than 6,000 of them, and this despite the substantial level of under-recording apparent in the North (Holt 1988, 8, 107). Richard Holt has suggested that, in the centuries after the Conquest, the overall increase in the number of mills could have been relatively small, although the pattern of mill location may have been fairly fluid in the 12th century, with some mills going out of use, and others being erected in new manors (Holt 1988, 13-14). In view of this, and given the limited options for powering mills in the two Wharram townships, any or all of the watermill sites, except for the grange mill, could be pre-Conquest in origin.

Demesne mills, the kind recorded in the Meaux charters, formed only one element of the medieval milling industry, alongside tenant mills, borough mills and domestic mills (Langdon 1994, 5-7). Though the role of tenant and domestic mills has achieved greater recognition over the past decade, there can be no doubting the importance of demesne mills to manorial revenues. They seem to have been particularly valuable to northern manors, where they contributed at times over a third of the total income (Holt 1988, 79-82).

The value of individual demesne mills was dependent upon various factors. One of the most important was the ability of the lord to enforce the 'soke' monopoly: ensuring that all the tenants of a particular manor could be compelled to use the lord's mill. Another was that the operation of the soke mill had to be unencumbered by the attempts of others to gain access to water-power along the same river, stream or leat. The threats came from new installations both upstream and downstream: the former potentially endangering the supply of water to the wheel; the latter creating - on courses with a shallow fall - backwash that prevented the water from clearing the tail race of the mill upstream, thereby stopping its wheel turning.

These issues are clearly spelled out in a grant of the Birdsall water-mill by Sir Peter de Mauley to the monks of Meaux, made between 1235 and 1238. Sir Peter granted the mill to the bretheren, along with the suit of grinding corn attached to specified bovates of land - for example the two bovates that John the reeve held - 'saving however to the said Peter and his heirs the said multure, if at any time the said bovates are being tilled by his ploughs' (*Cal Charter Rolls I*, 233). If any of the villeins who held these lands were to seek to evade the soke by having their corn ground elsewhere, they would be at the mercy of their lord. Furthermore, Sir Peter himself was not allowed to construct any other mill or building that might obstruct or impede the working of the mill, thereby reducing the value of the soke. In the words of the Meaux Chronicle:

Extract L

deditque nobis molendinum aquaticum de Byrdsalle, cum holmo adjacentente stagno, et melioratione eiusdem, et aque ductu, ac sectam multure de xvi bovatis terre et xv cottagiis in Byrdsalle... et omnem aliam sectam ad dictum molendinum pertinentem; et si quis villanorum dictas bovatas terre et cottagia tenentium, subterfugiendo multuram dictorum molendinorum, bladum suum alibi quavis occasione molere fecerit, in misericordia domini foret, et insuper nobis satisfaceret de multura competenti; nec liceret dicto domino Petro vel heredibus suis in predictis territoriis... aliquod molendinum vel edificium construere, vel aliquod aliud impedimentum facere, ad nocumentum dictorum molendinorum, per quod aque ductus obstruantur vel aliquatenus impediuntur, seu secta minuatur...

(Bond 1867, 60-61)

This grant makes very clear the direct relationship between the cultivation of specific bovat holdings and the requirement to grind corn at a specific mill. Another version indicates that the cottars who owed suit to the mill were those attached to the de Mauley manor: '*et sectam xv cotariorum ad dominicum nostrum in eadem villa pertinentium*' (BL Lansdowne 424, f.68v). Presumably, if the vill of Birdsall had contained a second manor, then the lord of that second manor might have built a second mill, and required his villeins and cottars to use it.

The Birdsall donation pictures a world in which milling sokes were mapped out in considerable detail on

the ground, even taking into account the status of crops harvested from lands which had been taken in hand by the lord of the manor. It is, of course, unclear as to how closely this legal framework related to the practical experience of peasant farmers; how strictly such regulations were enforced. In general terms there were two ways in which peasants could avoid using their lord's mill: by taking their corn to someone else's mill (whether demesne or tenant), or by grinding corn themselves in their own handmills. There are 12th-century records of the penalties laid down for peasants who tried to avoid their lords' mills, and from the 13th century there are references to penalties being imposed for such transgressions (Holt 1988, 38-9). Whilst the role of demesne mills in the overall milling industry may have been overstated in the past, they still seem to have been dominant north of the Humber (Langdon 1994, 17-22).

Medieval milling was not, of course, wholly dependent on water power. From the late 12th century there are references both to windmills and to horse-powered mills (Holt 1988, 17, 20), and some of the earliest of these are from East Yorkshire. There was a windmill at Weedley, near South Cave, by 1185, and another at Beeford in the 1180s or 1190s (Holt 1988, 20, 174). Though windmills and horsemills were built as demesne mills in the North, they generated far lower revenues than water-mills (Langdon 1994, 12-13).

On the Wolds, however, many lords may have had no access to suitable watercourses, and therefore little choice but to resort to horsemills or windmills. As Holt has noted, J.R. Mortimer excavated several windmill mounds on the Wolds but failed to recognise that the cross-shaped trenches he encountered in them were the slots that housed the post-mill cross-trees (Holt 1988, 126, 140-41). Two of the mounds were at Cowlam and Helperthorpe. A third, at Fimber, was helpfully known as 'Mill Hill'. It seems, however, to have been a prehistoric barrow reused as a windmill mound: no doubt many others were similarly reused (Mortimer 1905, 187-8, 338-9).

In these circumstances, the construction of so many mills on Wharram's *ductus aque* - at first sight such an unpromising source of motive power - is less surprising than it might otherwise be. The northernmost dam identified in the field survey (Fig. 5, Site E) is probably a remnant of the manorial mills of Wharram le Street. In the 12th century these were granted by the lords of the manor, the Fossards, to St Leonard's Hospital, York, and from the 1230s or 1240s the Hospital leased them to Meaux. The dam lies at the foot of a routeway, recorded in 1851 (Fig. 4), that runs south-westwards from the centre of Wharram le Street village. On the west side of the watercourse the route forks, one branch running north-westwards. In post-medieval times it linked Wharram le Street to Wharram Grange Farm, but during the Middle Ages it may well have been the trackway by which the Barkethorpe family's animals were driven to and from Thornlund pasture (see Extract B, p. 4).

The next mill site to the south, Site D on Figure 5, has been identified as the Meaux Grange mill because its

earthwork remains conform in every detail to the information provided by the documents. The pond is off the line of the watercourse - unlike the other dams identified during fieldwork - and it was fed by a leat. The east bank of the watercourse is lined with stone walling, undoubtedly part of the wall that bounded the middle court of the grange precincts. The bed of the adjacent stretch of water can be identified as the six-foot strip of land quitclaimed by Robert de Percy, in 1269-70, in favour of the monks. The place where the monks re-constructed their three-foot dam - the one Robert had been accustomed to demolish from time to time - has been once more destroyed, this time by cattle crossing the stream.

The *curia* presumably occupied the whole of the valley-side field later called Grange Cliff (Fig. 4), a location proposed by Professor Beresford (*Wharram I*, 25) and R.T. Porter (pers comm.). Part of this field, with its spring, can be identified as the land originally granted by William Fossard senior for the foundation of a grange (see Extract A). Additional grants, made by the Wharram and Greenwood families, contributed further parcels of land to the precincts, otherwise called the 'seat of the grange' (BL Cotton Vit. C. vi, f.42v, 43).

In passing, it is worth noting that Grange Cliff was also probably the initial site of the post-Dissolution farmstead, later replaced by the present Wharram Grange Farm on a new site 0.9km to the north-west. The fields called Near Cliff and Far Cliff, on the east side of the watercourse north of the Yorkgate-Banks Hill road (Fig. 4), were obviously named in relation to a farmstead at Grange Cliff. Their names do not appear in the Cottonian 'ancient measurement of lands', but Near Cliff and Far Cliff are probably represented by two 'cliff' names in that document: *le Coteclyf* and *Lambclyf* (BL Cotton Vit. C. vi, f.229v).

Immediately above the spring in Near Cliff (Fig. 4) are well-preserved earthworks marking the wall-lines of a large rectangular building, first recorded by Mrs Jean Le Patourel and identified by her as a sheepcote belonging to the medieval grange (see *Wharram I*, 25). The medieval field names support this identification, and indicate that the steep valley-side land north of the road was used as permanent sheep pasture.

The identification of Site D as the grange millpond led to a successful search for the Montfort/Percy mills immediately upstream, at Site C. Figure 9 indicates that they were situated on the boundary between Wharram Percy and Wharram le Street townships. On the basis of the documentary evidence they appear to have lain outside the manor of Wharram le Street, as the lords of that manor do not seem to have become involved in the Montfort/Percy dispute. On the contrary, the way in which that dispute surfaced in the king's court indicates that the interest claimed by each party was a tenancy in chief. The site of the mill, together with Grange Cliff and the field opposite Grange Cliff, on the western side of the watercourse, are all excluded from the manor of Wharram le Street on Donkin's 1838 plan. Grange Cliff was presumably excluded because it formed the precincts of

the grange. The field to the west of the watercourse and the bed of the watercourse itself are, however, likely to have been Montfort/Percy land, given the Montfort grant of the watercourse, and the later Percy quitclaim of the strip of land next to the grange wall.

It has already been suggested that a further remnant of earthwork dam, discovered at Site B (Fig. 5), south of the Montfort/Percy milldam, might represent the north milldam of Wharram Percy. The southern milldam of Wharram Percy is unquestionably the one excavated south of the church.

If all these identifications are correct, one problem remains. The presence of two mills in Wharram Percy township is readily intelligible, given that both the Percy and the Chamberlain families had manorial interests there in the late 12th and early 13th centuries. What is not clear is why there should be three mill complexes: the Montfort/Percy mill at the north end of the township, another, perhaps to be assigned to the Chamberlain bovates at the head of the watercourse, and a third approximately halfway between them. The central dam may have served a wholly post-medieval pond, but there is an alternative explanation.

Given the ties between particular bovat holdings and the mills that processed the crops grown on those holdings, as evidenced at Birdsall, it may be that the three dams in Wharram Percy reflect not the bipartite division of manorial interests evident in the late 12th and early 13th centuries, but the tripartite division recorded in Domesday Book: separate mill complexes for each of the four carucate manors, and a further mill for the carucate of sokeland.

The numbers and revenues of medieval cornmills reached their peak in the early 14th century (Langdon 1994, 7, 24). After 1350 there was a decline, as the high profits of previous centuries collapsed because of the population reduction (Holt 1988, 68, 159-66). The known history of the Wharram mills fits slightly awkwardly into this framework, as those at Wharram Percy both seem to have been out of use in June 1323, at the time of Robert de Percy's IPM, and as the Wharram le Street mills rented by Meaux were already regarded as a financial burden before 1310. What had caused these difficulties?

The issues may have been very localised and practical; for example, the volume of water to power the mills may have become problematical, leaving the mill wheels idle for much longer periods. On the other hand, they may reflect wider trends. Langdon suggests that the demesne milling sector may have become over-extended by the early 14th century, because of over-exuberant investment and increasing competition from the other sectors. The sample of IPMs on which his analysis was based begins to record an increasing number of derelict or damaged mills in the second half of the reign of Edward II, not only in the north, where Scots raids began to take their toll, but also in the south (Langdon 1994, 26-7).

The underlying problem could have been the agrarian crisis caused by frequent harvest failures, sheep disease and cattle murrain in the second decade of the 14th

century (Postan 1973, 169; Kershaw 1973, 14, 25-6, 66-7, 83-4; see also *Wharram I*, 10-11). Besides the derelict mills, two thirds of the Wharram Percy demesne bovates were uncultivated, each said to be worth 5 shillings 'if they can be let'. This may have been a result of the crisis; but as the customary tenants and cottars were still apparently cultivating land, it does not explain why both mills were derelict.

A more immediate factor may have been the Scottish raids referred to by Langdon. In October 1322 the Scots were at Malton, and for the first time the East Riding felt the effects of raiding. Reductions of 50% and more in the valuations of parishes in the 1327 extension of the *Nova Taxatio* can be seen across the northern Wolds, perhaps the result of Scottish devastation (McNamee 1997, 101-

04). In an IPM extent of July 1323, seven tofts in Thixendale were said to have been 'now burned by the Scots' (*Cal IPM VI*, 274). Water mills were a favourite target for Scots raiders (McNamee 1997, 75), and it is hard to see how the Scots could have missed the Wharram Percy mill or mills on their way to or from Thixendale. It is possible, therefore, that one of the two mills at Wharram Percy had gone out of use permanently either because of changes to the manorial structure in the township in the mid-13th century, or because of the agrarian crisis of the early 14th century. The other would have continued to serve the whole township, but was probably destroyed by the Scots in October 1322. It was not yet rebuilt by the time of the June 1323 IPM, but was working again by the time of the 1368 IPM.

Part Two

The Excavations

by C. Treen and M. Atkin, with contributions by
E. Marlow-Mann

4 Introduction

The excavation of the earthwork dam south of the churchyard, of the pond area to the south of the dam, and of adjacent areas on its north side, took place between 1972 and 1983. Within the overall campaign, the investigations were divided between two site codes. The bulk of the work, undertaken between 1972 and 1981, was assigned to Site 30, whereas a small extension northwards, excavated in 1982 and 1983, was classified as Site 71. The Site 30 excavations were supervised throughout by Colin Treen, assisted in the first season by N. Moon, and thereafter by Malcolm Atkin and Paul Stamper. The Site 71 excavations were supervised by Atkin, with the assistance of Lesley Abrams.

At the time work began, the area of the pond was a stretch of boggy ground, through which a stream meandered. An experimental temporary dam was constructed at the narrowest point of the cross-valley profile. The boggy valley-bottom pasture with no standing water became a water body (Plate 1). The then Ministry of Works decided to recreate the pond, and a five-year excavation programme was proposed in

advance of this. In the event, work on Site 30 ran on for a decade. It was hampered continuously by the wet conditions; and though attempts were made to improve matters through the use of water and sludge pumps, it should be stressed from the outset that the problems caused by these conditions are visible in both the stratigraphic and finds records (Plate 2).

In 1976 a new context recording system was introduced at Wharram, based on that used by the Central Excavation Unit (now the English Heritage Centre for Archaeology); this system and the need for it is explained in detail in *Wharram VII*. Site 30 was already under excavation; records from the old system have been retrospectively incorporated into the new system.

The character of the excavations, too, has had its impact on the preparation of an integrated site report (see Fig. 12). The initial excavation strategy for Site 30 was informed by the earlier programme of open area excavation of wold-top peasant house sites in areas of shallow deposits over natural chalk. When applied to Site 30 it was evident that the upper chalk surfaces lacked any evidence of buildings and, secondly, that there was an unknown depth of non-chalk deposits below.



Plate 1. General view of the experimental pond created in July 1970 by a temporary dam constructed of three planks and polythene, filled to a depth of 1m within 36 hours.

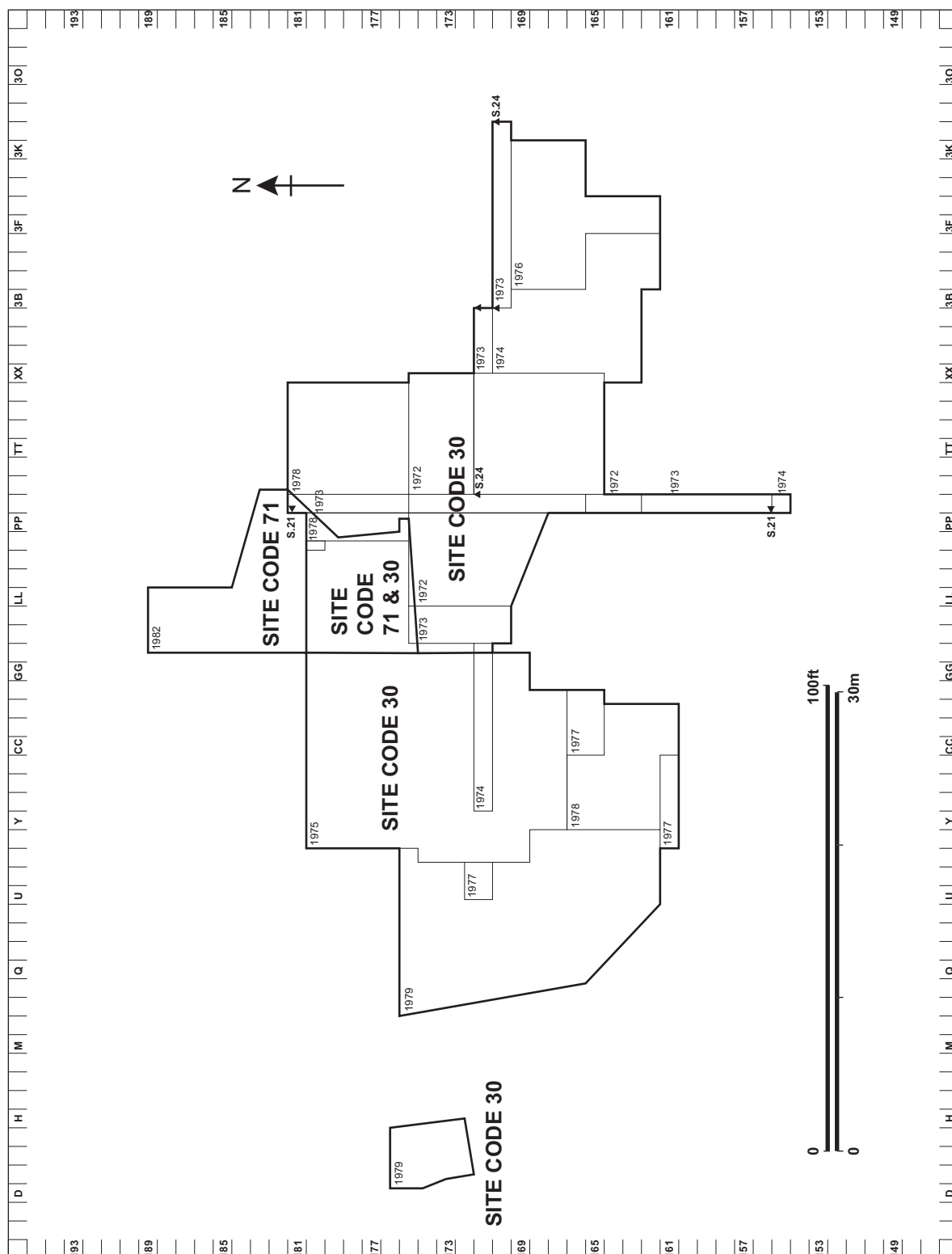


Fig. 12. Plan of Site 30 and Site 71 excavations. (E. Marlow-Mann after R.T. Porter)

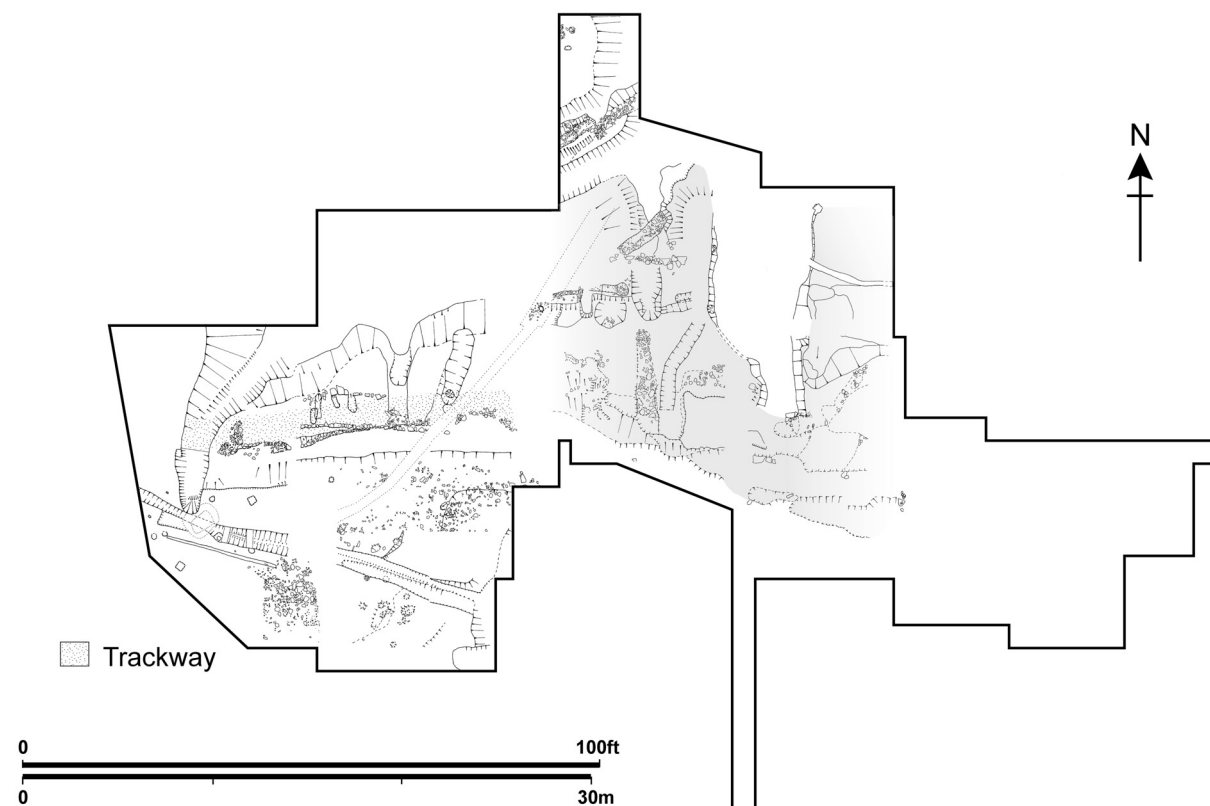


Fig. 13. Schematic plans of Sites 30 and 71 showing approximate areas of clay dam (top); chalk and earth dam, and Phase 4 features (bottom). (E. Marlow-Mann after R.T. Porter)



Plate 2. General shot of working conditions.

Consequently the strategy was modified to excavate trenches north-south and east-west in order to establish the relationship of the deposits to the longitudinal and latitudinal valley profiles. These were extended in the two subsequent years and the ground around these trenches was excavated as a series of small trenches and larger areas, starting in 1972 and ending in 1981. Though the overall effect is a single large (if irregular) excavation area, measuring about 950 square metres, one result of this strategy was that contexts could not always be traced reliably beyond the edge of one excavation area into another. For this reason, some of the detailed site plans show features ending at short lengths of chain lines; these mark the position of trench edges (though the full course of individual trench edges has not been shown, to avoid confusion). It has also resulted in a number of stratigraphic units not being numbered on the plans and section drawings.

Consistency between seasons was impeded by the impact of inter-season water erosion on parts of the site, and also by the scatter of stones thrown into the water-filled areas by off-season visitors. A further difficulty is that Figure 12 does not entirely match up with the detailed plans published here. This is because not all trenches were excavated right up to their intended limits at all levels – for example, near the stream. The south-west corner of the site deviated from the rectangular grid pattern due to the need to protect the roots of a mature ash tree. It was also not possible to excavate on land under water board control.

A final problem was caused by the water-works features of the 1930s. In the western part of the site was a collecting sump, and from this a pipeline extended north-eastwards, diagonally across the central part of Site 30, and beyond it bisecting Site 71. This has caused a major discontinuity in stratigraphic information, one that could not be side-stepped in the post-excavation phase of the project. The decision was taken, therefore, when preparing the report for publication, to divide Site 30 into

(roughly) two halves (see Fig. 12), to facilitate site description – the medieval features in the western half being assigned mainly to one phase – and in particular to facilitate the publication of plans at a reasonably detailed level.

Though ground conditions were worse during 1981 than in previous years, with increasing water flow in the stream, the following two three-week seasons of excavation in Site 71, immediately to the north, at the south-east corner of the present graveyard, were carried out in much better conditions. An area of 98.10 square metres was excavated during the summers of 1982 and 1983. The objectives were to investigate any sequence of graveyard boundaries; to relate stratification to the sequence of occupation recognised on Site 30 and to complete the excavation of features recognised in 1981 running under the north boundary of Site 30. In the same programme of work, the exceptionally dry conditions in 1982 allowed the opportunity to re-excavate early features on Site 30 that had previously only been barely discernible in the mud. Though Site 71 is reported separately here, data on the re-excavated early features have been incorporated in the Site 30 report.

5 Sites 30 and 71: Phases 1-7

Phase 1 features on the valley floor

Phase 1.1: burnt grain mound and milling site (Fig. 14)

The earliest archaeological features on the site were represented by materials that had been mounded up to form a dam, together with water channels cutting through the dam. The main channel was formed at the break in slope junction of the valley sides, where a chalk pebble and gravel platform (612, Site 30; Fig. 15, S.21), containing small fragments of burnt daub and animal bone and vegetative silty layers, gave way to the natural blue-black clay (648). The surface tilted from a maximum height of 135.48m (444.5ft) OD at the south-east corner of the site to 134.27m (440.52ft) OD in grid square PP/QQ 171. A channel of geological, rather than historical origin drained this platform northwards.

On the higher, eastern margin of the platform (Site 30; 612) had been dumped a large mound of what was at first identified as black silt. The mound (522, 1278, 1335 and 1337 among others, grid ref. TT-3B 168-175; Fig. 14; Fig. 16, S.24; Fig. 17, S.22) covered at least 52.95 square metres and survived to a maximum thickness of 0.3m. Later analysis showed the deposit to be ash and burnt grain. Where it had been deposited over the natural clay terrace of the eastern valley side the mound reached 136.09m (446.5ft) OD.

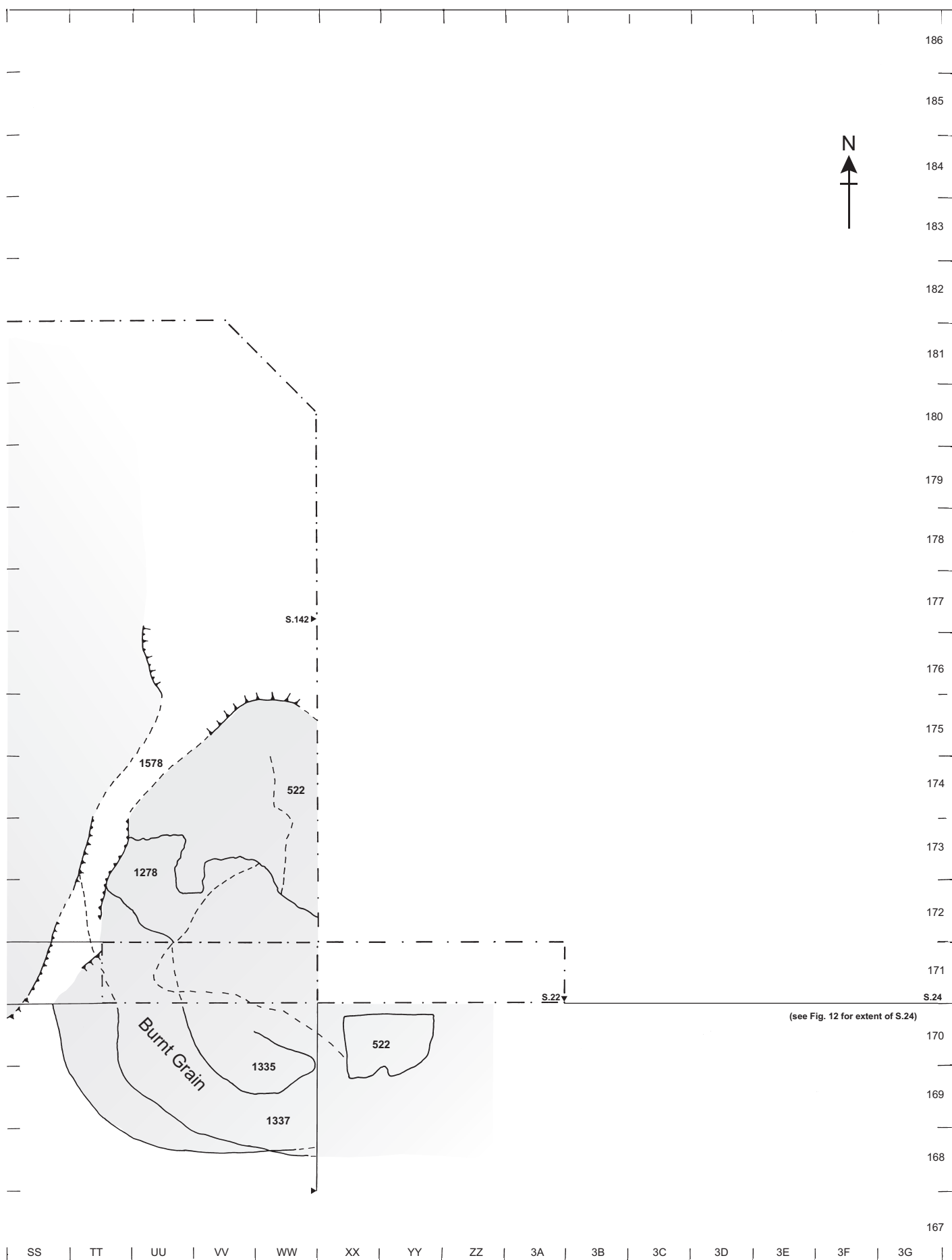
The centre of the mound (Fig. 18, S.142; Fig. 16, S.24) showed the greatest homogeneity of burnt grain material. It was, however, divided into two by a layer of green clay (no context number), which thickened as it sloped down westwards. The upper part of the burnt grain appeared to have been thrown up onto the clay from the west. The



Plate 3. Phase 1 (Site 30): wattle lines with Line 5 in the foreground and Line 2 in the background, viewed from the east.



Plate 4. Phase 1 (Site 71): erosion hollow 116, viewed from the south.



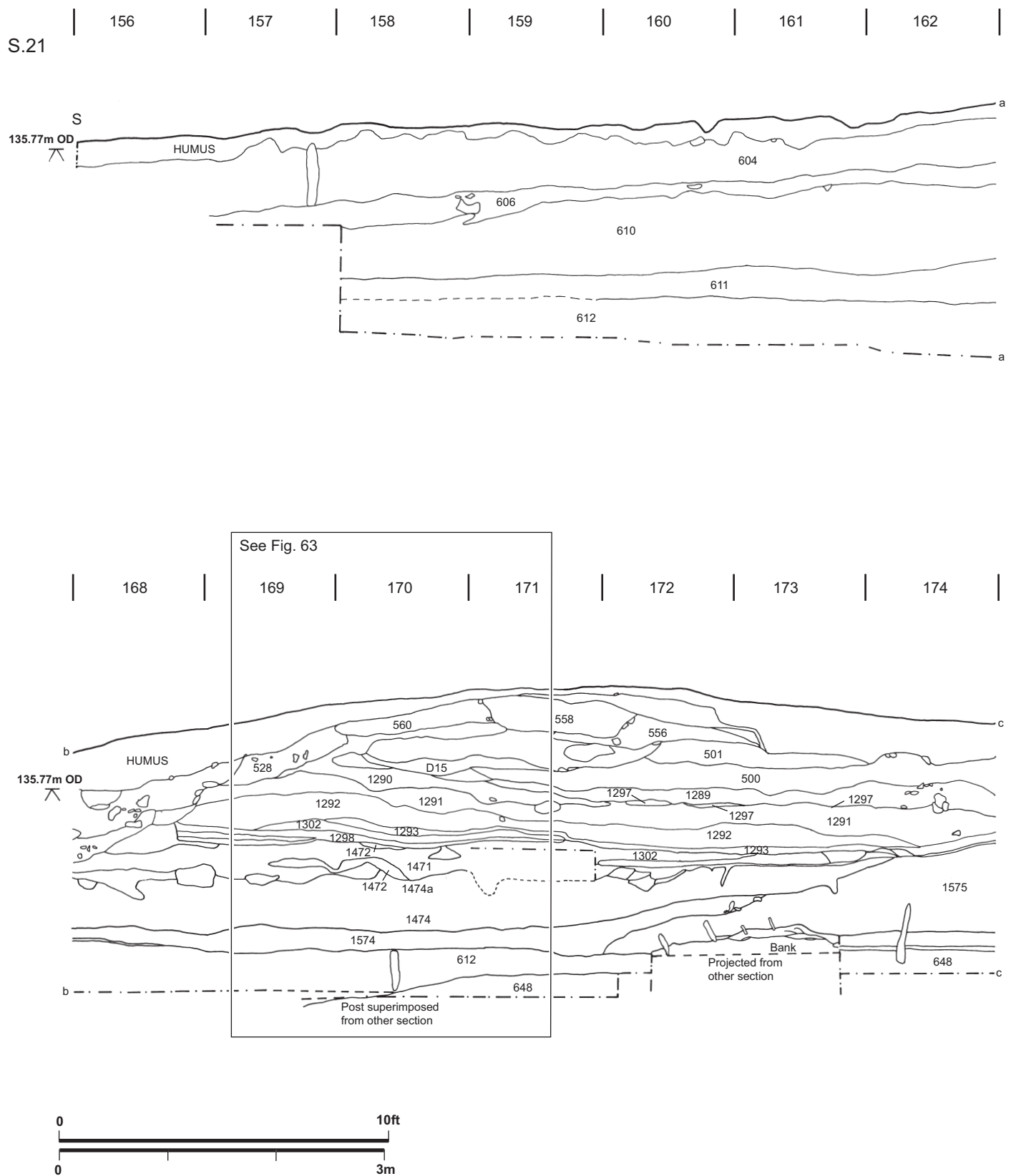
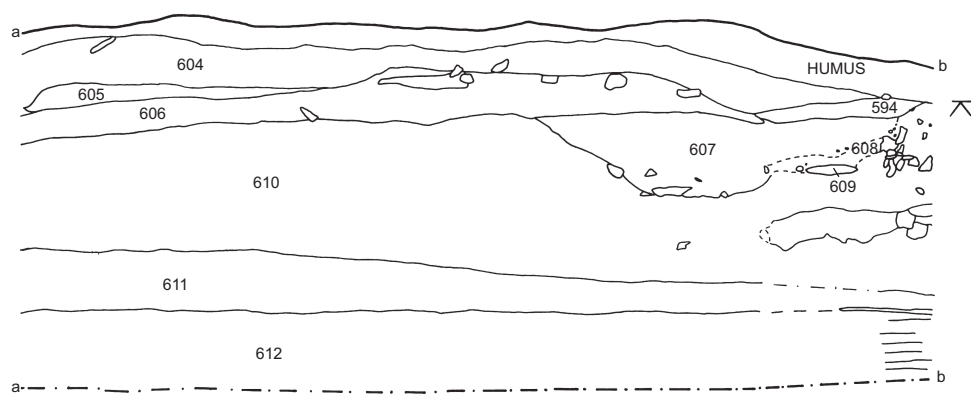
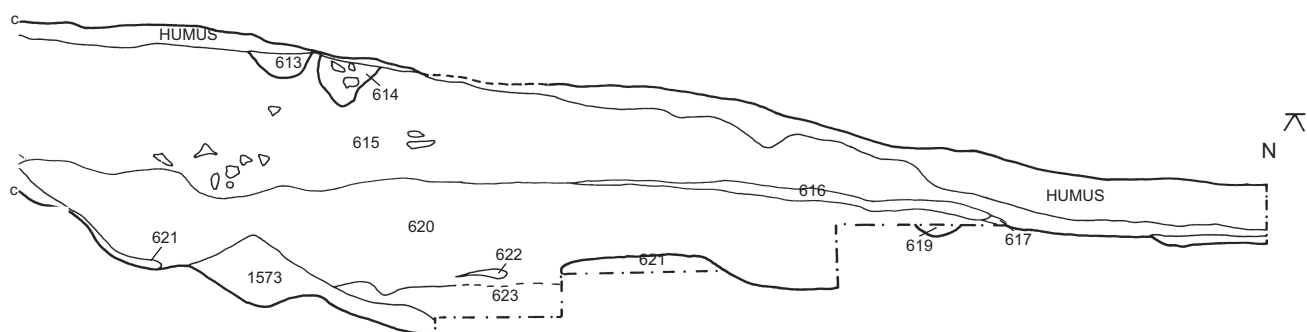


Fig. 15. Section 21: main north-south section. (E. Marlow-Mann)

| | | | | |
|-----|-----|-----|-----|-----|
| 163 | 164 | 165 | 166 | 167 |
|-----|-----|-----|-----|-----|



| | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|
| 175 | 176 | 177 | 178 | 179 | 180 | 181 |
|-----|-----|-----|-----|-----|-----|-----|



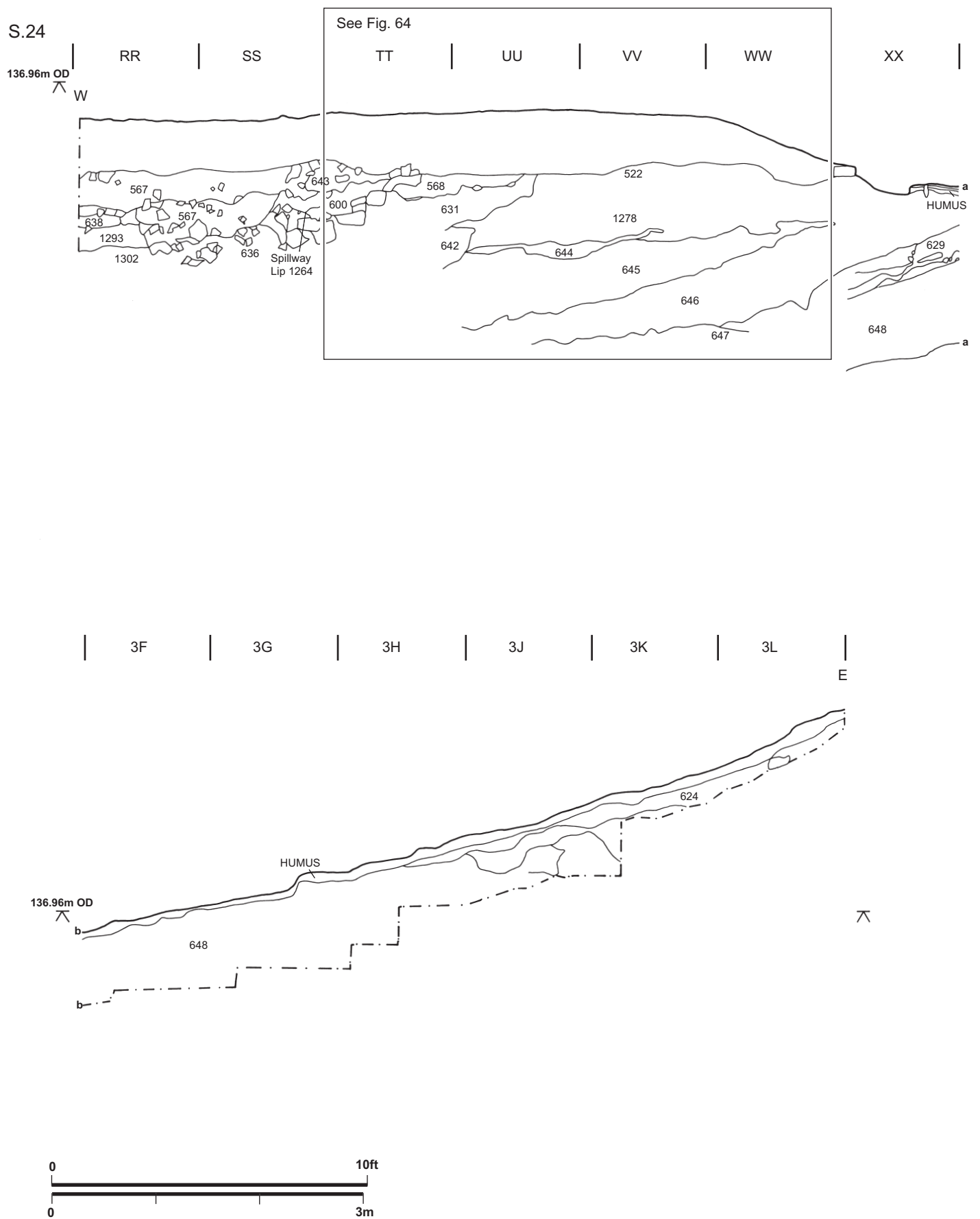
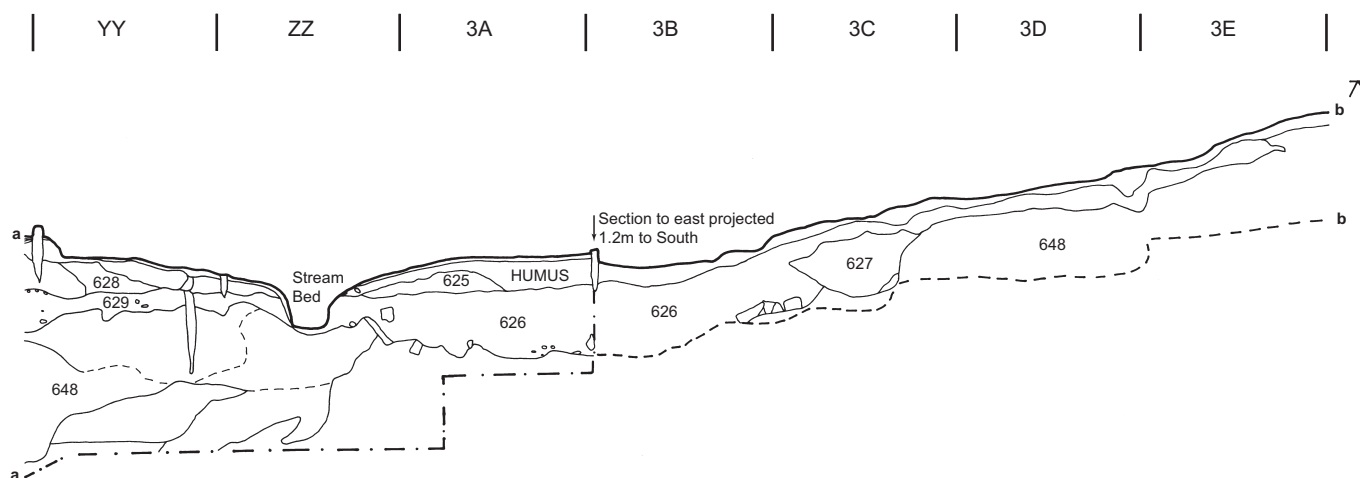


Fig. 16. Section 24: main east-west section. (E. Marlow-Mann)



upstream, south side of the mound, showed a more complex series of alternating black silt, black silt and chalk pebbles, clay, and iron stained gravel layers (no context numbers, Site 30; Fig. 18, S.142).

Black silt, washed over the low bank of green clay, lay along the west side of the mound. Water eroded a course (1578, Site 30, grid ref. SS-UU 171-176; Fig. 14) 0.61m wide and 0.3m deep at the rear of the clay bank along its junction with the black silt. A thin tail of the mound edge (not illustrated) spread westward across the valley bottom platform. It had been cut through by later spillway development (1578 and later channels, Site 30).

A bank, approximately 1.2m wide, (Site 71, grid ref. OO-QQ 175-176/177; Fig. 14) c. 0.3m high, composed of a core of redeposited gravel, cement-stone, silty clay and angular chalk fragments up to 50mm diameter (no context number), was laid along the western edge of the clay bank. These were not recorded on plan but can be seen in section (Site 30, grid ref. 172-173; Fig. 15, S.21). A line of wattling (Fig. 18; Figs 14 and 19: line 5. Plate 3; see Ch. 27), running north-north-west to south-south-east, was woven *in situ* upon it; of this 5.5m survived. Lines 4 and 5 merged at the southern 1.4m (Fig. 18 and Fig. 14: line 4) and consisted of a double line of rods and sails. This line of wattle had a downstream north-western terminal in an area of cementstone and chalk blocks, leaving a gap of 2.4m from that point to the natural clay bank scarp (110, Site 71; Fig. 14) forming the break of slope between the western valley side and the valley floor. Four oak posts (Fig. 14: WP7, WP8, WP9 and WP10: line 3) were set at intervals of between 1.1m and 1.3m in a line parallel to that of the wattle, but standing in positions up to 0.35m south-south-west of it.

The west face of the clay mound had been cut by a large erosion hollow (116; Fig. 14; Plate 4) which had formed in the valley bottom platform. A narrow channel (177) led from the hollow to a rectangular pit (178) set alongside the western scarp, and with an exit channel (65) from its north-eastern corner. Two postpads (92 and 44) and an eroded post-hole (175) were set at three of the corners of a possible structure.

The exit channel (65) led northwards from the erosion hollow (116) into a large depression (273) in the blue clay natural. The low clay bank (111) east of the exit channel may have been formed of the spoil from the hollow. Another channel (263; Fig. 25, S.1) flowed into this depression from the south-west, it also cut through clay natural and was fed by a spring on the west hillside. This ditch formed the basis for a sequence of boundary features between the churchyard area to the north and the water-related features to the south, a division which survived into the 20th century. This sequence is discussed further in Chapter 6. A low clay bank on its southern side (260; Fig. 25, S.1) was possibly formed when digging channel 263.

To the north-west of channel 263 and along the western edge of the depression were the fragmentary remains of an artificial chalk platform (245; Fig. 25, S.1) laid over a clay base (258; Fig. 25, S.1). The surface contained post settings for two 0.2m diameter timbers (270 and 271) and a post-hole (272) indicating the presence of some structure of this date on the edge of the depression.

A series of six posts (131, grid ref. PP-QQ 182; Figs 14 and 18) were set east-west in a line in a bay at the east side of depression 273 with a length of *in situ* wattling



Plate 5. Phase 1 (Site 71): wattle posts and planks 131; the *in situ* wattling is towards the top of the picture, viewed from the south.

(grid ref. PP 181-182; Plate 5). Immediately downstream and behind these posts, small planks were scattered. There was no evidence of a structural relationship between posts and planks.

The depression (273) and the pond south of the dam are similar in form and may have been dug at the same time, separated by the mound of burnt grain and clay that was cast up to form a dam. The structure (44, 92 and 175) built at the head of the dam has been interpreted as a small water-mill (Ch. 31). The bypass channel was probably that identified to the east (1578, Site 30, grid ref. SS-UU 171-176), cutting through the dam on a south-west to north-east alignment. If the interpretation of feature 273 as a depression is correct then this would suggest that it was a wide tailrace designed to carry water away from the wheelpit. The alternative interpretation, that it may have been another pond, is considered below (Ch. 32).

Phase 1.2

Silt was deposited alongside the western face of the wattle-capped bank, and subsequently, a replacement line of wattle (Fig. 14: line 2, see Ch. 27) was woven on the same alignment, but c. 1.22m south-south-west from it.

This second line of wattles extended 3.05m farther upstream, but 2.44m less far downstream. The line of wattling presumably represented successive revetments to the pond face of the dam. A sequence of six posts (WP1, WP3, WP5, WP6, WP17 and WP18) was set parallel to the second wattle line 0.25m south-south-west of it, repeating the relationship of the first line of wattles and posts. The lines of posts and wattles led downstream, but at an angle north-north-west across the valley bottom towards the lowest features excavated on the site.

Although channel 65 had been cleared of silt, a remnant of the initial silting of depression 273 survived on the west (107; Fig. 20). The silting (45) on the east side of the channel was apparent as a 500mm thick compacted clayey layer on the north-west edge of clay bank 111, with a surface of leached-out grits and gravels.

The initial, deliberate, fill of channel 263, comprising a silty clay deposit with sub-rounded chalk inclusions (255; Fig. 18, S.6) was partially overlapped by the initial silting (107; Fig. 20) of depression 273. This was then sealed by a layer of sand and gravel (254; Fig. 18, S.6) prior to the channel being cut by two successive recuts (269 and 268; Fig. 18, S.6).

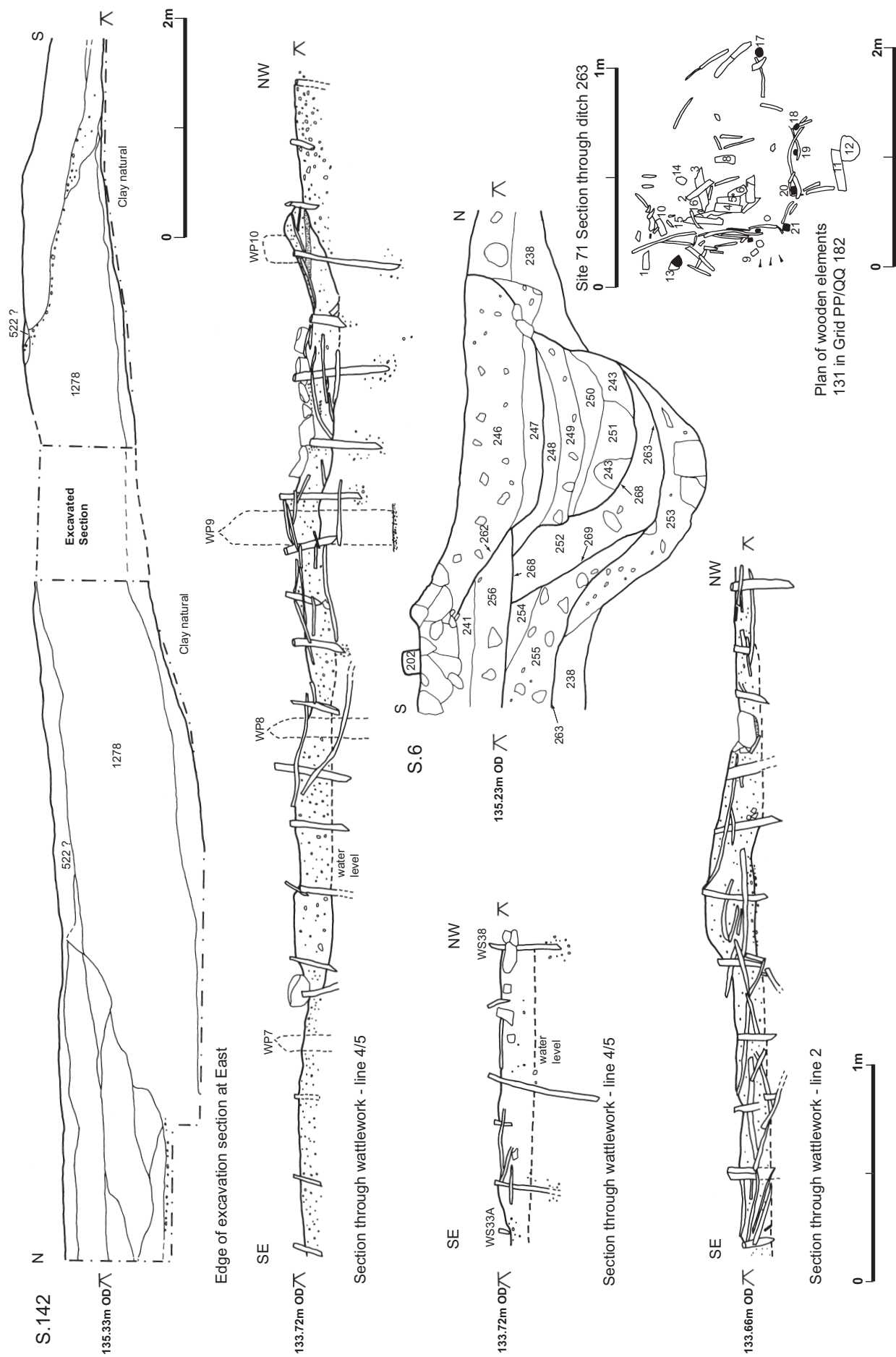


Fig. 18. Phase 1 sections S.6, S.142 and wattlework, and plan of timber features. (E. Marlow-Mann)

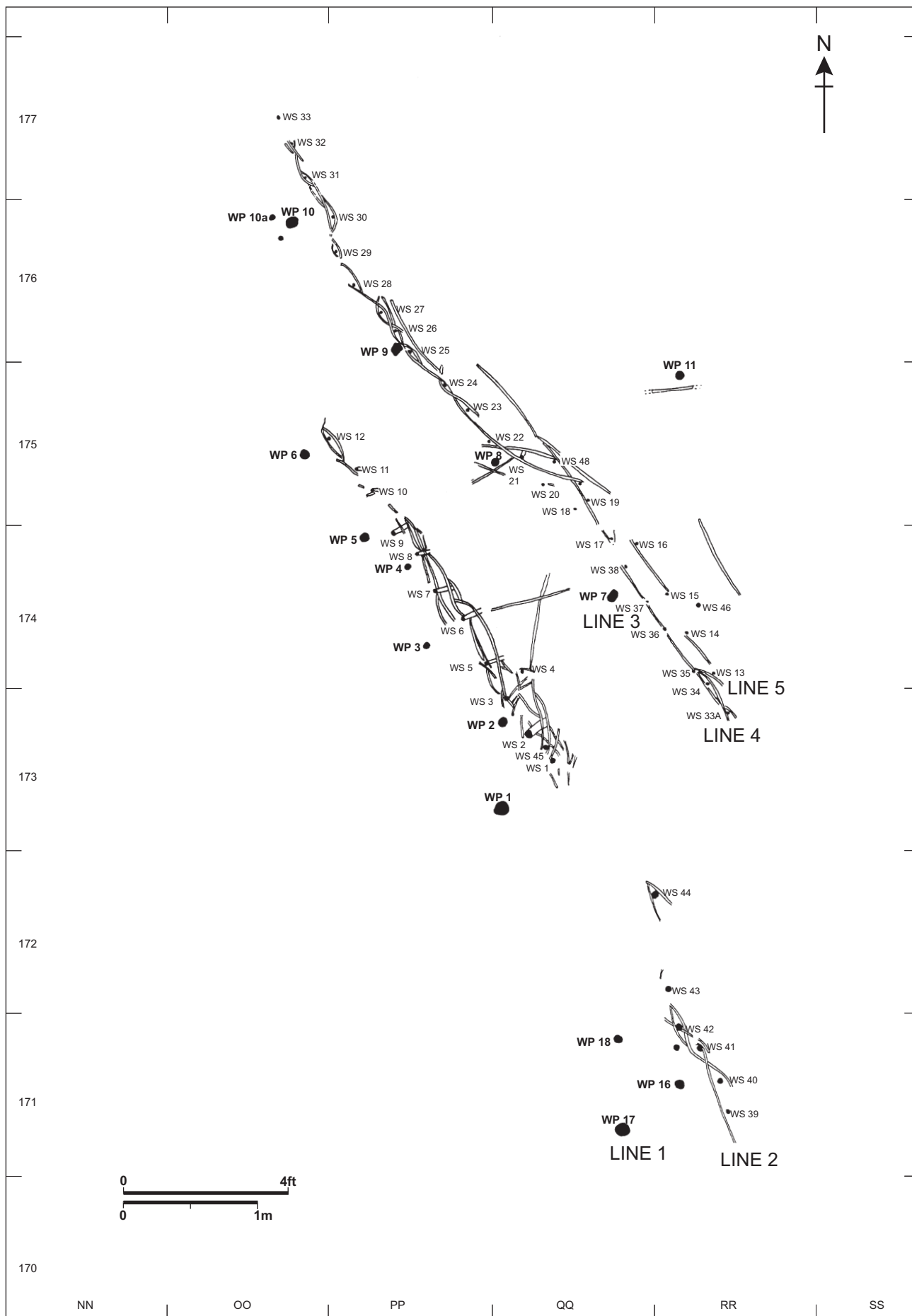


Fig. 19. Detailed plan of wattle features. (E. Marlow-Mann)

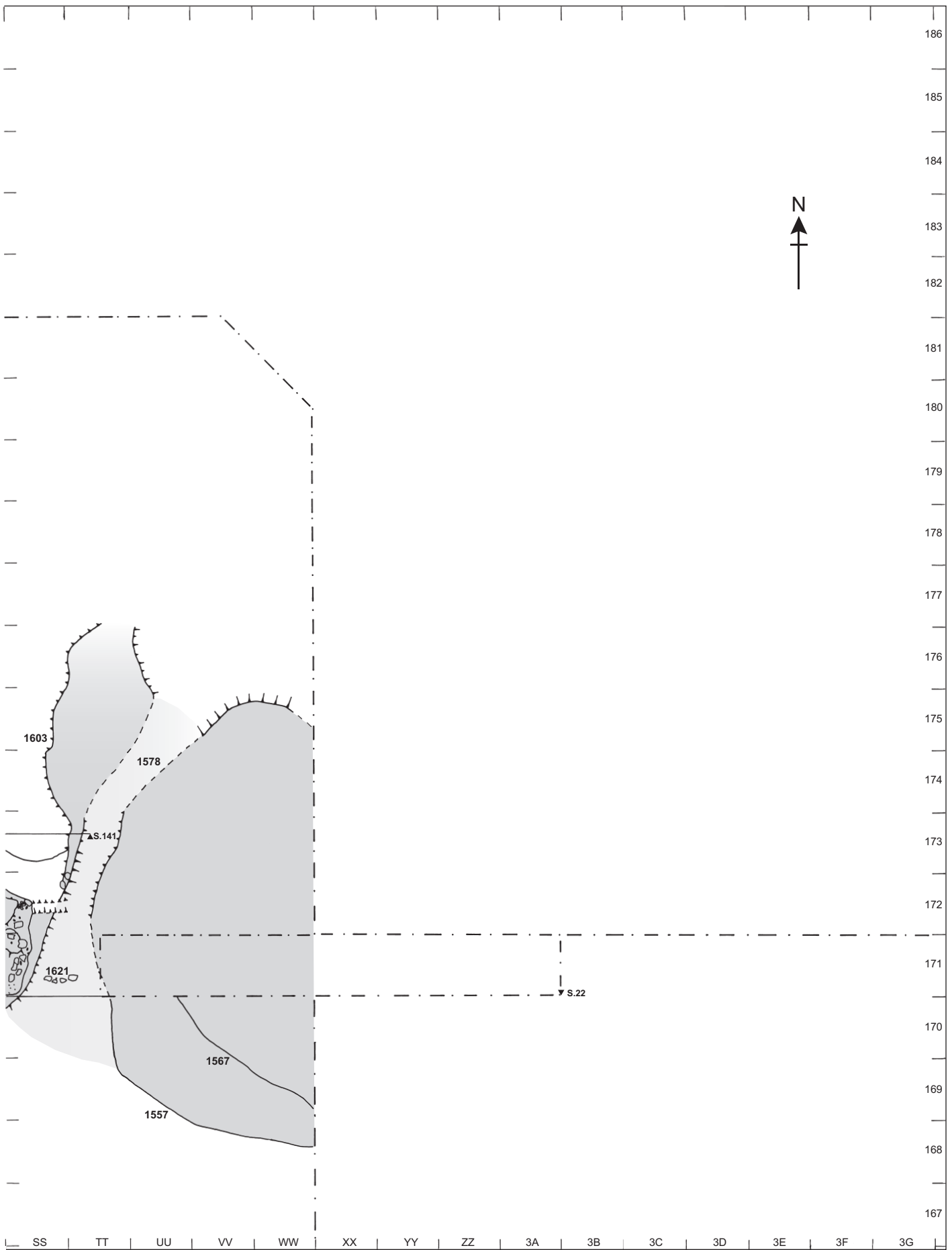




Plate 6. Phase 2 (Site 71): wall 41 blocking channel 65, viewed from the south-west.

Recut 268 had its initial clayey silting (256; Fig. 18, S.6) sealed by a sandy layer (241) which appeared to be a deliberate fill. This was then cut by a fourth channel (262; Fig. 18, S.6 and Fig. 25, S.1). Recut 262 was allowed to silt up.

The clay bank, previously revetted by the wattle lines, was extended westward, its edge running parallel to the earlier wattles (grid ref. RR 170 – NN 176; Fig. 14). This line marked the eastern edge of a water channel (western edge grid ref. MM 170-176) feeding water through the supposed mill-leet and the fill of hollow 116 and over the eroded remains of the now derelict structure recorded there in Phase 1.1 (178). This joined the exit channel (65) which continued to cut its way through the silts in depression 273. The water-washed pebbles of the water channel feeding into channel 65 and the water-washed gravel of channel 65 itself indicate continued movement of water along this line.

This exit channel (65) through the pond silts was at some stage blocked with wall 41 which was thrown up between post pads 44 and 92 (grid ref. MM 178; Fig. 20; Plate 6) and constructed of chalk rubble. Further silts accumulated in front of this and progressive dumps of cement-stone were then thrown into the silted rectangular pit from the higher ground to the west (179, grid ref. MM 176 – LL 178; Fig. 20). This was, possibly, to form a bridge abutment at the neck of the dam, or alternatively to provide the basis for a heightening of the clay dam. In the latter case, it should perhaps be regarded as an initial event of Phase 2.

Phase 2 clay dam and ponds

It is not clear from this point how Site 71 and Site 30 link together. Phase 1.2 must come before Phase 2.1 as the clay dam overlays the wattles and milling features (116,

177, 178 etc, Site 71). The development of channel 263 and its replacement by 265 could feasibly be contemporary with Phase 1.2.

Phase 2.1: first dam (Fig. 20)

The first indication of this phase was revealed in the 1973 north-south exploratory section as a clay bank (1575, Site 30; Fig. 15, S.21) overlying wattles and a level surface of small chalk. Further excavation showed that this bank had been laid across the valley floor, c. 16.46m west to east. It covered much of the silted up mill site features of Phase 1 (Figs 14 and 20).

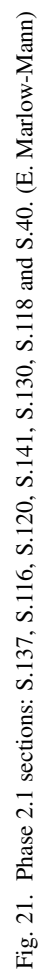
The bank had been given a crescent shape (Fig. 20). In the final form, as excavated, its height at western and eastern extremities was similar: the western margin at 136.09m (446.5ft) OD and the eastern margin at 135.94m (446ft) OD. The top was, however, lower in the middle of its length. It was cut by channels at two points which was a good indication that it had functioned as a dam rather than a weir.

The specific site chosen for the dam took advantage of the easternmost penetration across the valley bottom of periglacial slippage from the western hillside. This provided a natural clay escarpment and impermeable barrier against and over which to abut the clay dam. The slippage of the natural had a concave profile, which was reflected in the profile of the pond face of the western half of the dam.

At the eastern margin, the profile of the dam face was convex. This side of the dam was built over the southern and western margins of the burnt grain and ash mound (Fig. 14) of Phase 1. Clay (1557, Site 30; Fig. 20) was laid over the earlier deposits and a hard packed chalk pebble surface (1567, Site 30, grid ref. VV 170; Fig. 20) set into the clay. During construction considerable care had been taken in the selection and placing of rounded chalk pebbles for this surface, the whole being of a quality of workmanship rarely encountered within the stratified remains of the site.

The drainage function of ditch 262 was transferred to the south side of the Phase 1:1 bank (260, Site 71; Fig. 14 and 25, S.1) with the digging of a wide ditch (265; Fig. 20 and Fig. 25, S.1). This cut bank 110 over silt layer 107, with its own initial silting sealed by a layer of water-washed gravel implying that it continued to function. The existing clay bank (260) was raised (259; Fig. 20 and Fig. 25, S.1), partially extending over the fill of ditch 262, suggesting that this latter bank now served as a distinct boundary feature. It is possible that this particular sequence of events should be assigned to Phase 1.2 rather than to Phase 2.1.

The face of the clay dam had been cut at two points. A channel (1585/1586, Site 30; Fig. 20 and Fig. 21, S.137) was cut through the central portion of the clay bank. The higher level cut, further east, was a sloping channel (1603; Fig. 21, S.141) with a shallow lip in the pond face of the dam (grid ref. SS 172; Fig. 20). The sides of the channel were not as steep or as deep as those of the central channel 1585/1586.



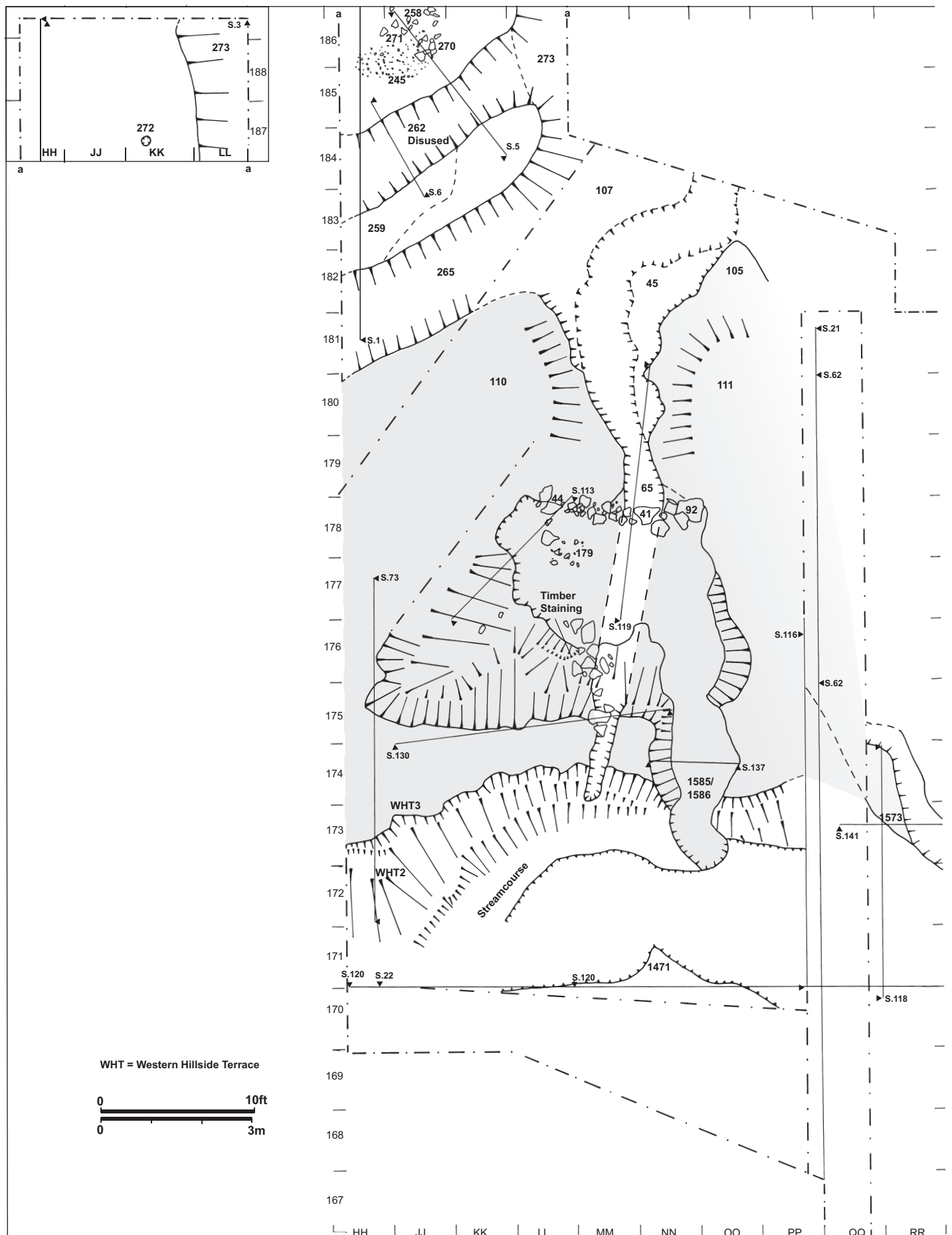
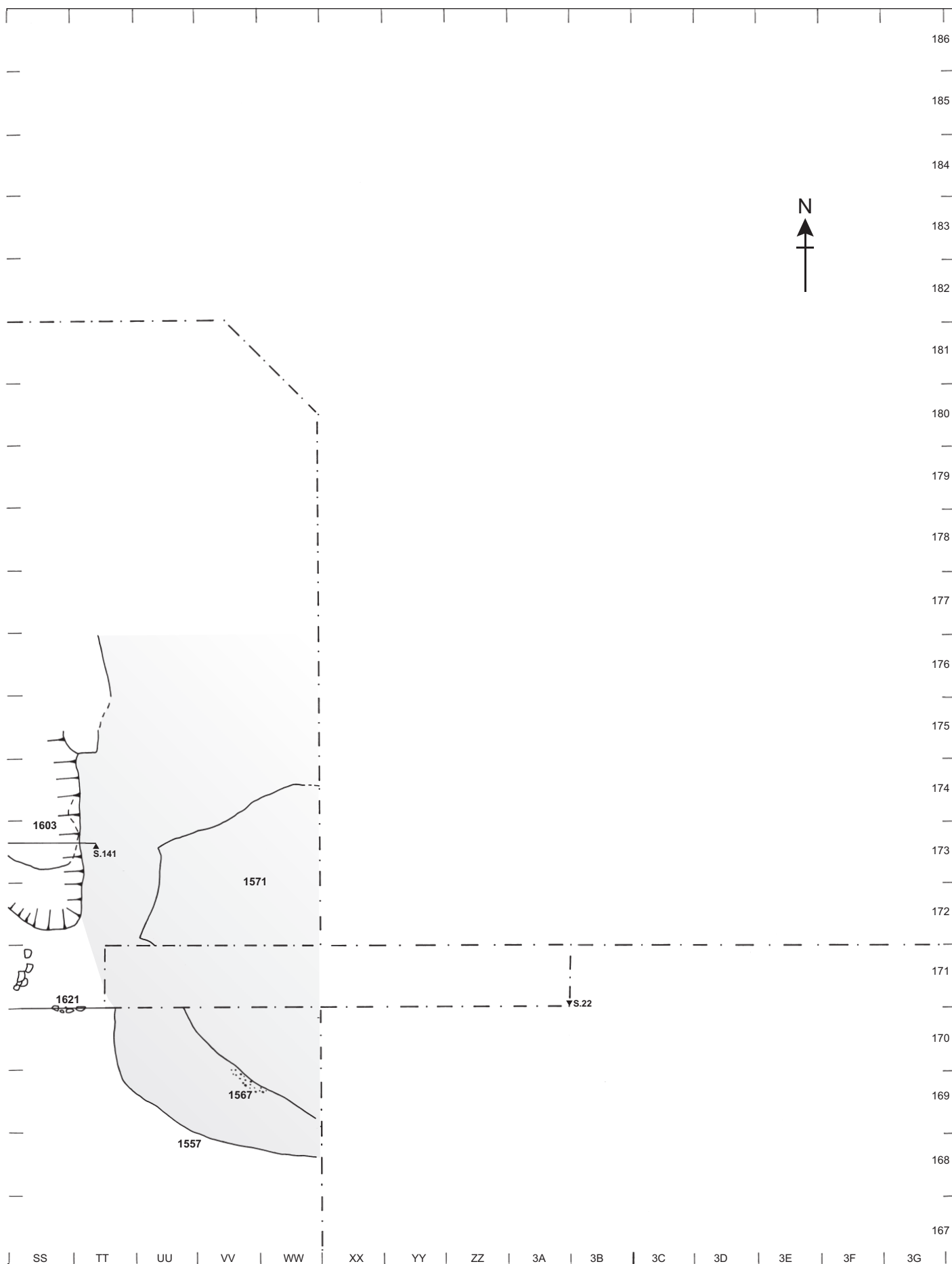


Fig. 22. Phase 2.2 plan. (E. Marlow-Mann)



Channel 1603 was made at the angle formed where the eastern dam margin turned westward across the valley. This position (Site 30, grid ref. SS 172; Fig. 20) was the most easterly possible if the permeable black deposit (no context number) below was not to be breached. Stone, primarily chalk, larger than the pebbles of the eastern dam face, reinforced the channel lip. This channel would have functioned as a spillway - an outflow from a full pond. An unlined cut across the black deposit (1578, grid ref. SS-UU 171-176; Fig. 20) east of this, used as a bypass channel in Phase 1.1, may have functioned whilst the spillway was being constructed). This was then filled and the entrance blocking reinforced with chalk (1621).

The sides of the spillway 1603 beyond the lip were formed by the clay banks (1575). The western of the two banks extended farther downstream and was capped with a gravel spread (1633) where the watercourse turned north-westward prior to entering the central channel (1585/1586).

For its pond floor (1574; Fig. 15, S.21; Fig. 21, S.116) the first clay dam 1575 utilised the valley floor platform. The first pond silts were partially drained by a streamcourse (Site 30, grid ref. KK 171 – NN 173; Fig. 20) which ran around the western pond margin and eastwards along the dam face to the central channel. In HH/JJ-170/171 this course was separated from the main body of the earliest pond, flowing in a northerly direction across a narrow terrace of the natural clay (Western Hillside Terrace 1). It brought water into the pond; the nearest source of water, other than the main stream itself, was a spring on the western hillside. The turn from easterly to northerly direction did not occur within the excavated area. Later phase events confirm the presence of waterflow into the pond area from a westerly hillside source.

Phase 2.2: dam modification (Fig. 22)

The principal change to the bank itself was shown clearly with the addition of clay deposits placed at the rear of the dam (1572, Site 30; Fig. 21, S.116 and S.130; and 1573, grid ref QQ/RR 173/174; Fig. 15, S.21; Fig. 21, S.118). This doubled the breadth of the bank at the centre of the valley, and raised the height by about 1.4m. A later addition of a green-blue clay (1571; Fig. 21, S.116 and S.130) on the eastern margin again raised the dam approximately 0.3m. The western half of the dam showed a less systematic mixture of clayey silts and silts within the primary blue clay material.

The margins of the central channel (1585/1586) had been raised as a consequence of raising the bank height and the channel itself had been recut with a broader profile. On its western side the edge had been eroded down to the height of the first clay dam top (1572 eroded to 1575, grid ref. NN 173; Fig. 21, S.137). No timber framework or lining to the cut survived. The clay, although mixed with clayey silt, would have served as at least a semi-permeable lining.

A development of the spillway raised the lip c. 0.23m, to 135.18m (443.5ft) OD, strengthening this portion of

the dam but retaining the shallow lip form of the original (1603). Chalk boulders up to 0.3m in diameter were set into a clayey silt deposited in the spillway immediately downstream of the lip, where they would have reduced the capacity of the water flow for headward erosion of the spillway lip. Beyond this the channel broadened out downstream and the gradient was reduced.

The consequence of raising dam and spillway heights was visible in the stratigraphy of the associated pond layers. The pond had filled with an homogeneous deposit of an olive green coloured silt (1474; Fig. 15, S.21) to a maximum surviving depth of c. 0.61m. The central channel (1585/1586, Site 30, grid ref. NN 172-174) must have been closed for this waterlain material to accumulate.

When the clay dam was raised the silted up pond was not cleared and the broader base of the higher dam extended upstream over the pond silt (Fig. 21, S.116). The failure to empty the pond meant that the raising of the dam did not increase the depth of water in the pond, although it may have increased the surface water area upstream.

A base of puddled clay (1471; Fig. 15, S.21; Fig. 17, S.22) was laid over the olive green pond silts. The western margin in HH/JJ 170 overlapped the top of the Western Hillside Terrace 1, but left the partially silted western margin watercourse open. Shallow depressions which formed in the top were of puddled clay, later filled with fine brown silt.

When this higher-level pond finally silted up the prevailing stream conditions produced a different composition of silts from those laid in the lower pond. In place of a single homogeneous silt, there was a series of alternating narrow bands of brown silt and of subangular small chalk. A north-south section (Fig. 21, S.116) through the centre of this pond showed a relatively simple sequence of six bands, but a section within 1.22m of the higher level spillway showed greater complexity of overlapping lenses of silt and chalk pebbles (Fig. 21, S.118).

The 1.22m wide western margin watercourse, referred to above, had its silting (1474; Fig. 20) removed. The second clay dam pond spread further westward by c. 2.44m to lap the edge of a 0.61m higher terrace in the natural clay (Western Hillside Terrace 2, Fig. 22), submerging the watercourse. After this second pond had silted up, a spillway was cut through the northern edge of the western silts. Its position (no context number, Site 30, grid ref. MM 173/174 – 175/176; Fig. 22) was c. 1.22m to the west of the central channel 1585/1586 and it would not have functioned when the central channel was available. This spillway eventually silted up (1438; Fig. 21, S.120) and was blocked with chalk rubble when it was put out of use. A V-shaped cross profile at the channel entrance from the pond gave way to a more round profile at the centre of the dam. There appeared to have been undercutting of the channel edge at this point. A vertical face with timber staining (Site 30, grid ref. MM 176; Fig. 22) between the silt and the chalk rubble blocking in the

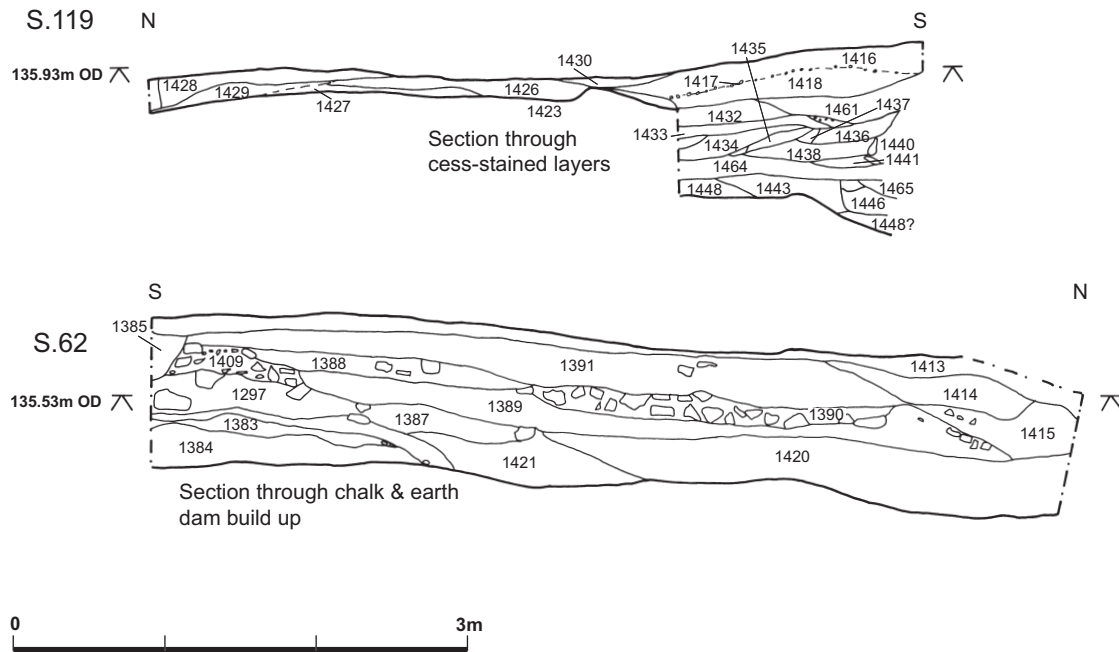


Fig. 23. Phase 2.2 sections: S.119 and S.62. (E. Marlow-Mann)

channel may be the only indication of the position of a timber barrier, subsequently removed or totally decayed without leaving any other trace. The broader spillway channel (1603) to the east continued to function.

Silt (1057, 1058, 1424, 1521; Fig. 21, S.40 and S.120), was dumped over the second terrace (Western Hillside Terrace 2; Fig. 22) which sloped down eastwards for a distance of 2.74m. This raised the level of its western edge to the height of a third natural terrace, this time of a chalk composition (Western Hillside Terrace 3; Fig. 22).

Silty loam and chalk pebble layers developed over the dumped silt, spreading 7.32m downslope and overlapping the western silted pond margin. Cess stained and organic matter accrued in these deposits (1416, 1417, 1418, 1419, grid ref. FF-LL 170/171; Fig. 21, S.120; Fig. 23, S.119). There was disturbance of the shallow continuation of these layers where it had spread over the chalk terrace margin for 1.22m and the appearance in section (1054, Site 30, grid ref. GG 170/171; Fig. 21, S.40) suggests trampling, presumably by animals.

The topmost layer of the upper pond silts (1297; Fig. 15, S.21; Fig. 17, S.22) also had a green tinge. The layers had consolidated sufficiently to bear the weight of animals and provide a c. 13m wide zone of marshy pasture reaching from the drier chalk terrace on the village side of the valley to the eastern spillway line.

The cess stained layer (1297) over the second pond silts had a counterpart to the rear of the clay dam. The lower ground behind the dam had been raised by 0.3m of compacted small chalk pebbles in a chalky clay matrix (1421; Fig. 23, S.62). This spread north for 1.22m and was capped by 150mm of loamy silt (1387), which abutted 1297 to the west.

The northern margin of the compacted chalk was extended for at least 3.66m to the limit of the excavated area by a spread of sub-angular chalk 'shingle' (1420;

Fig. 23, S.62). A cess stained layer of silty loam (1389, grid ref. PP 176-180) then developed to a maximum depth of 0.23m. This deposit extended the former depression (273) 6.10m to the north.

When excavated the clay dam's maximum height was c. 136m (446ft) OD at the western and eastern extremities and c. 135.3m (444ft) OD near the centre, with an additional low peak to the rear. The sectional view of this looks as though the dam had suffered rotational slippage at this point, the iron-stained chalk pebble deposit (621; Fig. 15, S.21) in the rear pocket of the slip being indicative of water flow over the dam top. Silt had also been deposited over the dam (1383 and 1384, grid ref. PP 176; Fig. 23, S.62) and these may have been factors in the construction decisions made for the following chalk and earth dam.

Phase 3 chalk and earth dam

Site 71 Phase 3 (Fig. 24)

Phase 3 of Site 71 seems to be slightly earlier than the chalk and earth dam but is broadly contemporary with Phase 3 of Site 30. It has, therefore, been placed on the same phase plan, Fig. 24, and is discussed first.

The silts in the north depression (273) continued to be progressively backfilled with dumps of chalk rubble and water-washed gravels, and the boundary line extended over it. The fills included water-washed gravel (11; not illustrated) which also filled channel 265 (see below).

The disused ditch 262 was finally backfilled and its backfilling was extended to the south by layers 219 and 239, overlying clay layer 238 (Fig. 25, S.13) which capped the earlier surfaces. These comprised a rough surface of compact layers of rotted chalk, but outlines of what had originally been roughly squared blocks were discernible within.



Fig. 24. Phase 3 plan. (E. Marlow-Mann)

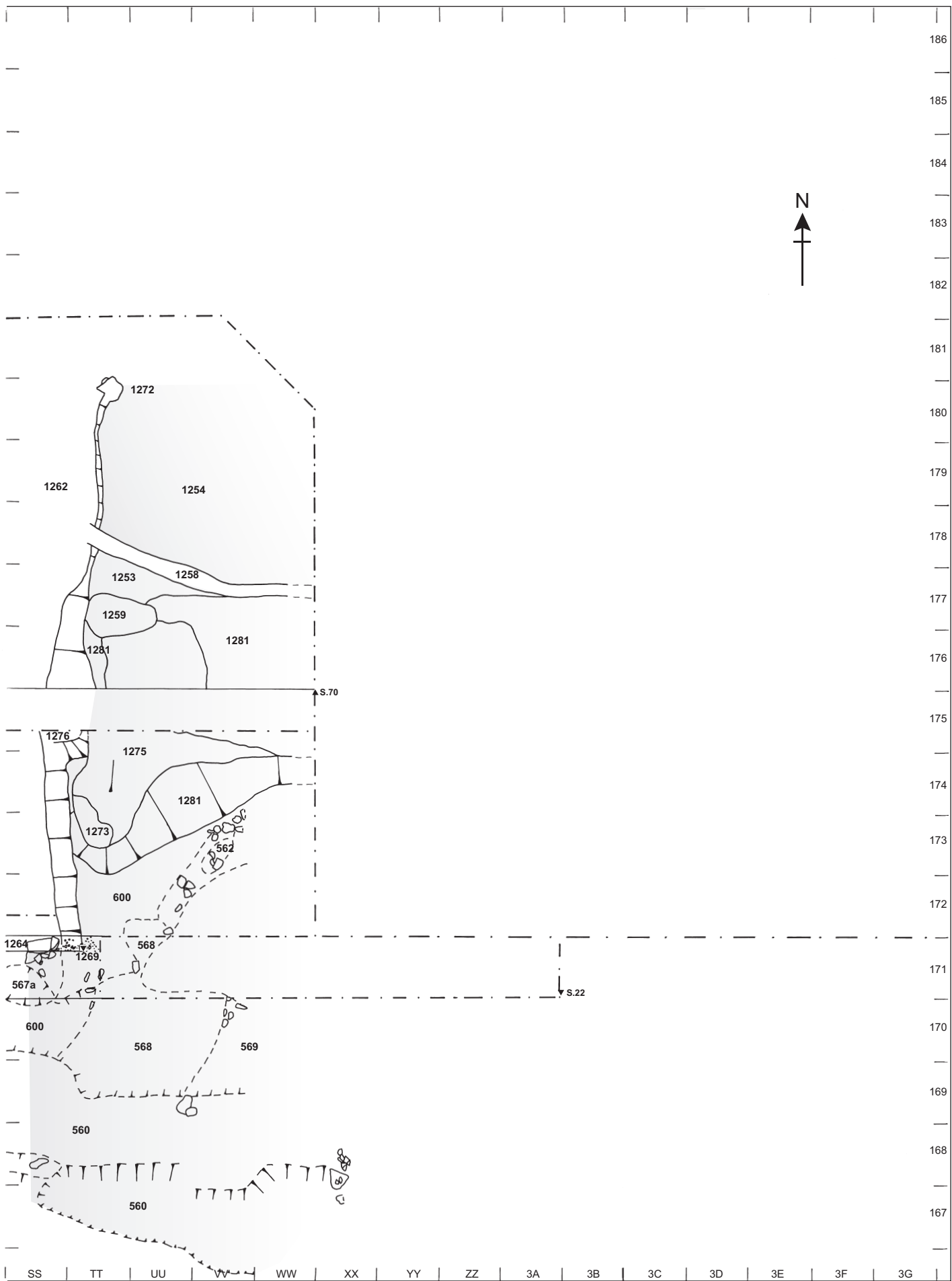




Plate 7. Phase 3 (Site 71): wall 202 with centre gap plugged with chalk rubble 217. Ditch 261 is located behind the wall and the disused ditch 265 is in the foreground, viewed from the south-west.

Clay bank 259 (Figs 20 and 25, S.1) was heightened by the addition of a deposit (235; Figs 24 and 25, S.1) whose line was continued over the fill of depression 273 by the heaping of a rough bank of earth and clay (236). The banks were then capped by a chalk rubble wall made of flat slabs (214, 218 and 202; Figs 24 and 26, S.5; Plate 7) with clay packing to the north of the wall (216). This wall was not continuous: a 0.61m gap (grid ref. KK 184; Fig. 24) was initially left at the junction of the old ground surface and the fill of ditch 262 to allow drainage from ditch 265 to continue to the north. A new 0.9m wide ditch (261; Figs 24, 25, S.1 and Fig. 26, S.5) was then dug to the north of the wall, cutting deposit 219 (Fig. 25, S.1) and the gap plugged with chalk rubble (217; Fig. 24). Ditch 261 now provided drainage northwards. This ditch appeared to have been regularly cleaned out, with the material piled on the north bank as a mixture of clayey silts (233) and a lens of water-washed gravel (220; Fig. 25, S.1). This may have been intended to provide extra protection for the platform.

The now-disused ditch 265 was then filled with a succession of dumps of chalk rubble and gravel (11 and 12; not illustrated) deposited from the south and probably associated with the construction of the chalk and earth dam of Site 30.

A further, 0.7m wide boundary wall (93), running roughly parallel to wall 214/218/202, was built across channel 65 (Fig. 14) finally blocking the entry into 273 (grid ref. KK/LL 179 – NN 180). This was represented by a 3.05m long foundation of chalk rubble with a slot dug into the end of clay bank 110 and overlying wall 41 (Figs 20 and 24). It may have represented a rebuilt foundation for a crossing as represented earlier by the dumps of cement-stone (179; Fig. 20) and wall 41.

Site 30 Phase 3 chalk and earth dam (Fig. 24)

The new dam was created out of the most readily available materials at Wharram, chalk and earth, with the dam top peak varying little in height along its length, standing at c. 136.47m (447.75ft) OD. The alignment was straighter across the valley than the clay dam had been, albeit not at a right angle to the hillsides (grid ref. JJ-XX 167-180 approx.).

Unlike the clay dam, the highest point of the chalk and earth dam, though only marginally, was at the midpoint of its length. There, (grid ref. PP/QQ along 170/171; Fig. 17, S.22) 0.9m of material was deposited over the clay dam pond silts (1291; Fig. 15, S.21; Fig. 17, S.22) in order to provide a broad and stable base for the new dam, while at the west end it was necessary to deposit only 0.3m of material onto the third of the natural terraces to attain the desired height. Sufficient material to provide an increase of c. 0.4m was deposited over the clay dam to the east of its spillway. The magnitude of work involved in removing silt from the Phase 2 ponds was probably one of the most influential factors in the decision to raise the height of the chalk and earth dam rather than cleaning out the waterlogged silt deposits, a task experienced first-hand by the excavation team.

The original relationship of the chalk and earth dam with the eastern hillside has been cut by more recent phase events. An east-west distance of 3.66m (grid ref. QQ/RR – VV; Fig. 17, S.22) stretching from the area of the burnt grain mound of Phase 1 to the eastern hillside slope had a height at the time of excavation which was lower than would have been needed to preserve any of the Phase 3 layers, standing at a maximum surviving height of 136.05m (446.36ft) OD.

Dam construction

The first step in constructing the bank was the making of a broader platform over the marshy ground. To the north of the spread of cess-stained loam the ground level dropped into a hollow, behind the earlier clay dam peak (grid ref. HH/JJ 174-175; Fig. 26, S.73). The lower of the two layers which filled it was a clay loam (1376; Fig. 26, S.73), also cess stained. Over this was tipped small sub-angular chalk with a clay loam matrix (1375; Fig. 26, S.73); a maximum thickness of 0.37m of deposit extended the level of Western Hillside Terrace 3 north-eastwards by at least 3.66m. A layer of larger sub-angular chalk up to 0.23m diameter in a similar yellowish-brown matrix (1390; Fig. 23, S.62) was laid onto the northern extension of the pond top cess stained silt (1389, grid ref. PP 178-179).

In the central part of the dam's length (Site 30; Fig. 15, S.21) the sequence of operations for any level began at the rear of the dam position. The middle portion was then built up, and finally the pond face of the tips was protected and reinforced. The greater quantity of material required in this area to achieve the same height as the western margin was represented by a sequence of friable clayey soils in deposits of between 0.15m and 0.3m, alternating with surfaces of thin layers of small chalk.

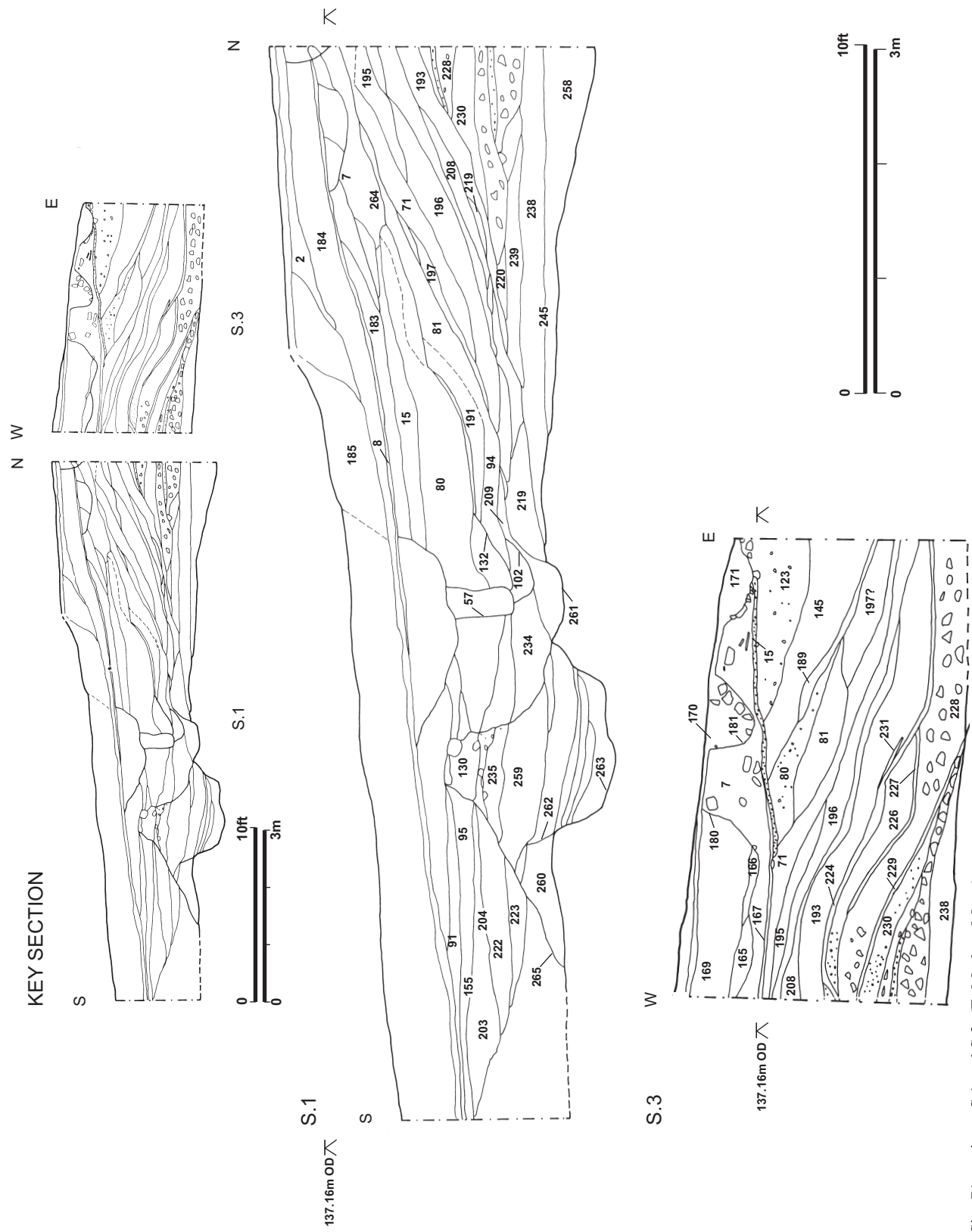


Fig. 25. Site 71 sections: S.1 and S.3. (E. Marlow-Mann)

The particular sequence of layers began with clay (1290; Fig. 15, S.21), then a compact chalk 'slurry' (1289), followed by small chalk fragments in a clayey matrix (sample no. D15). This was then topped off by a level surface of chalk pebbles and gravel (560; Fig. 24; Fig. 15, S.21; Fig. 26, S.73). This spread over the build-up and the former pond area, providing a flat top to the west end of the dam at 136.55m (448ft) OD. The clay base (1290) was thrown back northwards over this rubble layer with the effect of sealing it against water. Chalk rubble in a brown clay matrix (528) was then set into the clay to form the dam face. The dam top surface was then built up with a further 0.3m of chalk rubble in a light grey soil matrix (558; Fig. 24; Fig. 15, S.21).

The north face was steeper than that of the downstream side of the dam. Chalk rubble tips (615, 620, 1414, 1415, 1511 and 1512; Fig. 15, S.21; Fig. 23, S.62; Fig. 26, S.113) had been dumped over an area extending a maximum of 6.10m northwards from the rear face of the chalk and earth dam into which a scalloped shaped depression was cut (1395, grid ref. KK-LL 176; Fig. 24).

The chalk and earth dam face survived best in the stretch in front of the former spillway line (grid ref. TT-VV 168-169; Fig. 24). It was protected from the pond by post-medieval development; elsewhere, events in later phases cut away the face. The surviving portion retained a convincing profile and was faced by a layer of small chalk.

Channels (Fig. 24; Fig. 26, S.73)

A channel was dug to drain the pond silts, (1357, grid ref. LL/MM 171/172 – 175/176). Considerable slumping occurred and a line of substantial rubble (507) was overlaid as a countermeasure. A temporary drain (557) was roughly gouged out of the make-up layer but it was sealed by the next surface (560).

Spillway (1262, Site 30; Fig. 24)

Channel 1262 is a development of the earlier clay dam channel 1603 (Figs 20 and 22) and as the dam height increased the level of the spillway lip was also raised. In addition there was an associated increase in the height of deposits in the spillway channel through the dam, (Fig. 26, S.70). The cut and fills of channel 1262 are unrecorded on the main north-south section, Fig. 15, S.21.).

The lowest surviving silt in the spillway (1260; Fig. 26, S.70) accumulated to a thickness of 0.5m, and incorporated fragments of leather and wood. The finds from this deposit provide inconclusive dating and it is, therefore, not possible to connect this with a particular pond, although its lowest position, thickness and homogeneity, make attractive the hypothesis that it related to the first clay dam.

After the dam top east of the spillway line had been raised by 0.3m of horizontal make-up layers (1257, 1256, 1254 and 1280; Fig. 26, S.70), a new spillway edge was constructed on the east side out of blue clay, incorporating fragments of chalk (1281; Fig. 24 and Fig. 26, S.70). It extended partially across the surface of the

silt 1260 (Fig. 26, S.70) already deposited, and created a new higher base level for the spillway.

A further six layers filled the spillway channel and raised the level by almost a metre (1261, 1308, 1307, 1306, 1283 and 1282; Fig. 26, S.70). A narrower channel (no context number) had been recut through the silt 1308; this then filled and was sealed by a thin spread of silt (1306) across the whole width of the spillway. These events were then repeated at a higher level; the thicker silt deposit (1283) was cut by a 0.8m wide channel (no context number), which in turn was filled by silt 1282. The spillway channel was then full.

The eastern bank of the spillway was cut by a shallow ditch (filled by 1258; Fig. 24) running in a north-westerly direction from the eastern hillside. A spring which still flows intermittently from this hillside is the likely source for this water flow. There was no evidence for the spring being channelled into the pond.

Part of the western edge of the spillway was destroyed by the first, north-south, exploratory section. Four possible post-holes (1270, 1271, 1272 and 1276) are positioned at regular intervals in the sides of the spillway and suggest a timber lining; however, no information is available relating to these apart from that on Fig. 24.

The spillway lip position of the first chalk and earth dam (1264; Fig. 24; Fig. 26, S.69; Fig. 16, S.24) was in the same position as that of the earlier spillway of the second clay dam. It was a stone construction, of which the upright east edge stone and one base stone remained. The design changed from that of a shallow lip to one of a rectangular framed entry point, set into clay. The lip height was raised to 135.64m (445ft) OD.

Subsequent lip development is more ephemeral. The lip was moved southward in response to the movement of the dam face in the same direction. A shallow lip further south is a degraded form, although the channel line, with a recut, is just discernible (grid ref. SS-TT 170/171; Fig. 17, S.22).

The spillway line was finally abandoned and sealed by the penultimate top layer in this portion of the dam (1253; Fig. 26, S.70). This was one of at least thirty tip variations in the surface of this level of the dam within the overall parameter of chalk and earth aggregation.

Development

The later development of the western end of the chalk and earth dam was, at the time of excavation, thought to represent survivals of a high level dam, most of which had been eroded. However, later excavation of the west end showed this interpretation to be wrong. The works were related, not to pond water utilisation, but to the use of, and protection from, spring water flow rising at the junction of the Western Hillside Terrace 4 with the slope of the valley side. There were no surface indications of a watercourse from the western hillside at this point prior to excavation. The spring source proved to have been capped and piped away by 1930s waterworks exploitation. When excavations were undertaken, archaeology was not permitted in the waterworks property.

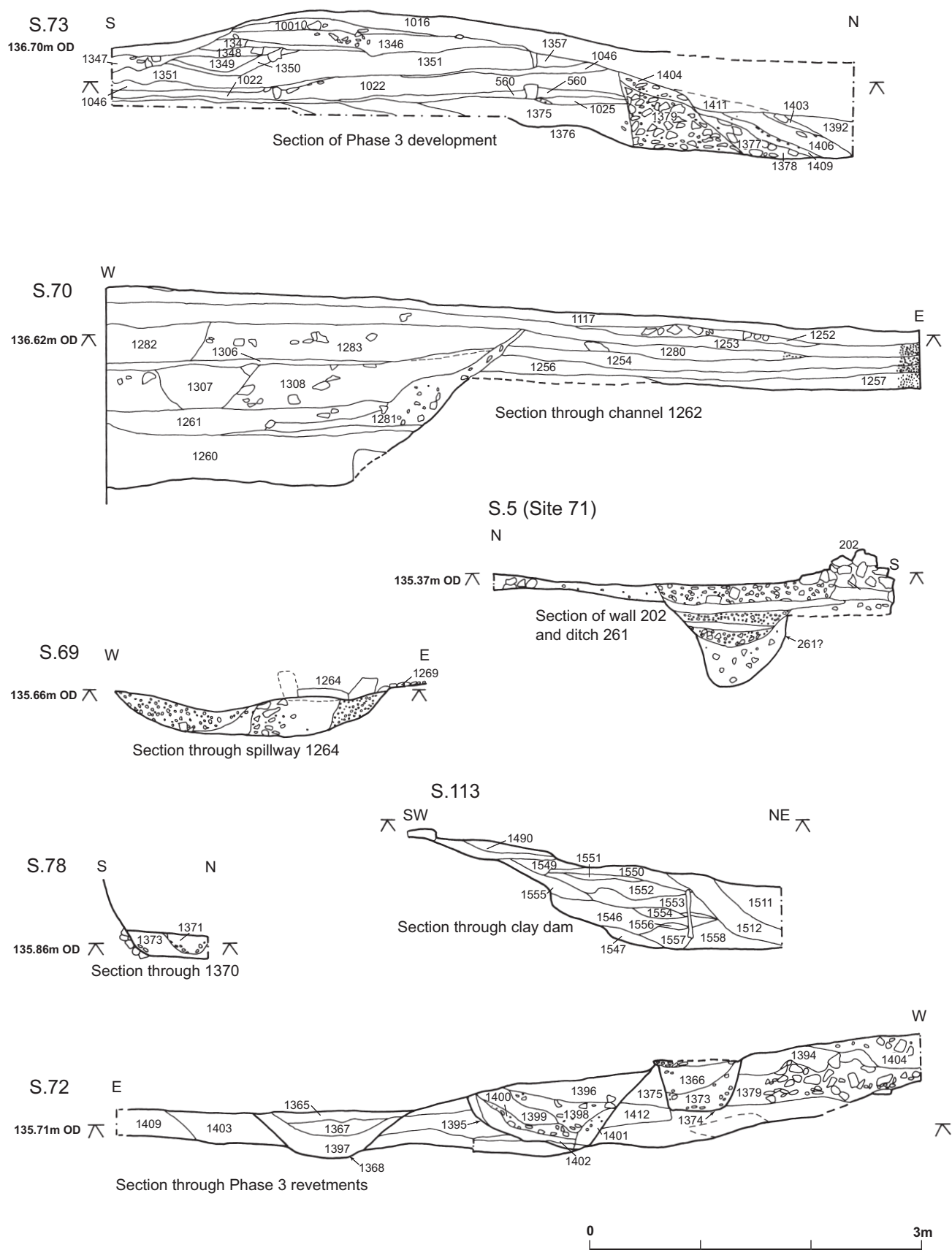


Fig. 26. Phase 3 sections: S.73, S.70, S.5, S.69, S.78, S.113 and S.72. (E. Marlow-Mann)

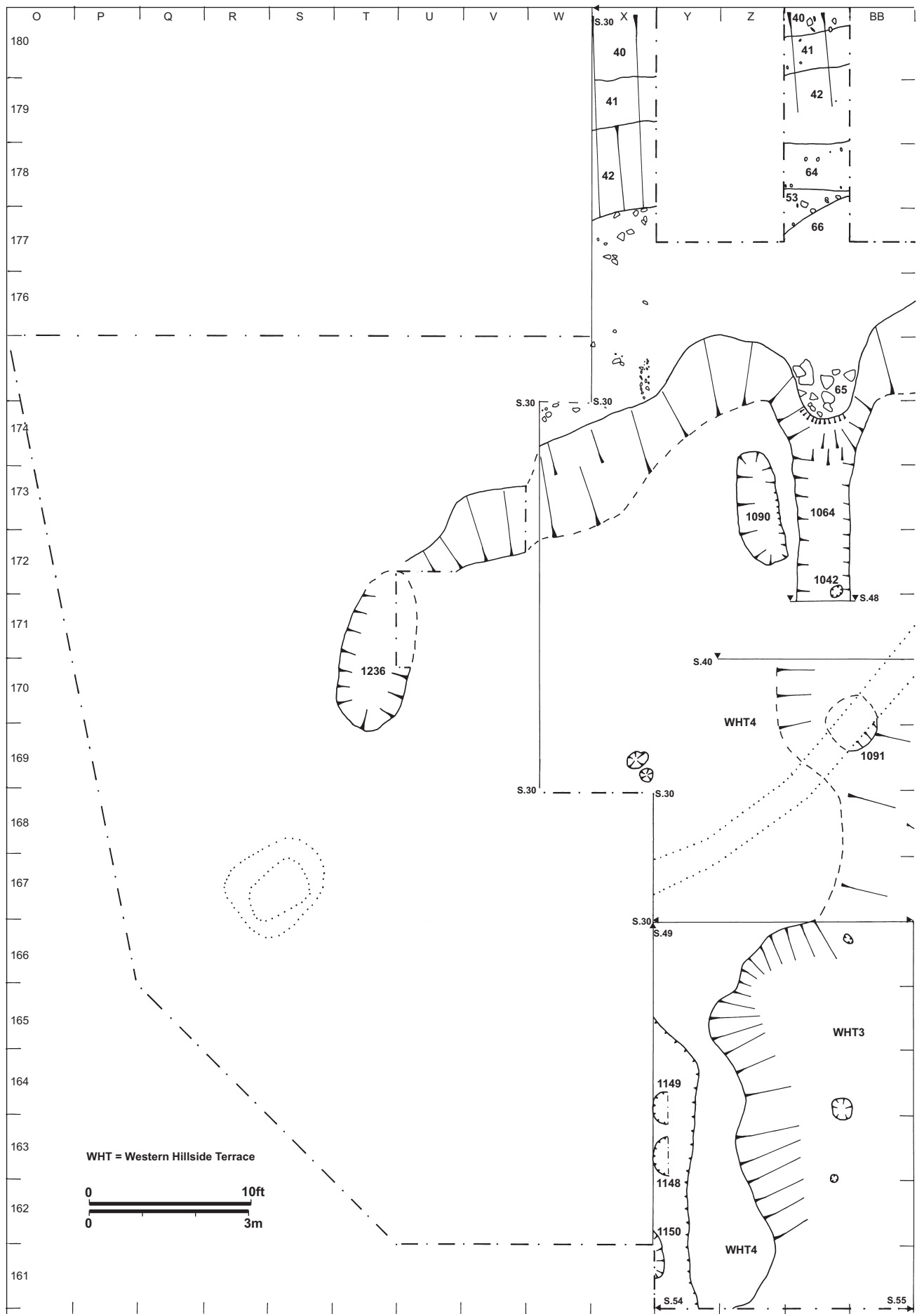
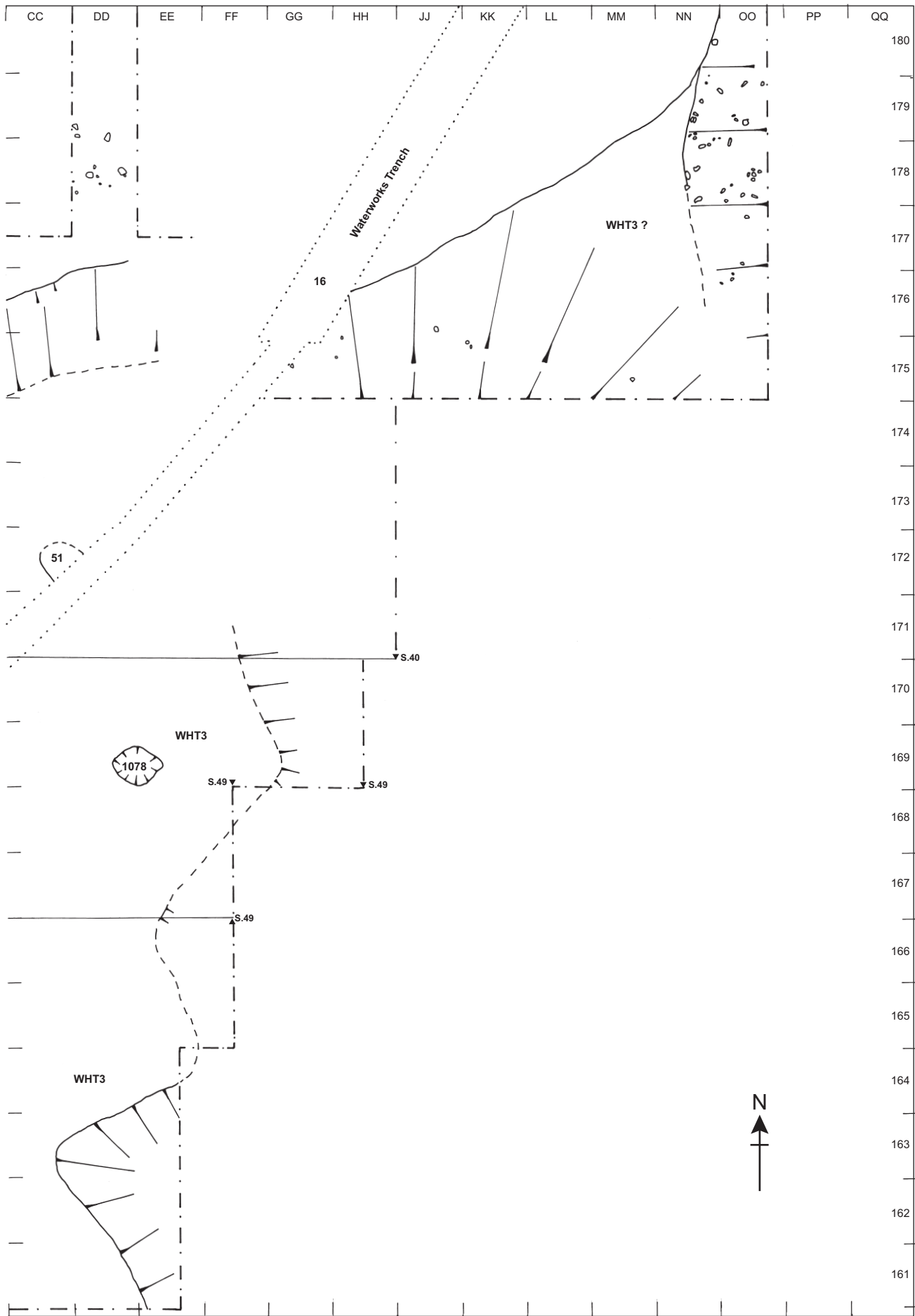


Fig. 27. Site 30 Phase 4.1 plan. (E. Marlow-Mann)



The western margin of the dam was raised above the level of the remainder by 0.3m of clayey soil (1022; Fig. 26, S.73), capped by another chalk pebble surface (1046; Fig. 26, S.73). This formed a low bank on top of the dam, which dipped slightly southwards (grid ref. HH 173; Fig. 26, S.73).

The build-up layers over Western Hillside Terrace 3 (Fig. 22) formed the western end of the chalk and earth dam where it had been laid onto the edge of the terrace. A bank (1351; Fig. 26, S.73, not on plan; maximum depth of deposit 0.3m), was raised with its southern face projecting 0.61m farther than the chalk and earth dam at the western terrace edge. This face was capped with clay (1350) and the bank top levelled up (1347, 1348 and 1349) for the laying of a chalk surface (1346). The earliest northern face of this bank survived as a line of pebbles in section after the bank was extended northward to provide a flat top *c.* 3.05m north to south, with a steep northern rear face.

Both front and rear faces of this bank were strengthened. To the rear the northern face was shaved off and then lined with a chalk rubble revetment (1379; Fig. 24; Fig. 26, S.73 and S.72). A cut (1404) was made through the rear face, but was above the pond water level and did not reach the pond face.

A further heightening of the bank raised the western extension of the dam line by *c.* 0.23m (1001; Fig. 26, S.73) and the build-up layers were again sealed by a chalk surface (1016). The earlier northern revetment was cut through by a channel (1374; Fig. 24; Fig. 26, S.72), and a new revetment wall (1378; Fig. 24; Fig. 26, S.73) was extended from the west to the line of this channel. Clay (1377) was packed into the gap between the lines of the old and new revetments.

Channel 1374 and the area to the north of the revetment were subsequently filled with silt and a replacement channel (1368; Fig. 24; Fig. 26, S.72) was dug further east. This cut through the earlier east-west channels 1451/1452. A short length of foundation trench (1370; Fig. 24; Fig. 26, S.78) and a post-hole (1410; Fig. 24), plus the channels which fail to reach the waters of the pond are the only indications of activity relating to this phase.

At this stage the dam height had reached 136.55m (448ft) OD over the site of the burnt grain and ash mound of Phase 1 (not shown in section due to disturbance during Phases 5-7). There was no central channel to the chalk and earth dam. Rejecting the hypothesis that the bank functioned solely as a weir once the spillway was filled, the option that remained available lay farther east across the 3.66m of the eastern hillside natural clay terrace. A broad shallow depression is shown here in the valley cross section (Site 30, grid ref. ZZ; Fig. 17, S.22). This has been the line used in post-medieval and modern phases and these have removed traces of earlier use. No positive evidence is therefore available for the medieval first use of this line, but by elimination this is the one potential solution to the question of how the spillway drainage system was replaced.

Phase 4 west end surfaces and features

Phase 4.1: the western pond margin (Fig. 27)

The western margin of the chalk and earth dam pond was represented by a very shallow spread of organic rich silt (1145, Site 30, grid ref. CC-HH 161-168 approx.; Fig. 28, S.49) across the eastern part of Western Hillside Terrace 3. Post-holes (1148, 1149 and 1150; Fig. 28, S.54) cut into the natural chalk may be the earliest surviving definition of the pond area boundary.

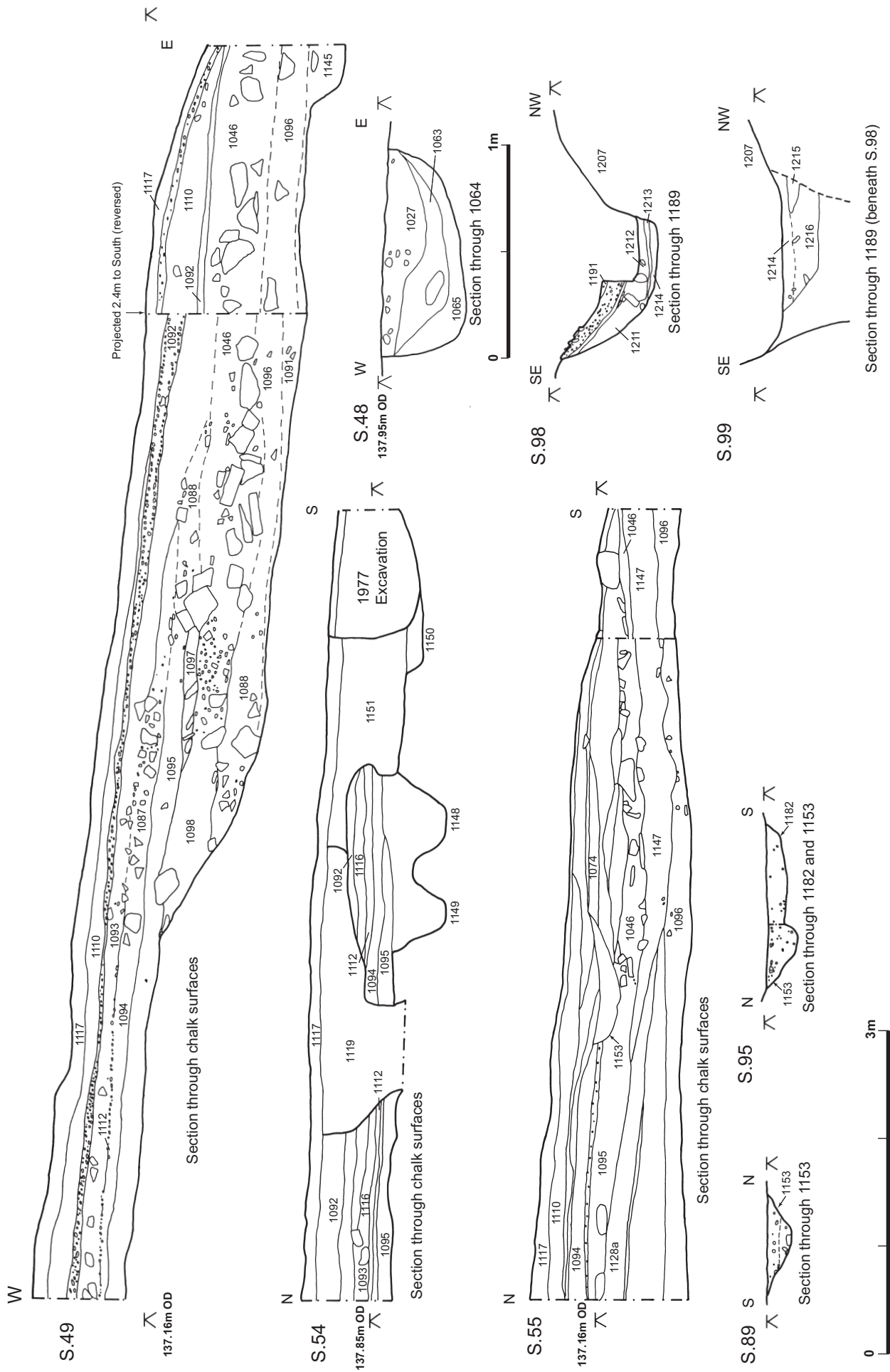
Into the natural chalk of Western Hillside Terrace 3 were cut two small pits, *c.* 1m in diameter (1078 and 1091), two 0.15m diameter post-holes and one 0.3m diameter post-hole (grid ref. AA/BB 163-166). The post-holes, pit 1091, post-hole 1042 in the base of channel 1064, plus the eastern edge of channel 1064 are in alignment (grid ref. AA/BB).

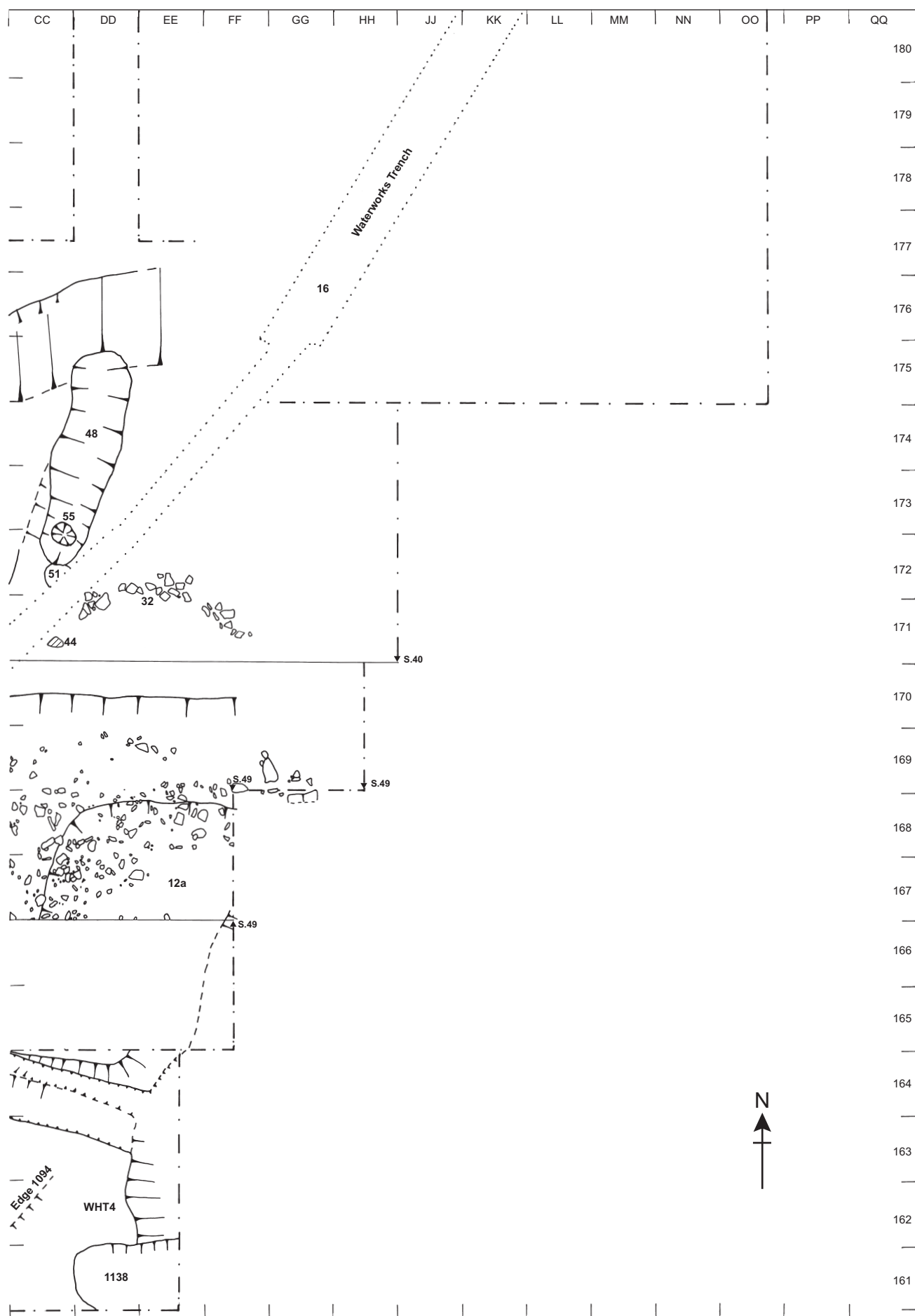
A large volume of silt (1096, Site 30, grid ref. AA-GG 161-168 approx.; Fig. 28, S.49 and S.55) was dumped onto Western Hillside Terrace 3, spreading 6.71m from west to east. The maximum depth of deposit was *c.* 3mm, its top level varied from 137.5m (451ft) OD at the eastern junction with Western Hillside Terrace 4 in Z 164/165 to 136m (446ft) OD at its furthest southwards excavated extent in EE 161/162. A hard compacted chalk 'concrete' layer (1128a; Fig. 28, S.55) was laid over the slope of the silt deposit for a west-east distance of 2.13m. Sufficient time then elapsed for frost shattering of the surface and for the loss of a small quantity of pottery and a stirrup.

A layer of debris (1147, grid ref. BB-DD 161-165 approx.; Fig. 28, S.55), a 4:1 mix of chalk pebbles and silt, was spread off the edge of the surface. A further silt dump (1046 and 1097, BB-HH 166/167; Fig. 28, S.49) up to 0.61m in depth was augmented by the tipping into it of large blocks of rough and partially worked sandstone and chalk, and also a fragment of grinding stone (No. 45, context 1143). A more extensive second compacted chalk 'concrete' layer (1095, X/Y-DD 164-167; Fig. 28, S.49 and S.55) was then laid over this.

This series of chalk and silt dumps raised and extended Western Hillside Terrace 3 producing a flat surface, western hillside terrace 4, sloping gently eastwards for 17.07m until it reached the artificial break in slope down to the surface of the chalk and earth dam top. This distance was equal to the length of the dam itself.

A north/south cut (1064, grid ref. AA 172-174; Fig. 28, S.48) through Western Hillside Terrace 4 survived for a length of 2.44m leading to a 0.61m drop into a semicircular embayment cut into the north face of the terrace. The floor of the embayment was a setting of chalk and sandstone blocks (65) 0.3m higher than the adjoining surface to the north. The cut was 0.61m wide with a flat bottom and vertical sides, suggesting that it had been timber lined. A single post-hole (1042) had been made in the base of the cut. On the western side and parallel to cut 1064 was a 0.23m deep depression, 0.8m wide and 2m long (1090). A small pit on the eastern side was visible as a collapse of the side of the modern trench





(51, grid ref. CC 172). To the south-west of cut 1090 was found another 0.23m deep depression, 1.22m wide and surviving for a north/south length of 2.44m (1236).

East of depression 1236 Western Hillside Terrace 4 sloped gently, dropping from 138.1m (453ft) to 137.3m (450.5ft) OD, over a distance of 0.3m to the south and a maximum of 9.14m to the east. The break in slope from WH4 down to WH3 ran north to south within Z-AA for 31.7m across the excavated area. Western Hillside Terrace 3 also fell away in the same manner, broadening southwards to a maximum 9.14m west-east dimension.

Phase 4.2 (Fig. 29)

West of the above features the north face of the terrace changed direction from south-west/north-east to north/south and became the eastern side of a deep sloping cut (1189; Fig. 28, S.98 and S.99). The cut sloped downwards in a northerly direction, running 6.10m north to south, and increasing in width from 1.22m to 2.32m. The floor of the cut dropped 0.8m, the gradient being steepest to the south and becoming shallower as it progressed northwards. Nails were found spread along the base of the feature.

The deep cut 1189 marked the western limit of feature development over the western hillside terraces during this phase. The western side of the deep cut 1189 was of a light orange coloured loess-type natural, different from the east side of the cut, which consisted of solifluction mixed chalk fragments. The cut position exploited this junction of natural materials, which may therefore have been visible at the ground surface.

A cross-section of 1189 (Fig. 28, S.98 and S.99) cut to confirm its base of natural chalk at c. 136.5m (448ft) OD showed after removal of 0.3m of chalk to have had an earlier period of use. Although it was only possible to open up a small area, 1.22m x 0.61m, the evidence was clear. A channel edge had been cut c. 0.3m to the north-west of the higher level edge; its breadth was at least 0.61m before it disappeared beneath slumpage of the natural hillwash without trace of the beginning of the other north-west side of the cut. On the visible 0.61m partial cross-section of the channel floor were a sequence of thirteen iron nails; no trace of organic material was found. Nails were also found on the lowest layer (1205, not illustrated) of the first 2.44m from the southern end of the deep cut 1189; this length of gully cut was separately identified (1208).

The south-western surviving edge of the channel was cut at an angle of 45 degrees, giving a depth of 0.3m. There were three fills to this channel, consisting of sub-angular chalk pebbles, fine chalk gravel, and chalk rubble up to c. 0.13m diameter having a brown-grey silt matrix. Layer 1214 (Fig. 28, S.98 and S.99) also incorporated sandstone amongst the rubble and pebbles.

A new, more vertical, edge was formed in the hillwash of the north-west face of the deep cut. The profile was matched on the opposite side by the building up of a more vertical face out of clay and small chalk pebbles (1211;

Fig. 28, S.98). The clay appeared to have been puddled and may have formed an impermeable lining to the channel.

A single nail was found at the junction of 1214 and the lowest fill of the second stage of the deep cut (1213; Fig. 28, S.98). The second stage channel had a rectangular cross section 0.23m deep x 0.8m wide (Fig. 28, S.98). This was later filled with silt, interspersed with occasional lumps of flint. The filled second stage channel and its south-east lining 1211 were sealed by a 0.15m deep layer of 75% chalk pebbles in a silt matrix (1209, not illustrated).

The southern end of the cut 1189/1208 formed a shallow lip, partially disturbed by a modern pit (1155), which intersected almost at a right angle with a channel (1153; Fig. 28, S.55 and S.89) running west-east across the 'concrete' surfaces 1094 and 1095 over Western Hillside Terrace 4. It ran from the western hillside, 0.61m wide x c. 0.18m deep with a 0.15m wide slot in the bottom. The channel ran for 18.29m (through the excavated area) before it reached the pond edge. Before it disappeared beneath the area of the unexcavatable waterworks collection tank it had broadened to 1.22m, whilst increasing only marginally in depth. Where it reappeared beyond the restricted area its course overlay an earlier line immediately to the south (1154).

The south side of channel 1153 was increased in width for a 1.22m stretch opposite the intersection with the lip of the deep cut 1189. The right-angled extension (1182; Fig. 28, S.95) was similar in form and position to that identified in phase 1.1 (178, Site 71; Fig. 14). The slot in the base of 1153 filled with silt; the silt fill above that contained 50% of small chalk angular fragments and pebbles, plus occasional lumps of flint.

About 0.6m beyond the south edge of channel 1153 and parallel to it, a shallow narrow soil mark (Site 30, grid ref. Q/R 166 – V 165) ran 6m westwards from the angle formed by the extension 1182. The eastern termination was at the north-western corner of a cobbled area, of chalk and sandstone (1216). After resurfacing of the cobbled area (1164, Site 30; not illustrated) had taken place the eastern end of the line was no longer visible. Context 1164 was particularly notable due to the large number of horseshoes recovered (see Ch. 15).

A number of small pits and post-holes (1186, 1187, 1172, 1174, 1176, 1178 (not illustrated), 1197, 1203, 1204, 1194) were situated mainly to the south of channel 1153. A further pit (1138, Site 30, grid ref. DD-EE 161) was dug, cutting through the earlier pond edge.

A build-up of chalk rubble (50, below 1094 on Fig. 29; Fig. 30, S.30) to a maximum depth of 0.3m over natural sealed the south end of cut 1064 and its parallel depression 1090 (Fig. 27). A similar cut (48) was made 3.05m further east through deposit 50, running north-north-east to south-south-west; the feature also had a post-hole (55), 0.5m diameter, set within the southern half of its surviving 3.35m length. The southern limit had been destroyed by the 1930s waterworks trench, but appeared to have terminated at an earlier pit (51).

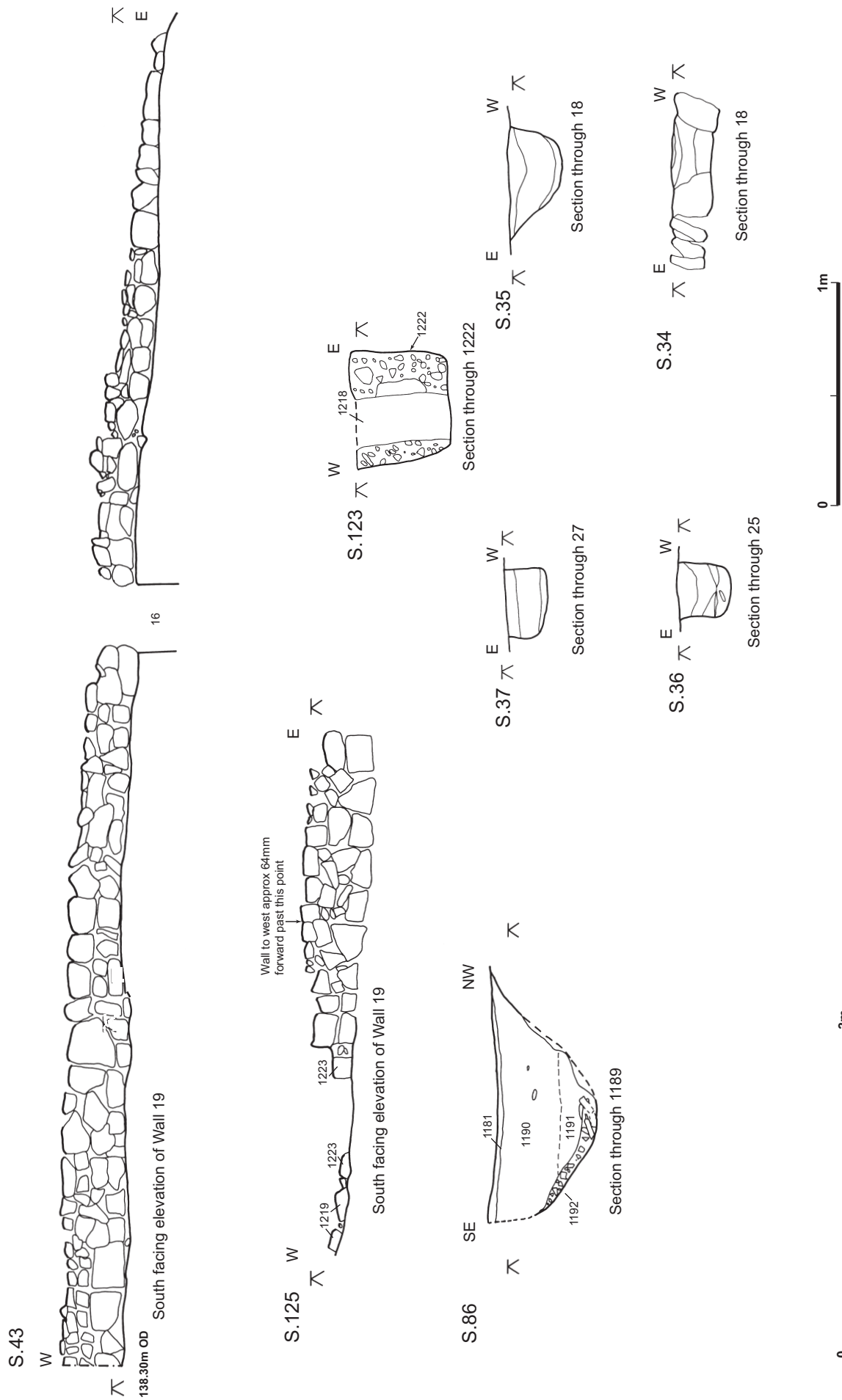


Fig. 31. Site 30 Phase 4.2 and 4.3 sections: S.43, S.125, S.86, S.123, S.37, S.35, S.36 and S.34. (E. Marlow-Mann)



Plate 8. Phase 4 (Site 30): stone footing 44. The subsequent footing 19 and revetment can be seen in section against the baulk, viewed from the south.

A stone footing or edging (44; Fig. 30, S.30; Plate 8) of irregular sized blocks was laid running westwards for 7.8m from a position close to the southern end of cut 48. It was only one block thick; a single block of sandstone continued the line of the structure east of the waterworks trench. The footing faced south, its position forming the crest of a west end platform. It was retained by a clay-bonded chalk surface (50, below 1094 on Fig. 29; Fig. 30, S.30) which abutted the footing on its north side. The surface spread 1.83m north to a deposit (39, Site 30; not illustrated) over the top edge of the steep north face of the platform. At the west end the footing stopped 2.44m short of the north-east edge of the earlier depression 1236 (Fig. 27).

The second hard-packed chalk 'concrete' surface (1095, below 1094 on Fig. 29; Fig. 28, S.49, S.54 and S.55), creating an artificial platform extending the level of Western Hillside Terrace 4 (WH4) over WH3 along the western pond margin, spread for 7.62m and terminated against context 44. On this surface accumulated 92 potsherds and a small quantity of animal bone. A tumble of chalk and occasional pieces of sandstone from context 44 spread southwards for 1.22m across surface 1095 along the full length of the wall.

A third hard-packed chalk 'concrete' surface (1094; Fig. 28, S.49, S.55 and S.54; Fig. 30, S.30) was laid over surface 1095, and was extended over the line of the tumbled 44; the depth of the new layer was 0.10m over the footing, increasing to between 0.15m and 0.3m depth over the platform to the south. Into this surface a large pit-like feature (12a, grid ref. CC-DD 166-168) containing large quantities of pottery (see Ch. 8) was cut, in addition to a number of post-holes (1128-1137).

Vestiges of another stone edging (32, Site 30), on the same general west-east alignment as context 44, formed the northern boundary for the laying of surface 1094. Nine stones remained *in situ* in X-Z 172-173, 1.22m north of the line of context 44. To the east of the modern waterworks trench a curving line of chalk tumble (grid ref. DD-EE 171/172) may represent a continuation of 32. The western limit of the edging petered out in a scatter of seven sandstone blocks (grid ref. W-X 172-173).

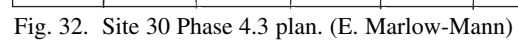
A shallow rectangular cut (27, grid ref. X 172; Fig. 31, S.37), 1.22m long, 0.3m wide and 0.3m deep with vertical sides, was dug north to south, its north end cutting through the sandstone scatter at the western surviving end of 32. Its fill consisted of three layers of ash. Three similar shallow rectangular features (18, 25 and 26; Fig. 31, S.34, S.35 and S.36; Plate 9) were cut at a higher level within 1.83m of the position of 27. They were filled with a sequence of ash layers over a base of sandy loam. The cuts were through layer 24 north of the later west-east stone edging (22). A further cut (29, grid ref. AA 173-174) was made through the now disused feature 1064 (Fig. 27).

The third in the series of west-east stone footings (30) was the most ephemeral. A length of 1.52m of chalk blocks remained in Z-AA 172, plus one roughly faced chalk block in DD 171. To the south of this wall was a rough-packed small chalk pebble surface (no context number), overlaying the line of context 32.

Context 22 (Fig. 30, S.30) was the fourth in the series. It was of a single stone thickness, set into a base (21; Fig. 30, S.30) which had been laid onto surface 1094, the third 'concrete' layer. Just over 12m of its length remained; the eastern half had been laid in almost the same position as the earliest footing (44); however, the western half curved



Plate 9. Phase 4 (Site 30): slots 18, 25, 27 and 26, viewed from the north.



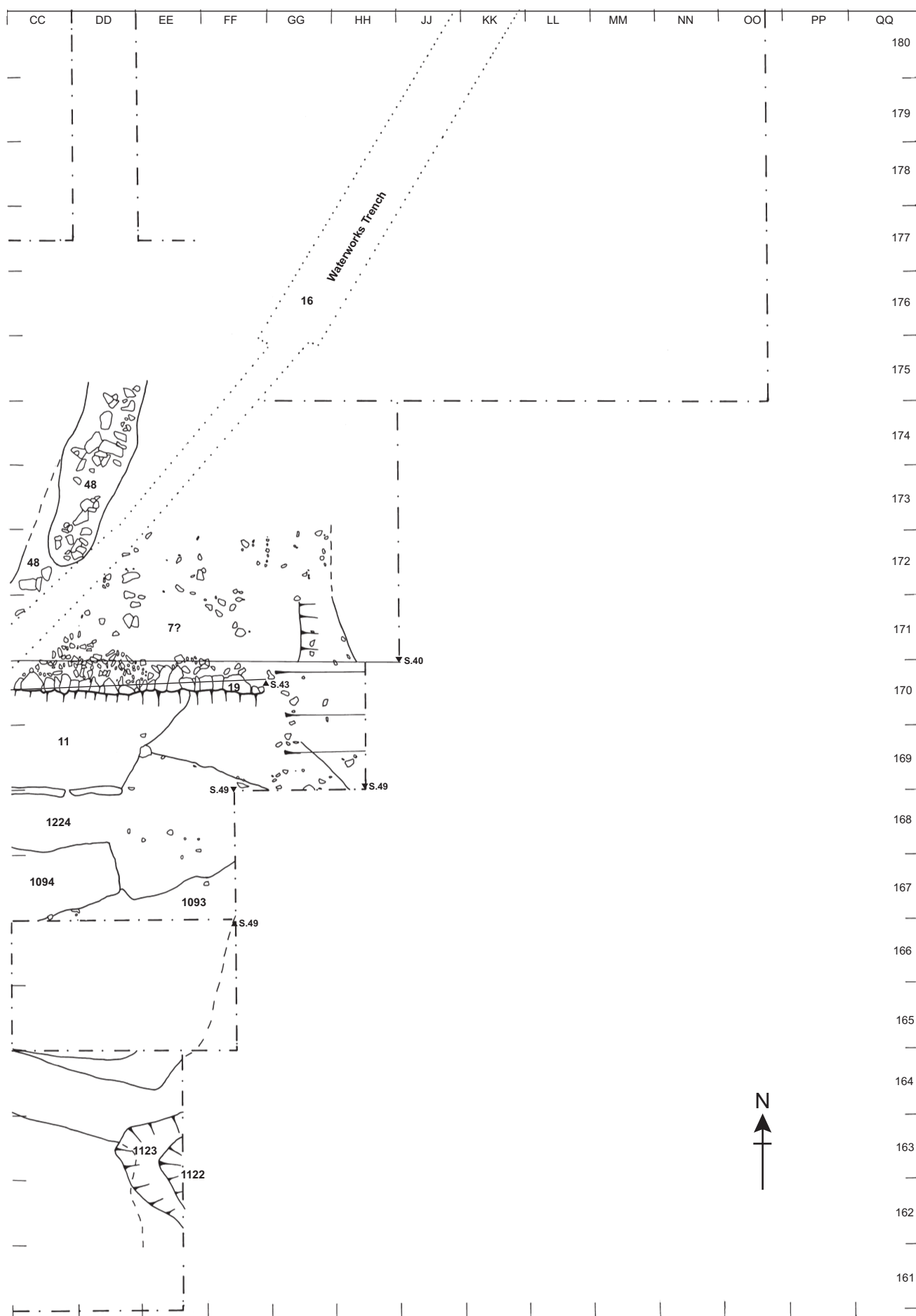




Plate 10. Phase 4 (Site 30): revetment of chalk blocking 1200 across deep cut 1189, viewed from the south-west.

southwards, finishing 1.22m further south than the line of context 44. The western termination was 3.96m away from the edge of the major channel 1189. The main body of the structure was of chalk stones roughly faced on their southern edge; only one course remained for most of its length.

The structure had a right-angled offset of 0.3m (1232, grid ref. V170) before continuing a further 1.83m westwards. This stretch of footings incorporated a 1.22m wide flat length (1233) of both chalk and sandstone. This feature was 0.15m lower than the adjoining eastern length of stonework. To the north of this feature was a flat, roughly paved area covering *c.* 1.86 square metres. Smaller chalk pieces formed the final 0.9m of the wall line to the west. North of this the paved area gave way to a scatter of chalk fragments forming an angular shape (grid ref. T 170) when viewed in plan, and stopping 0.3m from the edge of the major west end channel 1189. These features sealed the earlier depression 1236 (Fig. 27).

Phase 4.3 (Fig. 32)

Stone footing 19 (Fig. 30, S.30; Fig. 31, S.43 and S.125) which replaced context 22 was the final and most substantial of these features. The footing again faced south, with roughly-faced blocks, mostly chalk, but including occasional blocks and smaller pieces of sandstone. The surviving length was 16.15m, the full distance of the platform built up over Western Hillside Terraces 3 and 4. It curved very slightly to the south in the

western third of its length. The footing had a distinctive brown clay matrix, containing a large quantity of pottery (see Ch. 8), which was also banked up against the south side of 11 (Fig. 30, S.30). The footing was reinforced on the north, rear side by smaller pieces of chalk, intermingled with pieces of sandstone (20; Fig. 30, S.30), some of it burnt. At its eastern limit it was one course high; it increased in height westwards to a maximum of four stones in W, X, Y 170.

The last 2.44m of stone footing 19 reaching towards the edge of deep cut 1189 was *c.* 1.22m south of the stretch of flattish stones (1233). There was a chalk pebble surface (1223; Fig. 29) to the north.

The five westernmost stones of footing 19 survived at the lowest course only. They were spread in two pairs, with a single stone in between. A 0.61m gap existed in the footing where surface 1223 extended through it to reach 0.3m south of the wall line. The northern limit of this surface (maximum dimension 1.83m x 1.22m) was semicircular. A post-hole (1222; Fig. 31, S.123) had been cut into the surface north of the gap through the wall. A counterpart (1201) to this post-hole had been cut into the west side of the deep cut 1189/1208 with the eastern side of the hole open to the channel. This post, when paired with post-hole 1222 on the other side of the channel, forms a line at a right angle to and across channel 1208.

The post set into surface 1223 was removed and replaced by a shallow circle (1185) defined on its eastern side by a spread of sandstone fragments; the circular



Plate 11. Site 30, Phase 4: general shot of excavation showing the revetment 1200 and chalk rubble trackway, viewed from the south-west.

feature consisted of an equal mix of clayey loam, and chalk and sandstone pieces. The area of surface 1223 east of the circle was covered by a tumble of sandstone fragments, some bearing traces of diagonal tooling, bonded by blue clay (1193). The southern edge of this feature was defined by the rebuilding of a 1.52m length of footing 19, further south than the original wall line. Unlike the remainder of context 19, the rebuilt section was mostly of sandstone.

The tumble of sandstone and blue clay (1193) raised the westernmost area north of footing 19 to the level of a very good quality rounded chalk pebble surface (7; Fig. 30, S.30). To the south of footing 19 and to the east of the waterworks trench the ground was built up with clay and rubble surfaces (1093 and 1224).

A substantial revetment of chalk blocks (1200; Plate 10), some roughly squared, was built across the full height of the deep cut 1189, retaining the ditch fill on its south side. This causeway continued the line of the series of stone footings across the deep cut (Plate 11). A fan of chalk rubble debris (1192; Fig. 31, S.86) spread out down channel and from this fan a tail of smaller debris extended downslope for an excavated length of 2.13m.

The northern part of the deep cut was later filled by substantial dumps of silt. Two contexts were distinguished during excavation; a lower silt (1191; Fig. 28, S.98 and Fig. 31, S.86) filling the remaining void to the height of the top of the chalk rubble fan 1192; and an upper silt (1190; Fig. 31, S.86). A thin capping of chalk

pebbles (1181; Fig. 31, S.86) over silt 1190 completed the fill of the northern portion of the deep cut.

After the blocking wall was in place the first 2.44m length of the deep cut (1208) south of the wall was subject to separate treatment. The part of the eastern edge closest to the western end of the successive west-east stone footings across the extended Western Hillside Terrace 4 had a vertical side. The bottom of 1208 was irregularly worn with shallow slot-like gouges (1240; not illustrated), filled with gritty silty clay (1241; not illustrated) which spread over the whole base of the feature. One fragment of a sandstone block was found within the layer. Contexts 1234 and 1229 (not illustrated) brought the levels in 1208 up to a new base level, 1205 (not illustrated).

The pond continued to fill up with silts (1122 and 1123), presumably being washed in from channel 1153.

Medieval silt dumping which filled the deep cut 1189 extended beyond the outlet into a broad low lying area to the north. This had been filled with silt over 1.52m deep (23, 37 and 38; Fig. 30, S.30), bringing it up to the level of the west end platform and extending that level 7.62m northwards. This extension was strengthened in Phase 5 by spreads of chalk and sandstone rubble (4; Fig. 30, S.30) and spreads of hard standing. A base of sub-angular chalk (1168; not illustrated) was overlain by a surface of rounded and sub-rounded chalk pebbles up to 50mm in diameter (1167; not illustrated).

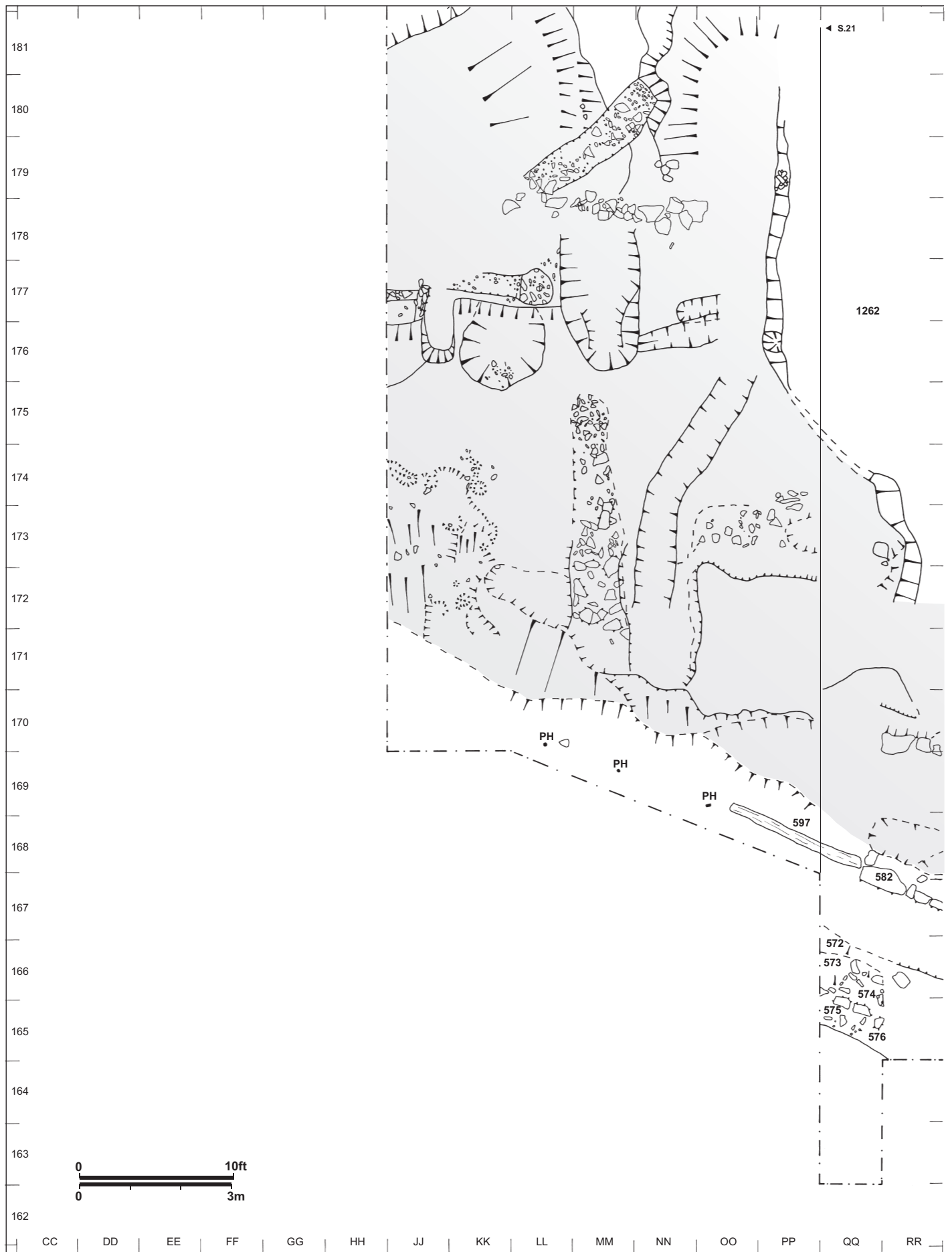


Fig. 33. Site 30 Phases 6 and 7 plan. (E. Marlow-Mann)

Phase 5: post-medieval surfaces and features (Fig. 32)

The good quality chalk surface (7; Fig. 30, S.30) to the north of the final west-east footing (19), and the cobbled area (1164; not illustrated) to the south-east of it, appear to have remained exposed into the post-medieval period, a small proportion of post-medieval sherds being found within a predominantly medieval quantity of pottery from the contexts. A fragment of 17th-century clay pipe bowl and a few stem fragments were also recovered (see Ch.4).

The cobbled area 1164 was partially resurfaced, with cobbles set in a dark soil matrix (1092; Fig. 28, S.54), and extended over the earlier water channel 1153 and the soil mark of a possible fence line. The chalk surfaces of Phase 4.3 (1167 and 1168) were also partially resurfaced with chalk, extending over the line of cut 1189, possibly in response to compaction of the underlying silt. A pit (28) was dug in the same position as pit 29 of Phase 4.2, suggesting a continuation of its function. A single small post-hole (1173) is attributed to this phase.

There was little evidence for post-medieval modification of the chalk and earth dam top. The uppermost layer of chalk rubble to the north of the dam, attributed to Phase 3, (615; Fig. 15, S.21), and an area of chalk gravel incorporating brick and sandstone rubble (1251; not illustrated) contained sherds of post-medieval pot. South of the clay dam, the pond gradually filled up with silt and clay deposits (Fig. 15, S.21)

Phase 6: sandstone wall and channel (Fig. 33)

The pond edge of the chalk and earth dam was modified by facing it with an ashlar sandstone wall (582). It remained *in situ* for nearly 6.10m to a height of four courses in front of the blocked line of the chalk and earth dam spillway (1262). The space between it and the remaining dam face to the rear was packed with a clayey fill (599).

To the west of the above length the dam face had suffered more damage. The continuation of the line for a further 6.72m was marked by a 2.74m long plank (597) and three post-holes. This portion had been removed in the 1920s to repair the uppermost courses of the south-east corner of the nave wall of St Martin's church (R. Bell, church report, pers. comm.)

To the east of wall 582 there was a 3.05m gap. Beyond this the walling resumed and ran a further 2.44m (588) towards the eastern hillside. It stopped short of the line taken by the stream prior to excavation. The westernmost stones of this length of walling (grid ref. YY 165) had been cut in a curved shape to form the eastern edge of a shallow channel (grid ref. XX 165-169) through the dam. Subsidence had affected this portion of the wall (grid ref. 3A 164).

Additional smaller tips of sandstone (589, 591 and 592) were dumped to the east side of this channel, shifting the course of the stream 4.57m eastwards on to its present line, running around the eastern valley hillside (grid ref. 3A-3B 164-170).



Plate 12. Phase 7 (Site 30): sheepwash and barrel, viewed from the south-west.

Phase 7: sheepwash (Fig. 33)

Phase 7.1

The longest surviving length of the sandstone wall (582) served as one side of a sheepwash. On cartographic evidence, the sheepwash was constructed between 1850 and 1888 (p. 9). Silt had been dug out in front of the wall and the southern side of the sheepwash reinforced against the pond silts by the creation of a 1.83m wide rough platform of reused sandstone and chalk (546, 572-6). The sheepwash was fed with water from the spring in the western hillside, not from the stream. Its eastern end was built of brick (586) with an iron flange over the drainage hole (grid ref. XX 166). There were three successive patterns of drainage leading the short distance from wash to stream, the earlier being brick-lined (583 and 548), the latest of glazed earthenware pipes (585). The line of the sandstone wall channel was blocked by a brick wall (581).

To the west, the floor of the sheepwash sloped upwards, allowing a way out against the water flow and leading towards the higher ground of the western platform. A rectangular wooden 'barrel' (grid ref. SS 166; Plate 12) was set against the sandstone wall of the sheepwash. Three post-holes were situated on three sides of this barrel and were presumably related, possibly as supports for the structure.

The top of the dam was pockmarked by a large number of shallow stake-holes (grid ref. WW 167, SS/TT 167), forming no obvious pattern. Iron rings were also found (grid ref. SS 166) and probably related to corralling prior to the animals' being processed through the sheepwash. The remnants of larger posts were found *in situ*, forming a fence line across the dam.

Phase 7.2

The sheepwash, abandoned for a new concrete model downstream in c. 1927, was filled by pushing in the upper

course of the sandstone wall, followed by chalk, brick and further sandstone rubble including 594 (not illustrated). It was topped off by the remains of a bicycle and other household residues, probably of the Milner family before they left the cottages in 1951. A 4.57m length of the Phase 6 channel survived, filled by the sandstone tumble from its walls (587; not illustrated).

Phase 8: waterworks

The water resource of the Wharram Percy springs was recognised in the 1930s when the strongest springs were capped and fed by pipes to a collection tank (Site 30, grid ref. W-X 166-169; Fig. 29; Fig. 32) cut into the medieval west end surface and fenced off.

A larger diameter pipe (16; Fig. 32; Fig. 30, S.30) led diagonally across the site to the valley bottom whence it led to a pumping station downstream. This extraction considerably reduced the flow of water down the stream, in turn reducing the erosion and transportation of loam along the stretch of streambed upstream from the pumping station. The modern pit (1155; Fig. 32) at the west end of the site may represent an abortive hole for the waterworks collection tank. A further two pits (1119 and 1151; Fig. 28, S.54) were also dug during this phase.

Four decades later the streamcourse through the silted-up pond was lost amongst the boggy pasture.

6 Site 71 Phases 4-8: Graveyard Boundary

Excavations on Site 71: graveyard boundary south-east

by M. Atkin

Introduction

The site consisted of a 98.10 sq m area in the south-east corner of the churchyard, extending to the north edge of excavation of Site 30 (Fig. 12). It bisected the existing graveyard boundary and encompassed a drop in level between the churchyard and the 'pond close'.

The presence of a water pipe running diagonally across the site, and the consequent need to maintain a permanent baulk effectively divided the excavation into two areas. These also had an historical significance in that Area 1 (HH-MM 189/HH179-MM184) was related to the activity north of the putative milling site, whilst Area 2 (HH179-MM184/RR183-NN177 – HH177) included features immediately behind the dam. Excavation of Area 2 was completed in 1982, that of Area 1 continued into 1983. The modern topsoil was removed by machine in Area 1, as was the tail of the medieval chalk and earth dam in Area 2 (sampled elsewhere on Site 30). All further excavation was by hand. All contexts (whether features or layers) were recorded in a single numerical sequence.

The features revealed in Area 2 south of the water pipe have been amalgamated into the descriptions of Site 30 and incorporated into the illustrations of that site. So, too, have

the features belonging to the earliest phases of Area 1 (Phases 1-3). It is the later phases that are discussed below.

Phase 4 (Fig. 34)

At least 1.83m of make-up was dumped from an area close to the north-west corner of Site 71 against the Phase 3 wall 214/218/217/202 (Fig. 24). The dump (grid ref. HH 186 – LL 187; Fig. 26; Plate 13) tailed off to the south and to the east. This dump had been carefully laid with a base of alternating layers of large and small rubble (193, 228 and 230, Site 71; Fig. 25, S.3), interleaved with thin layers of ash (208, 224, 227 and 229; Fig. 25, S.23) possibly used for tamping down. These were then sealed by a series of thick ash layers (71, 191, 192, 194, 195 and 196; Fig. 25, S.3), having a matrix of carbonised grain but also containing remarkably large quantities of fresh domestic refuse and iron nails. In turn, these were sealed by further rubble layers (81 and 197; Fig. 25, S.3) including some sandstone blocks.

As this dump of material built up, drainage ditch 261 (Fig. 24 and Fig. 25, S.1) lying north of boundary feature

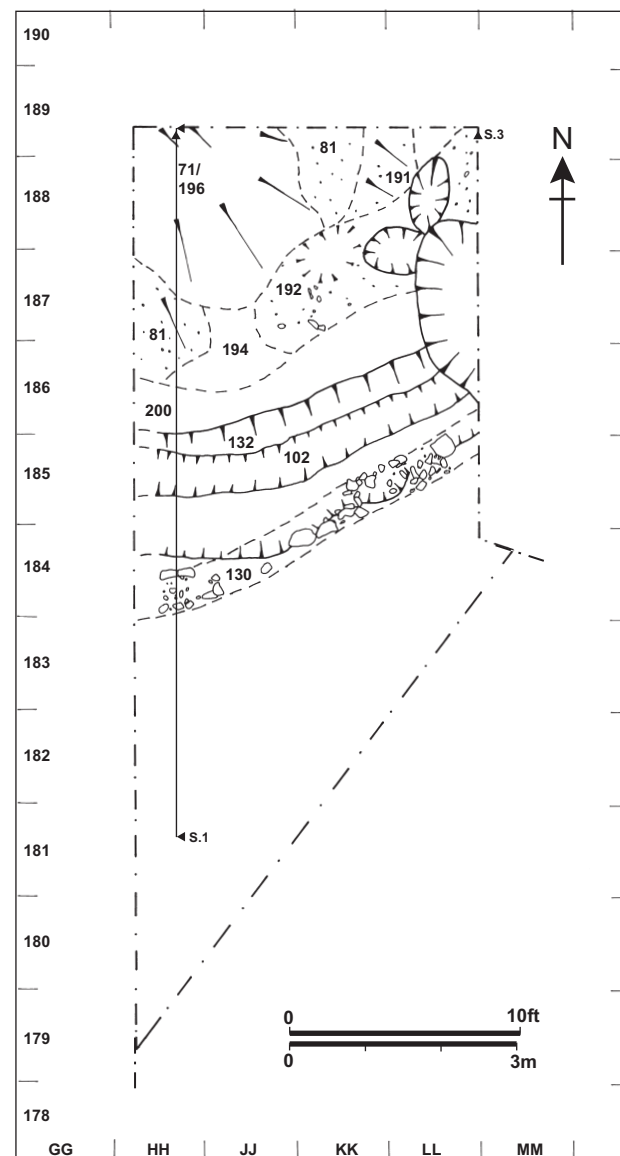


Fig. 34. Site 71 Phase 4 plan. (E. Marlow-Mann)



Plate 13. Phase 4 (Site 71): dump of rubble, ash and carbonised grain, viewed from the south.

235 (Fig. 24) had to be repeatedly recut as a series of temporary channels (102 and 132; Fig. 25, S.1). The apparent care in building up the dump of material suggests that this was not simply a casual waste-tip but may have been intended as the basis for an extension of the building platform on the terrace.

A new 0.61m wide chalk boundary wall (130; Fig. 25, S.1) was then built on top of bank 235 (Fig. 24), curving off to the west and forming a revetment to the rubble and slumpage from the dump (200) which continued to accumulate against its north face. Two oval-shaped depressions (grid ref. LL 188) were cut into the clayey silt deposit (192) and were subsequently cut by a large hollow (grid ref. LL 186-188).

On the south side of wall 130 were a series of chalk yard surfaces (the final one being 155; Fig. 25, S.1) and a possible fence or building line (unidentified in plan or section). Dumps of chalk building rubble (no evidence of sandstone) continued to be laid down to the south including 3, 4 and 30 (not illustrated).

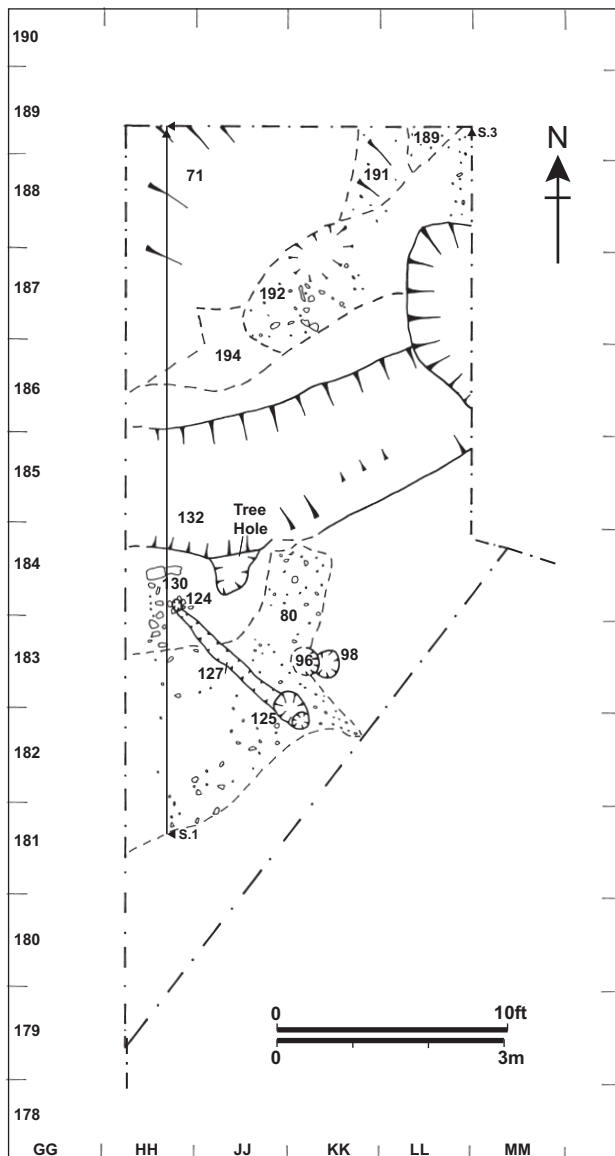


Fig. 35. Site 71 Phase 5 plan. (E. Marlow-Mann)

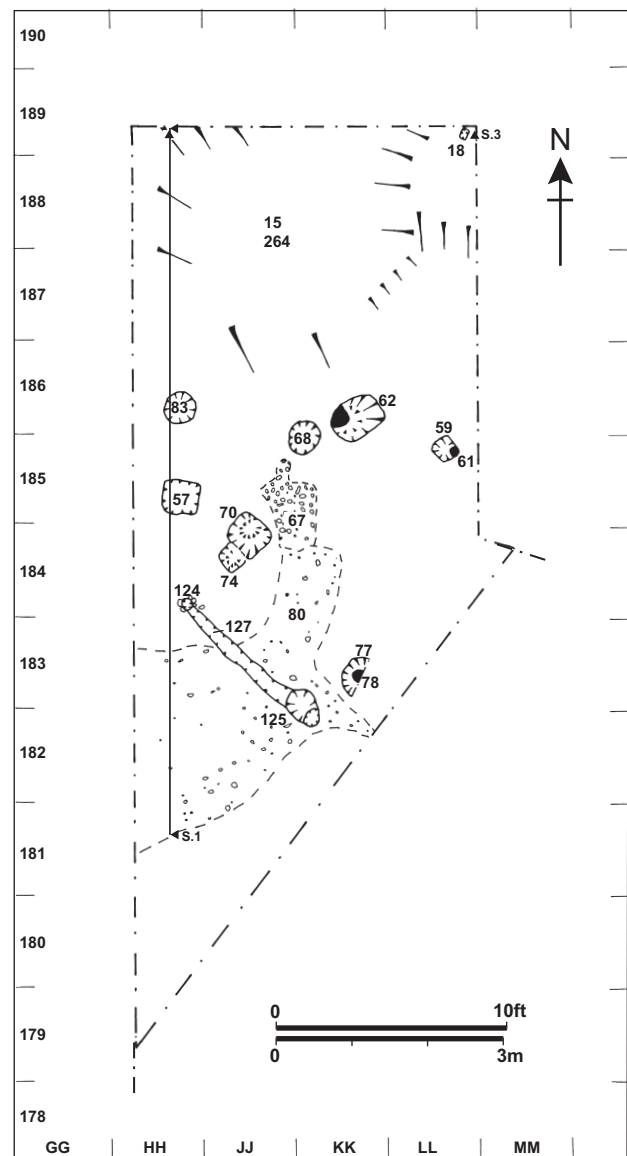


Fig. 36. Site 71 Phases 6-8 plan. (E. Marlow-Mann)

Phase 5 (Fig. 35)

Wall 130 was part demolished and then left to erode. Further dumps of chalk rubble and ash continued to be piled from the north to level the ground (82 (not illustrated) and 189; Fig. 25, S.3) and compacted to form the basis of a later trackway (264; Fig. 25, S.1 and Fig. 36). To the south was a further series of compacted rubble and silt yard surfaces (80 and 95; Fig. 25, S.1). These were cut by a possible fence line represented by a 1.83m long and 0.15m wide slot (127) with a chalk block post setting (124) at the north end and post-hole (125) at the south end. These partly cut the line of wall 130. There were two further, intercutting, post-holes to the north-east (96 and 98).

Phases 6 - 8 (Fig. 36)

In the northern part of the area, Phase 6 was represented by a compacted surface on the upper dumps of Phase 5 (15 and 264; Fig. 25, S.1). Post-holes (83, 70/74 and 77) were possibly joined to the Phase 5 boundary line in order to maintain the fence.

In Phase 7 the boundary line was represented by post-holes 57, 62, 68 and 59 (Fig. 25, S.1) at the foot of the slope of the medieval dump. A single small post-hole (18) was situated to the north-east of the excavated area, at the corner of the 1978-82 fence.

Phase 8 saw a further accumulation of soil represented by layers of silty loam with chalk and sandstone rubble

(7, 67 and 167; Fig. 25, S.3) sealed by turf line 8 (Fig. 25, S.1), with modern debris above which probably resulted from the documented graveyard clearance of 1923. The line of the graveyard boundary was, however, maintained throughout this time.

7 Site 67 (not illustrated)

Site 67 was excavated in 1980, under the supervision of Paul Herbert, whose Archive Report on its excavation has been used to compile this summary. It was a test pit, measuring 3m by 3m, dug in advance of the tree-planting programme, and was located to the south-west of Site 30 (Fig. 2).

The earliest features in the pit were successive 'concrete' chalk surfaces, the first of these (context 50) set on or in the natural subsoil at a height of 137.4m OD. In the absence of evidence to the contrary, it has been suggested that these were late medieval surfaces, comparable to similar surfaces at the west end of Site 30. The surfaces had then been covered by hillwash (context 48), and material probably derived from pond clearance (contexts 47), into which a pit for a cattle burial (context 45), and a trench for a late 18th or early 19th-century land-drain (context 44) had been cut. The cattle burial is likely therefore to have been post-medieval in date, although no stratigraphic sequence was established between the drain and burial.

Part Three

The Pottery

Small amounts of Roman and post-medieval pottery were recovered from the Pond and Dam sites. The Roman pottery has been catalogued and its presence noted in the concordance (Appendix 7), as have the post-medieval sherds which will be discussed in *Wharram XII* with the main assemblage from that period.

8 The Anglo-Saxon and Medieval Pottery

by A.M. Slowikowski, with
acknowledgements to P. Didsbury,
A. Jenner, A. Mainman, J. Vaughan and
J. Young

Introduction and methodology

The total Anglo-Saxon and medieval assemblage on the Pond and Dam sites is made up of 3122 vessels (14.32 EVEs) comprising 4733 sherds, weighing 48.148kg. The sherd count is the unit of quantification used in the discussion and tables, unless otherwise specified. Eight unidentifiable fragments, each weighing less than a single gram, have been omitted from the quantifications. All percentages have been rounded up to two decimal places.

The pottery was divided into fabric types using, as far as possible, the common names published by Le Patourel in *Wharram I*, and coded following the system used for the South Manor pottery (*Wharram VIII*). The pottery types have been assigned an alpha-numeric code, with the prefix letter denoting broad periods as follows: A - Anglo-Saxon; B - medieval; C - late medieval and early post-medieval transitional. A number of new fabric types were identified. These are fully described below. To avoid repetition, previously published fabric descriptions are not repeated here; they may be found in *Wharram I*, *Wharram VI*, *Wharram VIII* and *Wharram IX*.

The pottery has been grouped into broadly similar chronological groupings, based on the dates used in the bibliographic database of the Medieval Pottery Research Group. In summary, they are:

Ceramic Group 1 - Prehistoric and Roman pottery

Ceramic Group 2 - Anglo-Saxon AD 450-850 (less than 0.1% of total Anglo-Saxon and medieval assemblage by sherd)

Ceramic Group 3 - 'Anglo-Scandinavian'/Saxo-Norman AD 850-1150 (0.1% of total Anglo-Saxon and medieval assemblage by sherd)

Ceramic Group 4 - Early medieval AD 1150-1250 (44.08% of total Anglo-Saxon and medieval assemblage by sherd)

Ceramic Group 5 - High medieval AD 1250-1400 (31.11% of total Anglo-Saxon and medieval assemblage by sherd)

Ceramic Group 6 - Late medieval AD 1400-1500 (24.60% of total Anglo-Saxon and medieval assemblage by sherd)

Ceramic Group 7 - Late medieval/post-medieval transitional AD 1500-1750 (less than 0.1% of total Anglo-Saxon and medieval assemblage by sherd)

Each type description below is followed by a catalogue of illustrated pottery of that type (Figs 37-41), each entry containing the following information: catalogue number; description of vessel/sherd; number of sherds – site code/context number; phase. Percentages following the fabric code and descriptive name are for the fabric sherd count expressed as a percentage of the group total and as a percentage of the total assemblage. Decoration specific to sherds from the Pond and Dam sites is noted in the type descriptions. Forms within each fabric type are tabulated (Table 9).

Ceramic Group 2 (0.07% total assemblage)

Only three Anglo-Saxon sherds were found, one each in fabrics A03 (gold mica-tempered, formerly granite-tempered), A04B (sandstone-tempered) and A05 (quartz-tempered). These sherds are mixed with pottery of a later date, and all are residual.

Ceramic Group 3 (0.1% total assemblage)

(Fig. 37, No. 1)

Three rim fragments from jars, two in Torksey-type ware (B04) and one in Stamford-type ware (B05) were recovered.

Two sherds from a Stamford-type jug (No. 1) show this vessel to be decorated with a horizontal row of applied pellets, beneath a thick dark yellow external glaze. The applied pellets are not typical of Stamford ware decoration, but the thick glaze can be dated to the mid-12th century (Kilmurry 1980, 85).

1* Jug. Horizontal band of applied dark-green pellets. 1-71/15; Phase 6. 1-71/80; Phase 5

The small quantity of pottery from Ceramic Groups 3 and 4 suggests that there was little activity on the Pond and Dam sites prior to the 11th to 12th centuries. Most of the pottery occurs in Ceramic Groups 4-6.

Ceramic Group 4

B14 Reduced Chalky (0.48% / 0.21%)

No illustrations

Small unidentifiable body sherds only.

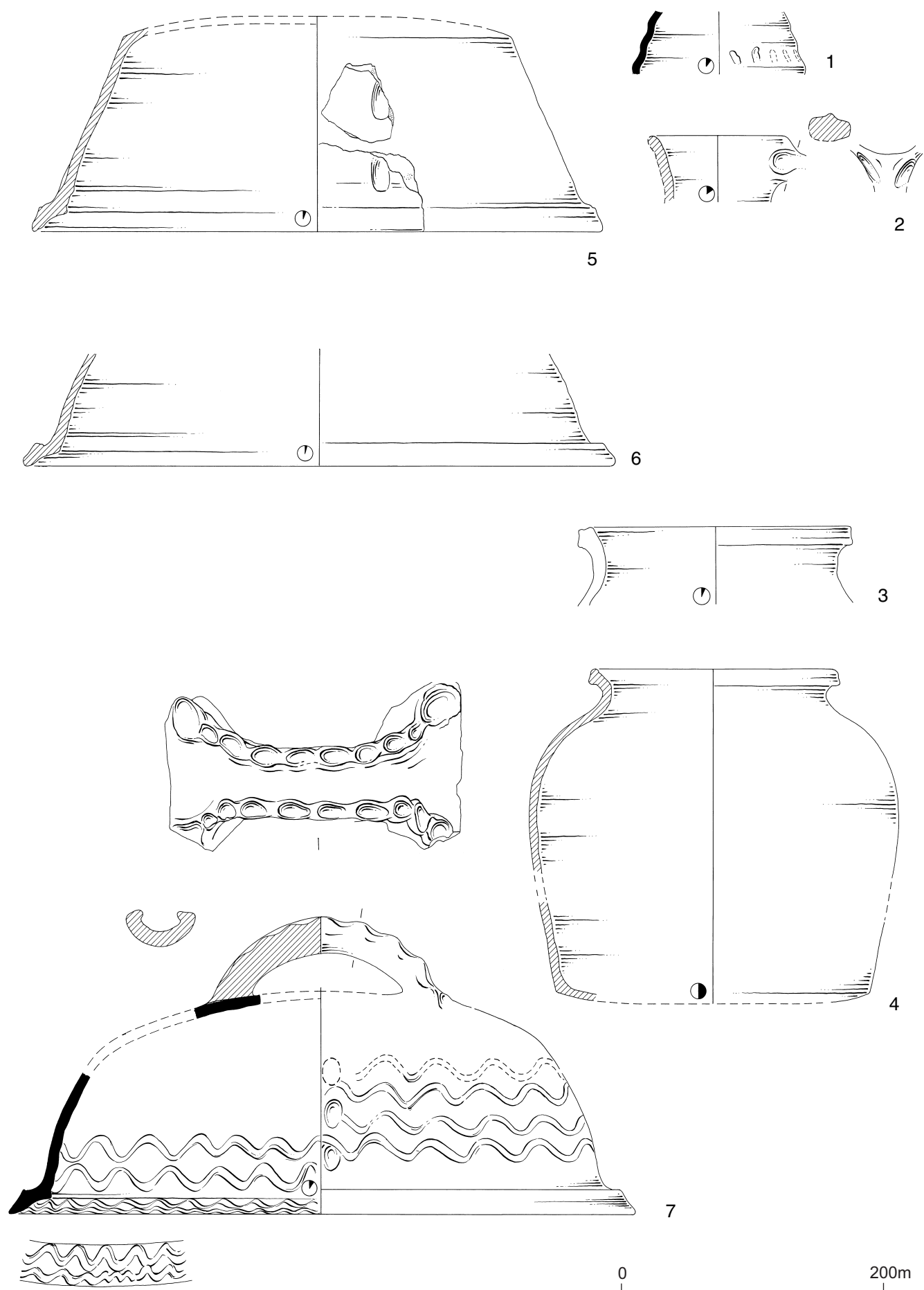


Fig. 37. Pottery: Ceramic Group 3 (No. 1) and Ceramic Group 4 (Nos 2-7). Scale 1:4 (C. Marshall)

B07 Pimply Ware (3.70% / 1.63%)

No illustrations

Only jars were recognised, two with knife trimming on the base angle. Two are particularly thin walled, measuring approximately 2mm.

B08 Pimply Ware variant (0.10% / 0.04%)

No illustrations

Two unidentifiable body sherds.

B09 Glazed Pimply (0.05% / 0.02%)

No illustrations

A single body sherd, possibly from a jug.

B10 Splash Glazed (Splashed Pimply) (3.84%/1.69%)

No illustrations

First identified and described on the South Manor, but published in the North Manor report as 'Splashed Pimply', the term 'pimply' is not included here due to possible confusion with Pimply ware. The majority of vessels have been identified as jugs from the presence of a splashed (or sprinkled) glaze on the body. This form of glaze application was common in the 12th century. The glaze is generally yellow or light green. There is a base with thumbing but no other decoration is seen. One body sherd has been reshaped into a possible counter (see Chapter 11). This is a fairly general fabric group at York, with a wide variation in fabric, defined principally by its characteristic glaze. Further work to characterise this type is ongoing (A. Mainman pers. comm.). At Wharram, it appears to have a consistently rough fabric.

B27 Splashed Glazed Orange (0.24%/0.10%)

No illustrations

Only jugs have been recognised from the presence of the splashed glaze.

B28 Splashed Glazed Chalky (Beverley 1 type) (0.67%/0.67%)

No illustrations

Only jugs have been recognised. Two bases are thumbled, one continuously and the other intermittently.

B11 Pink gritty (Scarborough Gritty; Pink Pimply) (2.11%/0.93%)

No illustrations

A pink, 'pimply' fabric, possibly Scarborough Gritty ware. Only jugs were recognised, from the presence of glaze, although a number of unidentifiable body sherds were also recorded. It may be that all vessels are jugs and that, as the jugs are only patchily glazed, the body sherds come from unglazed areas.

B12 Staxton Ware (69.61%/30.69%)

Fig. 37 (Nos 2-7)

Recognised forms are varied: jars, bowls, jugs, peat pots and curfews. Only two peat pots were recognised and this was from their bases only. Few bases of any type were found, therefore there are likely to have been more of

these vessels among the original assemblage. Jugs are rare in this fabric but two were recognised (for example No. 2). At least four curfews were identified, including Nos 5-7, and there may be more among the body sherds as at least one bowl sherd is sooted internally. This is a relatively high number of curfews; only one was found on the North Manor and two on the South Manor. Decoration is limited to incised wavy lines on two jars and a curfew. Three jars are particularly thin walled and fine, and three body sherds have been re-shaped into counters (see Chapter 11).

2* Jug. 1-30/23; Phase 4.3

3* Jar. 1-30/1475; Phase 3

4* Jar. Complete profile; internal white residue. 97-30/1122; Phase 4.3

5* Curfew. Sooted interior; undecorated. 12-71/196; Phase 4

6* Curfew. 2-71/200; Phase 4

7* Curfew. Unsooted; incised wavy lines. 6-71/196; Phase 4

B13 Glazed Staxton (0.77%/0.34%)

Fig. 38 (Nos 8 and 9)

A relatively high number of glazed Staxton vessels was found, fourteen in total, the same amount as on the South Manor; only three jugs were found on the North Manor. At least three sherds have tiny glaze splashes which might be accidental. One body sherd has an internal glaze and has been recorded as a bowl. There is one spouted pitcher with a patchy brown iridescent glaze (No. 8), and eight jugs have been recognised from the rims, necks and handles (No. 9). The rest are body sherds. All are glazed with a dull green glaze.

8* Spouted pitcher. Hand-made; sparse splashes of iridescent brown glaze on exterior. 1-30/1473; Phase 2.1

9* Jug. 1-30/1257; Phase 3

B16 Beverley 1 (0.43%/0.19%)

No illustrations

Five vessels were identified positively as Beverley 1 wares; all are jugs. Only one was decorated, with the combed wavy lines typical of the late 12th to early 13th centuries.

B18 York Glazed (13.92%/6.14%)

Fig. 38 (Nos 10 and 11)

A large number of York wares were found, the majority identified as jugs. Internal reduction occurred in four examples, where the interiors are a mid-dark grey colour. Decoration is generally a pale green or yellow glaze with occasional dark spots of copper or a darker green glaze. One possible seal jug is suggested from a fragment of ring applied to the shoulder. This jug is in very poor condition, under-fired with a poor quality unfluxed glaze. Decorative motifs on other jugs are applied red scales, applied vertical strips in red or in self-coloured clay; none of these is common. Handles are all rod sectioned.

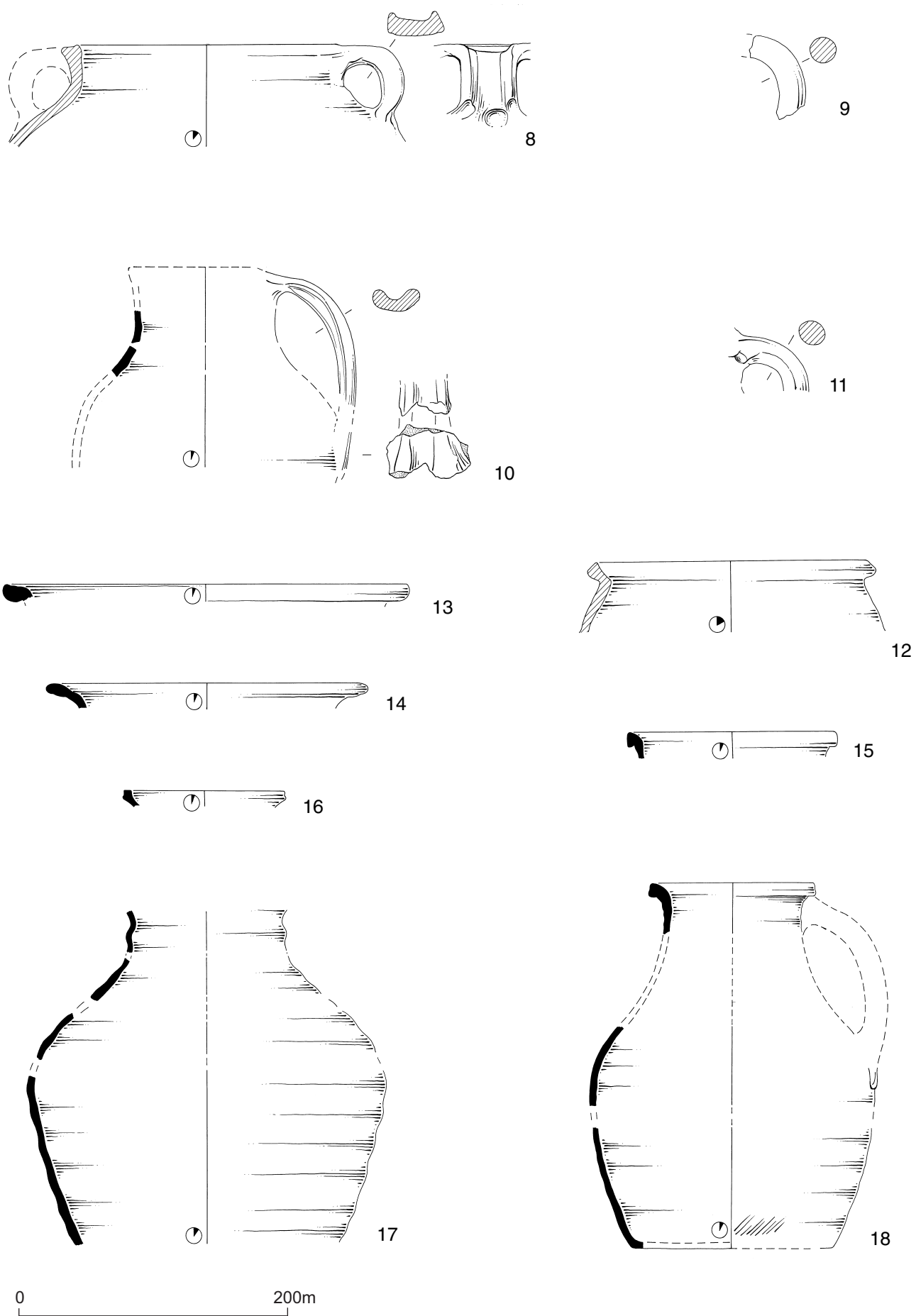


Fig. 38. Pottery: Ceramic Group 4 (Nos 8-18). Scale 1:4 (C. Marshall)

10* Jug. 56-30/1095; Phase 4.1

11* Jug. 2-30/1217; Phase 4

B18U Unglazed Whiteware (3.84%/1.69%)

Fig. 38 (Nos 12-18)

Fabric: Hard fired, buff to white fabric with occasional light grey core, fairly rough to the touch, but not harsh. Inclusions are common subrounded to subangular quartz, well-sorted 0.1-0.5mm, and the very occasional fragment of red iron ore, approximately 0.2mm.

One bowl (No. 15) and three jars (Nos 12-14); the rest are jugs. None of the vessels is decorated.

Number 12 was annotated by Le Patourel as being similar in fabric to pottery from Hickleton. This fabric is hard, fairly harsh with the abundant fine inclusions protruding through the surfaces to give an 'emery board' feel. The abundant quartz is well sorted, sub-angular, 0.2-0.5mm. Moderate amounts of dark red iron ore are found, approximately 0.3mm across. Sparse but large fine micaceous white inclusions, probably imperfectly mixed clay lumps, maybe up to 5.0mm in size and sparse black organic patches and voids. The background is full of fine mica, which is particularly visible on the surfaces. The internal finger marks on this jar suggest a hand-made vessel with the rim trued up on a wheel or turntable.

12* Jar. 'like Hickleton' (Le Patourel). 1-30/1142; Phase 4

13* Jar. 2-30/1095; Phase 4.1

14* Jar. 1-30/1142; Phase 4

15* Bowl. 1-30/1046; Phase 4

16* Jug. 1-30/1142; Phase 4

17* Jug. 1-30/1142; Phase 4. 7-30/1143; Phase 4.1; 1-30/1144; Phase 4. 12-30/1146, 11-30/1147; Phase 4.1

18* Jug. 9-30/560; Phase 3

B32 Fine Buff (0.24%/0.10%)

No illustrations

Fabric: Hard, and fairly smooth, buff in colour, usually all the way through, but occasional creamy core and/or pink margins are present. Inclusions are moderate amounts of sub-angular quartz, 0.2-0.7mm. Fine mica is visible on the surfaces and occasionally in the breaks. Sparse red iron ore, 0.3-0.7mm, is present. Glaze does not cover the whole vessel but is usually sparse and 'splashed' and varies in colour from yellow to olive green. A date for this type is uncertain, but possibly 12th to 13th century on the basis of the 'splashed' glaze.

Five body sherds were found, all probably from jugs. None is decorated.

Ceramic Group 5

B17 Scarborough (4.35%/1.35%)

Fig. 39 (No. 19)

All identified vessels are jugs. All vessels are well-glazed externally, with a thick dark-green or yellow glaze. Number 19 has alternating zones of plain dark-green

glaze and dark-yellow glaze beneath which are random applied red pellets, which appear black. There is one other example of a body sherd with applied red pellets beneath a yellow glaze.

19* Jug. 1-71/80; Phase 5

B19 Gritty (3.95%/1.23%)

Fig. 39 (Nos 20 and 21)

A larger quantity of this fabric was identified on this site than on either the North or South Manors. Most of the vessels are jugs, with either rod or strap handles. Decoration appears to be a patchy covering of green or purplish-brown glaze. One possible bowl can be suggested from the presence of a base sherd with internal glaze.

20* Jug. Combed lines. 1-71/1 (topsoil)

21* Jug. 4-30/1224; Phase 4.3

B20 Brandsby-type (18.75%/5.84%)

Fig. 39 (Nos 22-4)

A single jar and five bowls; the rest are jugs. The bowls are identified from their internal glazes. Number 23 has combed wavy lines on the rim. Decoration is limited on the jugs to bands of triangular-notched rouletting, combed wavy or vertical lines and applied red pellets. There is one example of a tubular spout (No. 24) and one base sherd re-shaped into a rounded counter and deliberately broken in half (see Chapter 11).

22* Jug. 3-30/1191; Phase 4.3

23* Bowl. Combed wavy line on rim. 5-30/6; Phase 4.2

24* Jug. Orange tubular spout. 1-30/12; Phase 4.2

B21 Hard Sandy (Hard Brandsby) (0.61%/0.20%)

No illustrations

A very hard-fired sandy ware with a distinctive 'streaky' appearance particularly to interior or unglazed surfaces. Eight small sherds from probable jugs were found; all are body sherds.

B22 Hard Orange ware (Brandsby/Humber) (35.78%/11.13%)

Fig. 39 (Nos 25-30)

First identified on the South Manor, in which report it is described. As on the South Manor, the predominant form is the jug, although a single bowl was recognised. It was particularly hard fired and had glaze on the interior of the base. Bases of jugs are thumbled, usually all the way round but there is one example of thumbing in groups of three. Some have knife-trimmed angles. Decoration is most commonly combing on the body, either in vertical bands or in horizontal wavy lines, a motif more characteristic of late 12th to early 13th-century Beverley wares (see B16). There is one example of an applied rouletted strip. Handles are both rod and strap sectioned, although the rod handles appear more frequently. They

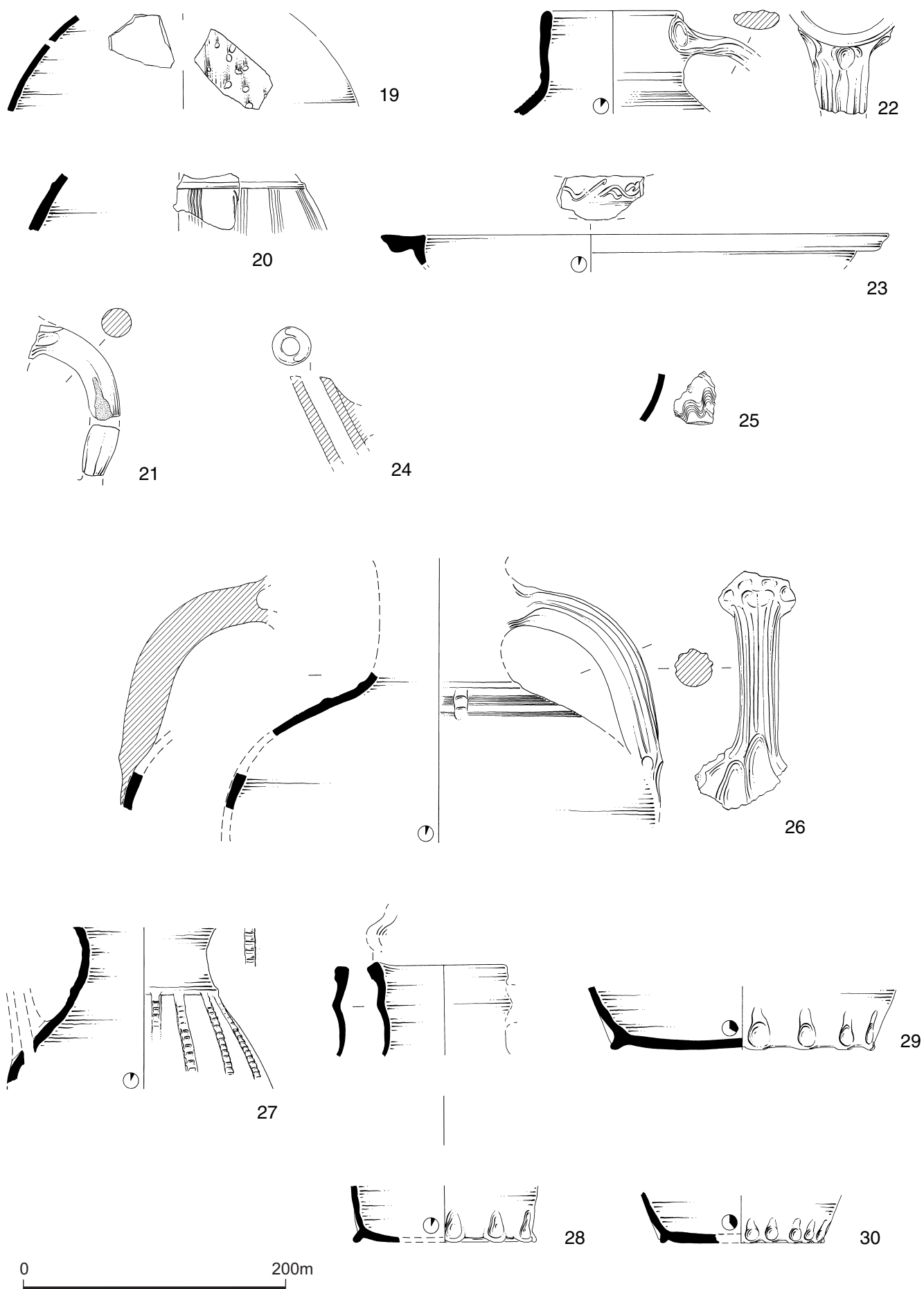


Fig. 39. Pottery: Ceramic Group 5 (Nos 19-30). Scale 1:4 (C. Marshall)

may be plain or ribbed, and finger indentations at their top and/or bottom joins are common. Glaze is bright green with occasional darker copper sprinkles. There are four examples of unfluxed glazes. One abraded body sherd was re-shaped into a counter (see Chapter 11). The superficial similarity to Humber wares was noted on the South Manor. This type occurs in large quantities at Barton-on-Humber where it has been dated to the 13th to 14th centuries (Didsbury and Young forthcoming).

25* Jug. Combed wavy line decoration. 1-30/10; Phase 4.3

26* Jug. 78-30/12; Phase 4.2

27* Jug. Applied rouletted strip; fabric slightly harder and finer than usual. 1-30/13, 1-30/33; Phase 4.2. 13-30/58; Phase 4

28* Jug. 6-71/15; Phase 6

29* Jug. Thumbled base with knife trimmed angle. 1-71/196; Phase 4

30* Jug. Thumbled base; patchy sooted exterior. 1-71/196; Phase 4

B23 Yorkshire Red ware (14.08%/4.38%)

Fig. 40 (Nos 31 and 32)

This small assemblage of red wares is, nevertheless, the largest so far examined from Wharram. They have been identified as possible Beverley 2 type (P. Didsbury pers. comm.). All vessels from this part of the village are jugs, with brown or green glazes occasionally coloured with copper. Of the two handles found, one is grooved-strap in section, the other ribbed-oval.

31* Jug. Weight increased by 'plaster of Paris' reconstruction. 125-30/11; Phase 4.3

32* Jug. Internal white residue; glossy glaze with copper speckles. 2-71/1; unstratified. 28-71/15; Phase 6. 11-71/80; Phase 5. 1-71/86; Phase 2. 13-71/138; Phase 5. 3-71/145, 3-71/147, 3-71/148; Phase 5

B26 Lightly Gritted (Unknown) (3.88%/1.21%)

Fig. 40 (Nos 33-7)

First identified at the South Manor and published as an unknown type. Other sherds have been found on the Pond and Dam sites, enabling it to be further characterised. All identified forms are jugs, two with bridge spouts and one with a decorative fillet of clay applied to the handle join. This type has been recognised at York where it has been called 'Lightly Gritted'; further work to characterise this type is ongoing (A. Mainman pers. comm.).

33* Jug. 29-30/11; Phase 4.3

34* Jug. 1-30/1137; Phase 4.2

35* Jug. Bridge spout. 1-30/1217; Phase 4

36* Jug. Bridge spout; very sparse chalk inclusions. 1-71/196; Phase 4

37* Jug. Fillet of clay applied at handle join. 1-30/1217; Phase 4

B30 Fine micaceous (1.70%/0.53%)

Fig. 40 (Nos 38 and 39)

First recognised on the North Manor, in which publication it is described (Wharram IX, 189). Only jugs

have been recognised on Sites 30, 67 and 71, among them sherds glazed with a yellow splashed glaze with sparse copper speckles. The only decorated jug is rouletted on the body (No. 39).

38* Jug. 5-30/1144; Phase 4

39* Jug. Rouletted decoration. 1-30/10; Phase 4.3

B31 Coarse Micaceous (1.22%/0.38%)

No illustrations

First recognised on the North Manor and described in that publication (Wharram IX, 190). Vessels were all thought to be unglazed but sherds with a yellow or yellow-green splashed glaze have been found on the Pond and Dam sites. The majority of vessels are jugs, although one jar was found.

B36 Brill/Boarstall type (0.14%/0.04%)

No illustrations

A sherd from 30/1217 was identified as a possible product of the Brill/Boarstall kilns, in Buckinghamshire.

Fabric: it is fairly smooth, light orange-pink throughout, with common well-sorted sub-angular quartz, 0.1-0.3mm and occasional red iron ore, up to 0.3mm. The glaze is a light yellowish-green with the addition of sparse copper to give slightly darker green speckles.

The form is uncertain as this is only a single body sherd, but it is relatively thin walled and the presence of an internal glaze and the absence of any glaze on the exterior suggest an open vessel such as a bowl, salt or condiment. The Buckinghamshire kilns were producing pottery from the mid-13th to 17th centuries, but the sherd from Wharram can be dated to the late 13th to mid-14th centuries (Ivens 1982, 151). This was a major industry with a wide distribution throughout the south midlands. The pottery, however, rarely reaches as far north as this, although examples are known from the excavations of the guest house of Kirkstall Abbey, West Yorks (Slowikowski 1991, 65).

B34 Tees Valley (0.88%/0.28%)

Fig. 40 (Nos 40-43)

Fabric: Hard, well-fired fairly smooth orange fabric, defined as Tees Valley Ware Type B by Didsbury (forthcoming). Inclusions are common well sorted sub-angular to sub-rounded quartz, 0.1-0.5mm. Sparse soft rounded white inclusions 0.2-0.5mm, and sparse hard red, and occasionally black, inclusions, possibly iron ore. A self slip is visible beneath the glaze, which is a dense rich yellow colour. Where it extends over the unslipped area, it is reddish-brown. One possible bowl was found; all other vessels are jugs. There is one jug with red applied pellets and a ribbed rod handle (No. 42). The type dates to the mid-13th to 14th centuries and has a limited distribution around the Tees Valley (Sweeney 1985). Wharram is well outside the main area of distribution.

40* Jug. 1-71/195; Phase 4

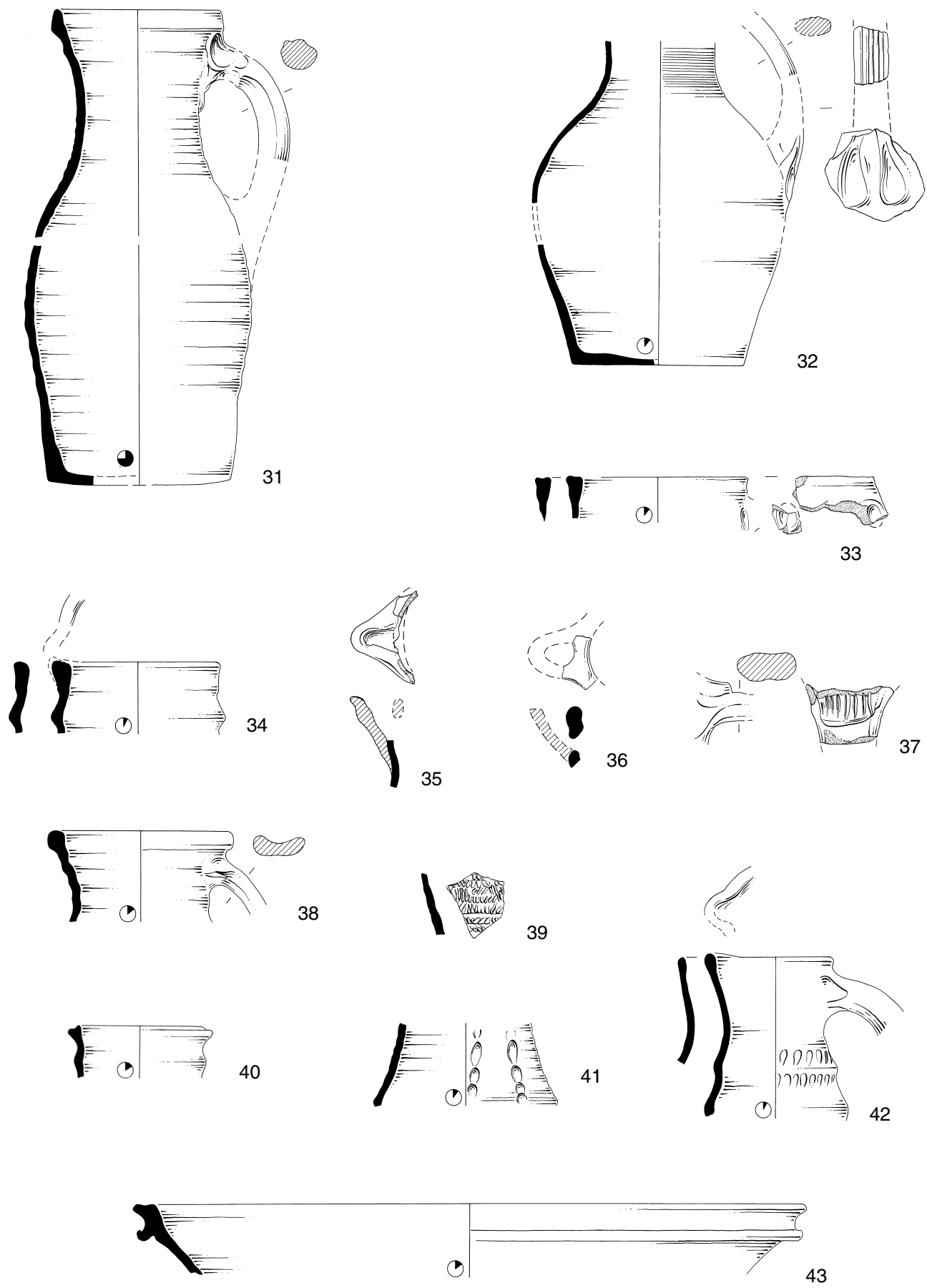


Fig. 40. Pottery: Ceramic Group 5 (Nos 31-43). Scale 1:4 (C. Marshall)

41* Jug. 1-71/48; Phase 1.1

42* Jug. Applied red pellets; 1 sherd burnt. 1-71/194, 3-71/196, 1-71/200; Phase 4

43* Bowl. Sooted exterior. 2-71-6; Phase 5

B35 Light Red ware (8.91%/2.77%)

No illustrations

First identified on the South Manor sites, and coded with the miscellaneous fabric B. Few examples were found there, but the additional sherds, now recovered from the Pond and Dam sites, allow a more detailed characterisation.

Fabric: It is fairly hard, not unlike Humber ware on first glance, but with paler and pinker fabric surfaces. Occasional patchy white slip beneath a green glaze, although the slip may just be the same clay as the body. There is occasional copper in the glaze. There is a single example with unfluxed glaze. All examples so far recognised have been oxidised, with a light, sometimes bluish grey core. Inclusions are fine, giving the surface a smooth feel. Fine, even, clear or white quartz inclusions are well sorted, sub-rounded frequent, 0.1-0.3mm. Small elongated black 'smudges' may occasionally be seen where organic matter has not fired out completely. Sparse red iron ore is poorly distributed throughout the fabric, c.0.3mm. Some examples have sparse inclusions of rounded white calcareous matter, c.0.5mm, but this is by no means a general trait. Number 26 is finer than usual and harder, but is close enough in its inclusions to be placed in this category. It has the same iron ore and black organic 'smudges', but the only difference lies in a finer quartz, which is still clear or white, but not as frequent, with most of the grains being c.0.1mm, at the finer end of the normal range. Handles are all rod-sectioned with the occasional finger indentation at the junction. One is ribbed.

B33 Saintonge (0.07%/0.02%)

No illustrations

Fabric: very smooth, fine, creamy off-white coloured fabric with a patchy light grey core. Very well fired thin walled vessels. Surfaces are micaceous; mica is more difficult to see in the break although some very fine mica is visible. Sparse sub-angular quartz, up to approx. 0.3mm, although there is one fragment of 2.0mm. Sparse small orange-red inclusions, possibly iron ore, 0.1mm or less. External light to dark green glaze.

Medieval continental imports are rare at Wharram; this single sherd from a possible jug comes from Saintonge, south-west France. This pottery was associated with the wine trade and large quantities have been found at sites along the south coast. Fully described and discussed by Brown (2002).

B37 Unidentified type (0.14%/0.04%)

Fig. 41 (No. 44)

Two jug sherds were recorded as possible Toynton-type; they are, however, from an unknown source.

Fabric: hard fairly smooth mid-grey throughout. Moderately well sorted sub-rounded, white quartz, giving a speckled appearance against the grey background, 0.3-0.5mm. Sparse small rounded black inclusions possibly iron ore, approx. 0.3mm. Very occasional elongated voids where organic matter has burnt out. Thick external dark green to light brown glaze. Decorated with applied horizontal strips, with vertical notched strips in red. A single line of square notch rouletting is seen running parallel to the red notched strip.

Number 44 may originate in an, as yet, unknown production centre possibly in the area of the Humber basin, while the other jug has affinities, particularly in its style, with Lincolnshire products (pers. comm. J. Young). Both probably date to the late 12th or early 13th century.

44* Jug. Applied red rouletted strip. 1-30/1112; Phase 4

B Unrecognised medieval

Fig. 41, Nos 45-9

Unrecognised fabrics usually occurring as single sherds, with individual fabric descriptions in the Archive.

45* Handled jar. Sooted externally. 2-71/80, 5-71/94, 8-71/147; Phase 5. 1-71/176; Phase 1.2. 6-71/192, 9-71/196, 14-71/200, 1-71/206, 1-71/208, 1-71/211; Phase 4. 2-30/unstratified

46* Jug. Hard reduced fabric with splashed glaze. 5-30/1190; Phase 4.3

47* Jug. Tooling/ripping on neck. 2-71/196; Phase 4

48* Jug. 1-30/7; Phase 4.3

49* Vessel. 3-30/1124; Phase 4

Ceramic Group 6

C Unrecognised medieval

No illustrations

C01 Hambleton ware (6.28%/1.54%)

Fig. 41 (Nos 50 and 51)

Jugs are the predominant form although a single possible bowl was identified from the internal glaze within the base. Handles are either oval-sectioned, occasionally ribbed or stabbed, or strap. The poor quality of this type is evident from the scars, which are relatively common. No attempt has been made to remove them. Three have been recorded, two on bases and one on a rim.

50* Jug. 5-30/23, 5-30/36, 2-30/37; Phase 4.3. 1-30/1110; Phase 5

51* Jug. 2-30/8; Phase 4.3

C02 Humber ware (66.26% / 16.30%)

Fig. 41 (Nos 52-5)

Both the fine oxidised and coarser reduced versions are present, although the oxidised ware predominates. A relatively large variety of forms was recovered, among them jars, bowls, jugs, cisterns and a urinal. Bowls are large and glazed internally (e.g. No. 54). The single jar also had an internal glaze. Jug handles are both rod,

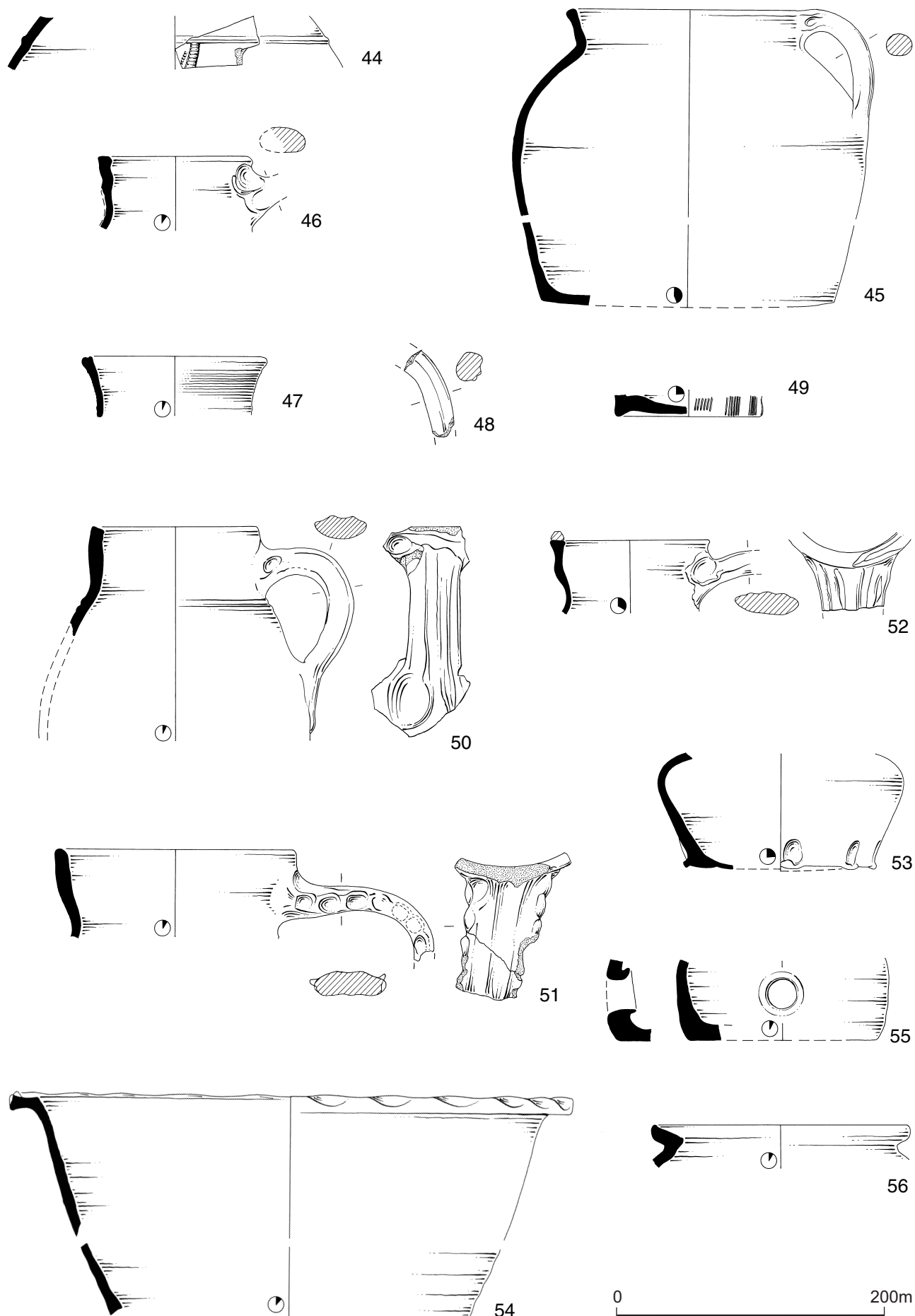


Fig. 41. Pottery: Ceramic Group 5 (Nos 44-9) and Ceramic Group 6 (50-56). Scale 1:4 (C. Marshall)

which may be ribbed, and strap. The handle attachment can be seen on one example where the handle has been riveted into the body at the lower junction. Decoration on the body is scarce, with wavy line or horizontal combing. Bases are generally plain although there are examples of thumbing. There is a thumb applied collar on one jug, but these also occur commonly on cisterns. Scars on rim or base occur on five examples, and a fillet of clay has been added to the interior of a single base.

52* Jug. Base of other pot stuck to rim; sooted internally. *1-30/1229; Phase 4.3*

53* Urinal. Internal white residue. *1-30/615; Phase 3. 2-30/-; unstratified. 2-71/105; Phase 1.1. 15-71/165; Phase 8*

54* Bowl. *1-71/148; Phase 5. 1-71/190; unstratified. 5-71/200; Phase 4*

55* Cistern. Bung hole; base with small radius of 6.5mm. *1-30/23; Phase 4.3*

C03 Chalky Humber ware (25.30%/6.22%)

No illustrations

The amount of chalk varies from sparse to dense. All recognisable forms are jugs with rod or oval handles. These may occasionally be ribbed. No decoration was found. One body sherd has been re-shaped into a possible counter (see Chapter 11).

C04 Humber ware Spoutless Jugs ('Skipton-on-Swale') (0.86%/0.21%)

No illustrations

Only four of these spoutless drinking jugs were found.

C11 Rawmarsh-type ware (0.17%/0.04%)

No illustrations

Fabric: very hard, fairly smooth, mid-grey with lighter inner and outer margins. The general appearance is of a dense, almost vitrified fabric. Dominant inclusions are abundant poorly sorted black inclusions, possibly iron ore, 0.1-1.0mm. Sub-angular quartz is less common, 0.2-0.5mm. External glaze is a dull olive green with purple-brown streaks and patches.

A source for this type is the Rawmarsh/Firsby kilns in South Yorkshire. Two sherds, possibly from the same vessel were found. Only one other vessel of this type has been recognised at Wharram, a jug, recovered from the floor of one of the peasant buildings (*Wharram VI, 37*)

C12 Late Medieval Gritty (0.09%/0.02%)

Fig. 41 (No. 56)

Fabric: very hard and coarse fabric; orange brown with light grey core and an external patchy purple glaze. Inclusions are clearly visible as sub-angular poorly sorted quartz 0.3-1.5mm. Sparse but large red earthy lumps, possibly iron ore, up to 2.5mm.

Only this one example has so far been recorded from Wharram, a jar (No. 56) with a flat everted rim. The rim is closer in form to Humber ware jars but the coarseness of the fabric has affinities with the late medieval gritty

wares found in West Yorkshire. In West Yorkshire, this fabric has been dated to the 15th century, but probably began in the mid to late 14th century, as a development of the East Pennine Gritty wares (Moorhouse and Slowikowski 1987, 64). Just as there are small quantities of earlier medieval East Pennine Gritty wares on the sites covered in this volume (59 sherds) and elsewhere in the village (thirteen sherds each from the Churchyard and the North Manor), so the later versions may also have arrived in small quantities.

56* Jar. Patchy purple external glaze. *1-71/71; Phase 4*

Ceramic Group 7 (0.04% total assemblage)

C05 Purple-glazed Humber ware

No illustrations

A single jug sherd was found.

C08 Cistercian ware

No illustrations

A single sherd from a cup was found.

Discussion

With some notable exceptions, particularly Nos 4, 26, 31, 32 and 45, the pottery is generally fragmentary, with a vessel to sherd ratio of 1:1.52. Sherd size is, however, larger than normal at an average weight of 10.19g, as compared to the North and South Manors at 7.23g and 7.04g respectively.

Quantification and discussion of pottery by phase and context

Figures 42-53 (pp 110-121) show the proportion of each fabric type within each phase. The entries in the tables indicate vessel count: sherd count: weight (in grams). Within each phase contexts are discussed in the order they appear in the site discussions.

Vessels with more than one sherd from the same context or with sherds from different contexts were defined as described in the South Manor pottery methodology (Table 1; Slowikowski 2000, 60). Sherds and weight were recorded in the relevant context, but as a single vessel can only be recorded once, this was recorded in the context with the largest number of sherds or where it could be shown that the vessel was most likely to have been deposited originally. The other contexts with sherds from the same vessel have a '0' recorded in the vessel field. Tables 2-8, therefore, record some instances where sherds, but not vessels, are noted.

Phase 1

A small quantity of pottery was recovered from Phase 1 contexts. None is earlier than the 12th century in date and it is all intrusive. Another sherd of the B11 vessel came from clay bank 71/236 in Phase 3. The sherd from post-hole fill 71/176 comes from a handled jar in unidentified fabric B (No. 45), whose other sherds come from Phase 4 and 5 contexts. Two sherds of a Humber ware urinal (No. 53)

Table 1. Vessels with cross contexts.

| Site | | Site 71 | | | | | | | | | | | | | | | |
|-------------|------|--------------------|------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| Phase | | u/s | 6 | 5 | 5 | 2 | 5 | 5 | 1 | 5 | 5 | 5 | 5 | 8 | 1 | u/s | |
| Fabric Type | Form | Cross Ill. Cxt No. | 71/1 | 71/15 | 71/80 | 71/82 | 71/86 | 71/94 | 71/95 | 71/105 | 71/138 | 71/145 | 71/147 | 71/148 | 71/165 | 71/176 | 71/190 |
| B07 | JAR | 26 | | | | | | | | | | | | | | | |
| B10 | JUG | 20 | | | | | | | | | | | | | | | |
| B27 | JUG | 28 | | | | | | | | | | | | | | | |
| B11 | VESS | 08 | | | | | | | | | | | | | | | |
| B12 | JAR | 01 | | 1 | | | | | | | | | | | | | |
| B18 | JUG | 12 | | | | | | | | | | | | | | | |
| B18 | JUG | 13 | | | | | | | | | | | | | | | |
| B18 | JUG | 30 | | | | | | | | | | | | | | | |
| B18U | JUG | 17 | | | | | | | | | | | | | | | |
| B17 | JUG | 07 | | | 1 | 4 | | | | | | | | | | | |
| B17 | JUG | 23 | | | | | | | | | 2 | | 2 | 2 | | | |
| B19 | JUG | 03 | | 2 | 1 | | | | | | | | | | | | |
| B20 | JUG | 17 | | | | | | | | | | | | | | | |
| B20 | JUG | 31 | | | | | | | | | | | | | | | |
| B22 | JUG | 02 | | 3 | 2 | | 1 | | | | | | 3 | 2 | | | |
| B22 | JUG | 16 | | | | | | | | | | | | | | | |
| B22 | VESS | 27 | | | | | | | | | | | | | | | |
| B22 | JUG | 32 | | | | | | | | | | | | | | | |
| B22 | JUG | 34 | | | | | | | | | | | | | | | |
| B23 | JUG | 06 | | | | | | | | | | | | | | | |
| B23 | JUG | 24 | | | | | | | | | 13 | 3 | 3 | 3 | | | |
| B34 | JUG | 14 | | | | | | | | | | | | | | | |
| B | JARH | 09 | | | 2 | | | 5 | | | | | 8 | | 1 | | |
| B | VESS | 25 | | | | | | | | | | | | | | | |
| B | JUG | 35 | | | | | | | 1 | | | | 2 | | | | |
| C | JUG | 11 | | | | | | | | | | | | | | | |
| C01 | JUG | 18 | | | | | | | | | | | | | | | |
| C02 | URNL | 19 | | | | | | | | 2 | | | | 15 | | | |
| C02 | BWL | 21 | | | | | | | | | | | | 1 | | | 1 |
| C11 | JUG | 22 | | 1 | | | | | | | | | | | | | |

Table 1 continued.

| Site | | Site 71 | | | | | | | | | | | | | | Site 30 | | | |
|-------------|------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|------|------|-------|
| Phase | | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 1 | 2 | 1/2 | 5 | 5 | 4 | 4 | 4 |
| Fabric Type | Form | Cross Ill. Cxt No. | 71/192 | 71/194 | 71/195 | 71/196 | 71/200 | 71/206 | 71/208 | 71/211 | 71/236 | 71/238 | 71/240 | 71/246 | 71/201 | 30/3 | 30/5 | 30/7 | 30/10 |
| B07 | JAR | 26 | | | | | | | | | | | 9 | 1 | | | | | |
| B10 | JUG | 20 | | | | | | | | | | | | | | | | | |
| B27 | JUG | 28 | | | | | | | | | | | | | | | | | |
| B11 | VESS | 08 | | | | | | | | | 1 | 6 | | | | | | | |
| B12 | JAR | 01 | | | | | | | | | | | | | | | | | |
| B18 | JUG | 12 | | | | | | | | | | | | | | | 1 | 16 | |
| B18 | JUG | 13 | | | | | | | | | | | | | | | | | |
| B18 | JUG | 30 | | | | | | | | | | | | | | | | | |
| B18U | JUG | 29 | 17 | | | | | | | | | | | | | | | | |
| B17 | JUG | 07 | | | | | | | | | | | | | | | | | |
| B17 | JUG | 23 | | | | | | | | | | | | | | | | | |
| B19 | JUG | 03 | | | | | | | | | | | | | | | | | |
| B20 | JUG | 17 | | | | | | | | | | | | | | | | | |
| B20 | JUG | 31 | | | | | | | | | | | | | | | | | |
| B22 | JUG | 02 | 1 | | 1 | | | | | | | | | | | | | | |
| B22 | JUG | 16 | | | | | | | | | | | | | | | | | |
| B22 | VESS | 27 | | | | | | | | | | | | | | | | | |
| B22 | JUG | 32 | | | | | | | | | | | | | | | | | |
| B22 | JUG | 34 | | | | | | | | | | | | | | | | | |
| B23 | JUG | 06 | | | | | | | | | | | | | | | | 6 | 8 |
| B23 | JUG | 24 | | | | | | | | | | | | | | | | | |
| B34 | JUG | 14 | | 1 | | 3 | 1 | | | | | | | | | | | | |
| B | JARH | 09 | 6 | | 9 | 14 | 1 | 1 | 1 | 1 | | | | | | | | | |
| B | VESS | 25 | | | | | | | | | | | | | | | | | |
| B | JUG | 35 | | | | | | | | | | | | | 1 | | | | |
| C | JUG | 11 | | | | | | | | | | | | | | 1 | | | |
| C01 | JUG | 18 | | | | | | | | | | | | | | | | | |
| C02 | URNL | 19 | | | | | | | | | | | | | | | | | |
| C02 | BWL | 21 | | | | | | | | | | | | | | | | | |
| C11 | JUG | 22 | | | | | | | | | | | | | | | | | |

Table 1 continued.

| Site | | Site 30 | | | | | | | | | | | | | | | | | | |
|-------------|------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|---------|---------|---------|---------|---------|---|
| Phase | | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Fabric Type | Form | Cross Ill. No. | 30/11 | 30/13 | 30/15 | 30/19 | 30/23 | 30/24 | 30/33 | 30/36 | 30/37 | 30/58 | 30/80 | 30/615 | 30/1046 | 30/1086 | 30/1096 | 30/1110 | 30/1114 | |
| B07 | JAR | 26 | | | | | | | | | | | | | | | | | | |
| B10 | JUG | 20 | | | | | | | | | 1 | | | | 6 | | 8 | | | |
| B27 | JUG | 28 | | | | | | | | | | | | | | | | | | |
| B11 | VESS | 08 | | | | | | | | | | | | | | | | | | |
| B12 | JAR | 01 | | | | | | | | | | | | | | | | | | |
| B18 | JUG | 12 | | | | | | | | | | | | | | | | | | |
| B18 | JUG | 13 | 1 | | | | | | | | | | | | | | | | | |
| B18 | JUG | 30 | | | | | | | | | | | | | | | | | | |
| B18U | JUG | 29 | 17 | | | | | | | | | | | | | | | | | |
| B17 | JUG | 07 | | | | | | | | | | | | | | | | | | |
| B17 | JUG | 23 | | | | | | | | | | | | | | | | | | |
| B19 | JUG | 03 | | | | | | | | | | | | | | | | | | |
| B20 | JUG | 17 | | | | | | 3 | | 11 | 1 | | | | | | | | | |
| B20 | JUG | 31 | | | | | | | | | | | | | | | | | | |
| B22 | JUG | 02 | | | | | | | | | | | | | | | | | | |
| B22 | JUG | 16 | 27 | 1 | | | | | 1 | | | 13 | | | | | | | | |
| B22 | VESS | 27 | | | | | | | | | | | | | | | | | | |
| B22 | JUG | 32 | | | | | | | | | | | | | | | | | | |
| B22 | JUG | 34 | | | | | | | | | | | | | | | | | | |
| B23 | JUG | 06 | 32 | | | | | | | | | | | | | | | | | |
| B23 | JUG | 24 | | | | | | | | | | | | | | | | | | |
| B34 | JUG | 14 | 42 | | | | | | | | | | | | | | | | | |
| B | JARH | 09 | 45 | | | | | | | | | | | | | | | | | |
| B | VESS | 25 | | | | | | | | | | | | | | | | | | |
| B | JUG | 35 | | | | | | | | | | | | | | | | | | |
| C | JUG | 11 | | | | | | | | | | | | | | 1 | | | | 2 |
| C01 | JUG | 18 | 50 | | | | 5 | | | 5 | 2 | | | | | | | 1 | | |
| C02 | URNL | 19 | 53 | | | | | | | | | | | 1 | | | | | | |
| C02 | BWL | 21 | 54 | | | | | | | | | | | | | | | | | |
| C11 | JUG | 22 | | | | | | | | | | | | | | | | | | |

Table 1 continued.

| Site | | Site 30 | | | | | | | | | | | | | | | |
|-------------|------|---------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---|
| Phase | | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 |
| Fabric Type | Form | Cross Cxt No. | 30/1128 | 30/1140 | 30/1142 | 30/1143 | 30/1144 | 30/1146 | 30/1147 | 30/1153 | 30/1183 | 30/1188 | 30/1205 | 30/1254 | 30/1393 | 30/1397 | |
| B07 | JAR | 26 | | | 7 | | | | | | | | | | | | |
| B10 | JUG | 20 | | | | | | | | | | | | | | | |
| B27 | JUG | 28 | | | | 1 | | | 1 | | | | | | | | |
| B11 | VESS | 08 | | | | | | | | | | | | | | | |
| B12 | JAR | 01 | | | | | | | | | | | | | | | |
| B18 | JUG | 12 | | | | | | | | | | | | | | | |
| B18 | JUG | 13 | | | | | | | | | | | | | | | |
| B18 | JUG | 30 | | | | | | | | 8 | | 1 | 53 | | | | |
| B18U | JUG | 29 | 17 | | 1 | 7 | 1 | 12 | 11 | | | | | | | | |
| B17 | JUG | 07 | | | | | | | | | | | | | | | |
| B17 | JUG | 23 | | | | | | | | | | | | | | | |
| B19 | JUG | 03 | | | | | | | | | | | | | | | |
| B20 | JUG | 17 | | | | | | | | | | | | | | | |
| B20 | JUG | 31 | | | | | | | | | 1 | | | | | | |
| B22 | JUG | 02 | | | | | | | | | | | | | | | |
| B22 | JUG | 16 | 27 | | | | | | | | | | | | | | |
| B22 | VESS | 27 | | | | 3 | 1 | 1 | 1 | | | | | | 1 | 2 | |
| B22 | JUG | 32 | | | | | | | | | | | | | | | |
| B22 | JUG | 34 | | | | | | | | | | | | | | | |
| B23 | JUG | 06 | 32 | | | | | | | | | | | | | | |
| B23 | JUG | 24 | | 1 | 2 | | | 1 | | | | | | | | | |
| B34 | JUG | 14 | 42 | | | | | | | | | | | | | | |
| B | JARH | 09 | 45 | | | | | | | | | | | | | | |
| B | VESS | 25 | | 1 | 2 | 1 | 1 | | | | | | | | | | |
| B | JUG | 35 | | | | | | | | | | | | | | | |
| C | JUG | 11 | | | | | | | | | | | | | | | |
| C01 | JUG | 18 | 50 | | | | | | | | | | | | | | |
| C02 | URNL | 19 | 53 | | | | | | | | | | | | | | |
| C02 | BWL | 21 | 54 | | | | | | | | | | | | | | |
| C11 | JUG | 22 | | | | | | | | | | | | | 1 | | |

were found in the gravel bank 71/105; 15 other sherds from this vessel come from a Phase 8 pit (71/180) and one from a Phase 3 chalk rubble spread, 30/615.

Table 2. Phase 1 quantification of pottery by context number (vessel:sherd:weight).

| Site | | Site 71 | | | | | Site 30 |
|-------------------|-----|---------|---------|--------|--------|----------|---------|
| Cxt | | 48 | 105 | 118 | 176 | 238 | 522 |
| = Cxt | | | | | | | |
| Early Med. | B07 | | | | | 3:9:33 | |
| | B10 | | | | | 1:1:4 | |
| | B28 | | | | | 1:9:42 | |
| | B11 | | | | | *1:6:13 | |
| | B12 | | | | | cc8 | |
| | | | 1:1:4 | | | 4:10:143 | |
| High Med. | B22 | 1:1:2 | | 1:1:12 | | | |
| | B31 | | | | | | 1:1:10 |
| | B34 | 1:1:24 | | | | | |
| | B | | | | 0:1:11 | | |
| Late Med. | C02 | | *0:2:16 | | | | |
| | | | cc19 | | | | |

* indicates cross context joins

Phase 2

The bulk of the pottery in Phase 2 dates from the 12th or possibly early 13th centuries, although the earliest sherd is of Torksey type, dating from the 10th century. While the Pimply ware (B07) in the 262 channel fill 71/246 comes from the same vessel as that in gravel 71/240 in the same phase, the Hard Orange and Yorkshire Red wares (B22 and B23) come from vessels with sherds in Phases 4, 5 and 6. A single sherd of unglazed White ware (B18U), weighing only 4g, and dating to the 12th or early 13th century came from the blocking of the temporary spillway 1621. The assemblage from the pond silts is primarily 12th to 13th century in date; the later pottery is small and weighs only 2g. The silts dumped over the second terrace (1057) and (1297) contained pottery of a similar date.

Phase 3

The bulk of the pottery in this phase comes from the various layers making up the chalk and earth dam. Some of the earliest pottery, however, comes from 71/220, one of the cleaning layers of ditch 261. It is dated to the early medieval period, the 12th to 13th centuries.

The small amount of pottery from Ceramic Groups 6 and 7 reflects the continued use of the dam into the post-medieval period. It mainly consists of small and fragmentary sherds, with the exception of the sherds from a heavy Humber ware base in a chalk and earth dam deposit, 30/1403. Another sherd from the Humber ware urinal (No. 53 - see Phase 1) was found in spread 30/615.

Table 3. Phase 2 quantification of pottery by context number (vessel:sherd:weight).

| Site | | Site 71 | | | | | | Site 30 | | | | | |
|-------------------|------|---------|--------|-----|-------|----------|---------|---------|--------|---------|-------|-------|-------|
| Cxt | | 85 | 86 | 139 | 142 | 240 | 246 | 1057 | 1297 | 1299 | 1425 | 1471 | 1621 |
| = Cxt | | | | | | | | 1473 | | | | | |
| Early Med. | B14 | | | | | | 1:3:12 | | | | | | |
| | B07 | | | | | *3:12:99 | *0:1:34 | | | 1:1:15 | 1:2:1 | | |
| | | | | | | cc26 | cc26 | | | | | | |
| | B10 | | | | | | | | 1:1:3 | | | | |
| | B11 | | | | 1:1:2 | | | | | | | | |
| | B12 | 1:1:21 | 1:6:44 | | 2:2:3 | 1:3:75 | | | 3:3:13 | | 1:1:3 | | |
| | B13 | | | | | | | | | 1:1:200 | | | |
| | B18 | | | | | | | 1:1:2 | | | | 1:1:8 | |
| | B18U | | | | | | | | | | | | 1:1:4 |
| High Med. | B19 | | 1:1:36 | | | | | | | | | | |
| | B22 | | *0:1:3 | | | | | | | | | | |
| | | | cc2 | | | | | | | | | | |
| | B23 | | *0:1:6 | | | | | | | | | | |
| | B30 | | cc6 | | | | | | | | | | |
| | | | | | | | | 1:1:6 | | | | | |

* indicates cross context joins

Table 4. Phase 3 quantification of pottery by context number (vessel:sherd:weight).

| Site | | Site 71 | | | | | | | | | | Site 30 | | | | | |
|--------------------|------|---------|-------|-------|--------|--------|----------|--------|--------|---------|--------|---------|-------|-----|-------|--------|-------|
| | | 9 | 11 | 12 | 16 | 204 | 220 | 225 | 237 | 500 | 501 | 503 | 506 | 532 | 552 | 556 | 558 |
| Conxet | | | | | | | | | | | | | | | | | |
| =Context | | | | | | | | | | | | | | | | | |
| Saxo-Norman | B04 | | | | | | | | | | | | | | | | |
| Early Med. | B14 | | | | | | 1:1:2 | | | | | | | | | | |
| | B07 | | | | | | 1:1:7 | | | | | | | | 2:2:5 | 1:1:1 | |
| | B12 | | 1:1:3 | 1:1:5 | 1:1:42 | 1:2:51 | 12:12:92 | 1:1:10 | 3:3:13 | 2:6:40 | 2:2:31 | 3:3:46 | 1:1:3 | | | 3:3:11 | |
| | B13 | | | | | | | | | | | | | | | | |
| | B18 | | | | | | | | | | | | | | | | |
| | B18U | | | | | | | | 1:1:7 | 1:1:7 | | | | | | | |
| High Med. | B17 | | | | | | | | | | | | | | | | |
| | B20 | | 1:1:4 | | | | | | | | | | | | | 1:3:12 | |
| | B21 | | 1:1:6 | | | | | | | | | | | | | | |
| | B22 | | | | | | | | 1:2:23 | | | 3:3:27 | 1:1:5 | | | | 1:1:5 |
| | B23 | | | | | | | | | | | | | | | | |
| | B31 | | | | | | | | | | | | | | | | |
| | B35 | | | | | | | | | | | | | | | | |
| | B33 | | | | | | | | | | 1:1:2 | | | | | | |
| Late Med. | C01 | | | | | | | | | 1:2:153 | | | | | | | |
| | C02 | | | | | | | 1:1:31 | | | | | | | | 2:2:13 | |
| | C03 | | | | | | | | | | | | | | | | |
| | C04 | | | | | | | | | | | | 1:1:4 | | | | |
| | C11 | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

* indicates cross context joins

Table 4 continued.

| Site | Site 30 | | | | | | | | | | | | | | | | |
|---------------|---------|--------|--------|-------|---------|-------|--------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--|
| Context | 560 | 563 | 564 | 567 | 568 | 600 | 615 | 624 | 1001 | 1016 | 1251 | 1254 | 1257 | 1260 | 1261 | 1281 | |
| =Context | 1285 | | | | | | | | | | | | | | | | |
| Saxo - Norman | B04 | | | | | | | | | | | | | | | | |
| Early Med | B14 | | | | | | | | | | | | | | | | |
| | B07 | | | 1:1:5 | 1:1:5 | 1:1:1 | | | 1:1:7 | 2:2:12 | | | | | | | |
| | B12 | 1:1:9 | | 1:1:6 | 1:1:1 | 1:1:8 | 2:2:19 | 1:1:6 | | 5:5:86 | | 5:5:54 | 3:3:44 | 1:1:11 | | 1:3:77 | |
| | B13 | | 1:1:21 | | | | | | | | | | 1:1:33 | | | | |
| | B18 | 1:1:8 | | | 2:2:19 | 1:1:3 | | | | | | 1:1:5 | | | | | |
| | B18U | 1:9:82 | | | | | | | | | | | 1:2:5 | | | | |
| | | | | | | | | | | | | | | | | | |
| High Med. | B17 | | | | | | | | | | | | | | | 1:1:10 | |
| | B20 | | | | | | | | | | 1:1:2 | 1:2:17 | 1:1:61 | | | | |
| | B21 | | | | | | | | | | | | | | | | |
| | B22 | | | | 1:10:27 | | | | | | | 1:1:10 | | | | | |
| | B23 | | | | | | 1:1:4 | | | | | 1:3:39 | | | | | |
| | B31 | | | | | | | | | | | | | | | | |
| | B35 | | | | | | | | | | | 4:4:59 | | | | | |
| | B33 | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| Late Med. | C01 | | | | | | | | | 1:1:14 | | | | | | | |
| | C02 | | | | | | *0:1:9 | | | | 1:2:27 | | | | 1:2:34 | | |
| | C03 | | | | | | | | 1:1:21 | | | | | | | | |
| | C04 | | | | | | | | | | | | | | | | |
| | C11 | | | | | | | | | | | 1:1:9 | | | | | |

* indicates cross context joins

Table 4 continued.

| Site | Site 30 | | | | | | | | | | | | |
|---------------|---------|--------------------|-------|--------|---------|----------------|-----------------|-------|------|------|------|------|--|
| Conxet | 1287 | 1366 | 1367 | 1371 | 1377 | 1392 | 1393 | 1397 | 1403 | 1413 | 1475 | 1512 | |
| = Context | | | | | | | | | | | | | |
| Saxo - Norman | B04 | 1:1:7 | | | | | | | | | | | |
| Early Med. | B14 | | | | | | | | | | | | |
| | B07 | 1:1:28 | 1:1:1 | | | 1:1:1 | | | | | | | |
| | B12 | 2:8:40 | | 1:1:24 | | | 3:3:96 | | | | | | |
| | B13 | | | | | | | | | | | | |
| | B18 | 1:1:1 | | | | | | | | | | | |
| B18U | | | | | | | | | | | | | |
| High Med. | B17 | | | | | | | | | | | | |
| | B20 | 1:1:6 | | | | | | | | | | | |
| | B21 | | | | | | | | | | | | |
| | B22 | 1:1:5 | | | 1:2:131 | *0:1:1 cc32 | *2:3:14 cc32 | 1:1:2 | | | | | |
| | B23 | | | | | | | | | | | | |
| | B31 | 1:1:7 | | | | | | | | | | | |
| | B35 | | | | | | | | | | | | |
| | B33 | | | | | | | | | | | | |
| Late Med. | C01 | | | | | | | | | | | | |
| | C02 | 1:14:114 1:2:18 | | | | | | | | | | | |
| | C03 | | | | | | | | | | | | |
| | C04 | 1:1:9 | | | | | | | | | | | |
| | C11 | | | | | | | | | | | | |

* indicates cross context joins

Of the four horizontal layers, which built up the top of the dam, only the 3rd and 4th layers contain pottery, datable to the mid-13th to 14th centuries. Sherds of the same fabric type B22 vessel were found in layer 30/1393 and channel fill 30/1397. The lowest surviving silt of the spillway channel, 30/1260, produced a single sherd of 12th to 13th-century Staxton ware, the only dating evidence which might, however, support the hypothesis that this was related to the first clay dam pond (see p. 40). Of the six layers that filled the channel, only 30/1261 produced pottery, two sherds of possible Humber ware C02.

On Site 71, gravel layers 11 and 12, the filling of depression 273 and channel 265, produced sherds of Staxton and Brandsby wares, but they are all very small and fragmentary.

Phase 4, Site 71

The carefully laid dump of rubble and ashy layers against the wall 214/218/217/202 contained pottery within its final sealing layers 195 and 196, and within the slippage from these layers, 200. Large quantities of fresh domestic refuse were recovered from these contexts (Nos 5, 7, 29, 30, 36, 42, 44, 45 and 47). The bulk of it is Staxton ware (B12) or Hard Orange ware (B22); a Humber ware bowl (No. 54) found in layer 200, has cross matching sherds in Phase 5, from where it may have migrated.

While the B22 vessels are all jugs, the Staxton ware vessels are more varied; they are mainly bowls and jars but there are at least two curfews in this assemblage, three if a bowl with slight internal sooting (No. 5) is included, an unusually high number of such vessels.

More than one substantial sherd has survived from some of the vessels, for example the curfew (No. 5) comprises twelve sherds weighing 364g, and the handled jar (No. 45) comprises nine sherds from dump 71/196 (134g) together with many sherds from a number of other contexts (see Table 1). The average sherd weight of pottery from contexts 195 and 196 is 25.26g and, together with the fact that there are a number of vessels with more than one sherd, suggests that the pottery was deposited soon after breakage, and probably not far from where it had been used and broken.

The handled jar in unrecognised type B (No. 45, cc9 in Table 1) has sherds from contexts of wide ranging dates, from Phase 1 to Phase 5. It is uncertain whether the jar is one or two handled as only one handle survives. Handled forms such as this are not common; a glazed Staxton ware (B13) handled vessel was found on the site, but this could be a spouted pitcher (No. 8). Handled jars are, however, an important if limited element of the Brandsby kiln production. The unprovenanced Brandsby vessel in York Museum, illustrated by Jennings (1992, 49, no.105), is a close parallel to the Wharram jar with the exception of the pulled lip which is absent from the Wharram pot. In form, if not in fabric, therefore, it is typical of the Brandsby kilns. If the Wharram jar is of a comparable date, late 13th to 14th-century, then it is likely to have originated in this phase, with the sherd in Phase 1 being clearly

intrusive and the sherds in Phase 5 residual. Out of 50 sherds, 64% occur in this phase.

The repeated recuts of ditch 261 contained pottery: the fill of channel 132 contained a single residual sherd of Staxton ware; channel 102 and its fills 94 and 121 contained sherds of Staxton ware (B12) and five sherds from the handled jar (No. 45). The final dumps of building rubble, layers 3 and 4, also contained sparse pottery, a sherd each of Staxton ware and Splash-glazed orange (B27), both likely to be residual.

Phase 4, Site 30

Phase 4.1

A relatively small amount of pottery was recovered from Phase 4.1, 6.95% of the total Phase 4 assemblage. There are small fragments of possible Humber ware, including a tiny one in post-hole 1149, but these could be intrusive. The pottery from layer 1096/1146 includes vessels with cross matching sherds from contexts in Phases 4.2 and 4.3 (see Table 1 cc nos 23, 28 and 29). Among the fragmentary pottery in surface 47/1095 is a York Glazed jug made up of 56 sherds, weighing 233g (No. 10). This vessel can be dated to the late 12th to 13th centuries and it was clearly discarded soon after breakage. The make up layers 40 and 41 contained fragmentary pottery, the bulk of which is early and high medieval in date.

Phase 4.2

Pottery from this group of contexts makes up 24.34% of the total from Phase 4. The latest pottery is Hambleton and Humber wares of the 14th and 15th centuries. None of these late medieval vessels is complete but they occur in quantities and vessel to sherd ratios that preclude them from being intrusive. For example, the Hambleton jug (No. 50) has five sherds weighing 148g and the Skipton-on-Swale drinking jug from cobbled surface 1164 is made up of seven sherds weighing 99g.

The latest pottery from the fills of the northern part of the deep cut, 1189/1208, is Hambleton and Humber ware. Three substantial sherds from a Brandsby jug (No. 22) were found in 1191, a lower fill of the channel, together with sherds of Humber ware and earlier pottery. Layer 1205, one of the base layers of the channel, produced a large part of, but not a complete, seal jug of York Glazed ware (B18). The jug (not illustrated) is very soft and poorly fired with an un-fluxed glaze; it comprises the badly shattered body only. Part of the raised outer circle of a seal can be discerned on one of the sherds. There are cross matching sherds from grit layer 1188 associated with the fill of the small channel 1153.

The southern part of the deep cut 1189/1208 contained a sparse collection of pottery, but among this assemblage is a large sherd of Humber ware (No. 52) from deposit 1229, and, from gritty clay 1241, a single Anglo-Saxon sherd.

Layer 1181, a silty clay spread with chalk pebbles, over 1190, the upper fill of channel 1189, contained largely 13th to 14th-century pottery although there are also sherds of a York Glazed jug.

The small channel, 1153, and its extension 1182 contained, not only the fragments of the York seal jug

Table 5. Site 71 Phase 4 quantification of pottery by context number (vessel:sherd:weight).

| Cxt | | 3 | 4 | 71 | 81 | 102 | 132 | 192 | 193 | 194 | 195 | 196 | 200 | 203 | 206 | 208 | 211 |
|-------------------|-----|--------|-------|--------|--------|-------|-------|----------------|-------|-----------------|---------------|------------------|------------------|--------|---------------|----------------|----------------|
| = Cxt | | | | | | | | | | | | | | | | | |
| Early Med. | B10 | | | | | | | | | | | | | | | | |
| | B27 | | 1:2:4 | | | | | | | | | | | | | | |
| | B28 | | | | 1:1:63 | | | 2:2:35 | | | | | | | | | |
| | B12 | 1:1:39 | | 1:1:22 | | 1:1:2 | 1:1:7 | 14:14:160 | 1:1:7 | 1:1:19 | | 50:66:1677 | 10:11:378 | 2:2:61 | 7:7:43 | 4:4:127 | |
| | B13 | | | | | | | 1:1:8 | | | | | | | | | |
| | B18 | | | | | | | 1:1:2 | | | | | | | | | |
| High Med. | B17 | | | | 1:1:2 | | | 1:1:1 | | | | 1:2:10 | | | | | 1:1:5 |
| | B19 | | | 1:1:23 | | | | | | | | | | | | | |
| | B20 | | | | | | | 1:1:73 | | | | 1:2:16 | | | | | |
| | B22 | | | | | | | *3:4:56 cc2 | | 1:1:15 | *0:1:1 cc2 | 6:16:690 | 1:1:62 | | 2:2:69 | 2:6:118 | 2:6:87 |
| | B26 | | | | | | | | | | | 1:1:21 | | | | | |
| | B30 | | | | | | | | | | | | | | | | |
| | B34 | | | | | | | | | *0:1:14 cc14 | 1:1:23 | *1:3:49 cc14 | *0:1:76 cc14 | | | | |
| | B | | | | | | | *0:6:65 cc9 | | | | *1:11:134 cc9 | *0:14:195 cc9 | | *0:1:5 cc9 | *0:1:14 cc9 | *0:1:11 cc9 |
| Late Med. | C02 | | | | | | | 1:2:63 | | | | | *1:5:143 | | | | |
| | C03 | | | | | | | | | | | | cc21 | | | | |
| | | | | | | | | | | | | | 1:1:6 | | | | |

* indicates cross context joins

Table 6. Site 30 Phase 4 quantification of pottery by context number (vessel:sherd:weight).

| Site | | Site 30 | | | | | | | | | |
|-------------|--|--|------|------|------|------|------|------|------|------|------|
| Cxt | | 0007 | 0008 | 0011 | 0012 | 0018 | 0019 | 0021 | 0023 | 0024 | 0029 |
| = Cxt | | 5 | | | | | | | | | |
| Anglo-Saxon | A04B A05 | | | | | | | | | | |
| Saxo-Norman | B04 B05 | | | | | | | | | | |
| Early Med. | B14 B07 B08 B09 B10 B27 B11 B12 B13 B16 B18 B18U B32 | <p>1:1:2</p> <p>1:1:2</p> <p>16:16:81 4:4:16 38:38:352 63:63:394 2:2:2 4:4:8 2:2:12 22:22:232 6:6:48</p> <p>3:19:218 *3:3:36 7:8:126 *0:1:4 10:11:27 1:1:6</p> <p>cc13 cc13</p> <p>3:6:26</p> <p>1:1:30</p> | | | | | | | | | |
| High Med. | B17 B19 B20 B21 B22 B23 B26 B30 B31 B36 B37 B34 B35 B | <p>1:1:1</p> <p>1:6:44 1:1:3 1:1:7</p> <p>2:9:74 3:3:99 *2:5:24</p> <p>cc17</p> <p>3:3:21</p> <p>3:11:111 2:4:70 9:107:823 2:2:48 3:3:41</p> <p>1:125:1415</p> <p>1:29:109</p> <p>1:4:114 1:3:24</p> <p>6:6:33 7:7:51 1:4:21 1:6:41</p> <p>1:1:34 1:1:40</p> | | | | | | | | | |
| Late Med. | C C01 C02 C03 C04 C05 C08 | <p>2:3:69 1:2:58 *7:13:251 1:1:1</p> <p>cc18</p> <p>4:5:41 17:17:170 17:34:277 1:1:1 5:5:6 24:25:387 19:19:81</p> <p>3:3:56 2:2:2 2:2:2 1:1:2</p> <p>1:1:12</p> | | | | | | | | | |

* indicates cross context joins

Table 6 continued.

| Site | | Site 30 | | | | | | | | | |
|-------------|--|--|------|------|------|------|------|------|------|------|------|
| Cxt | | 0030 | 0031 | 0036 | 0037 | 0038 | 0039 | 0040 | 0041 | 0043 | 0045 |
| = Cxt | | 6 | | | | | | | | | |
| Anglo-Saxon | A04B A05 | | | | | | | | | | |
| Saxo-Norman | B04 B05 | 1:1:13 | | | | | | | | | |
| Early Med. | B14 B07 B08 B09 B10 B27 B11 B12 B13 B16 B18 B18U B32 | 1:1:2 *0:1:26 cc20 1:1:13 4:4:6 13:15:294 16:16:49 1:1:2 2:2:4 1:2:44 1:1:16 9:9:48 1:3:10 11:16:88 4:5:33 1:1:3 | | | | | | | | | |
| High Med. | B17 B19 B20 B21 B22 B23 B26 B30 B31 B36 B37 B34 B35 B | 1:2:57 *6:21:153 *0:1:3 1:1:2 1:2:11 cc17 cc17 1:2:8 1:1:2 2:2:83 2:2:4 1:1:1 1:1:5 1:1:83 1:1:34 | | | | | | | | | |
| Late Med. | C C01 C02 C03 C04 C05 C08 | 1:3:13 *2:6:151 *0:2:38 1:2:1 cc18 cc18 6:6:37 11:11:21 5:5:34 1:1:2 1:1:3 4:5:51 1:1:33 1:1:6 | | | | | | | | | |

* indicates cross context joins

Table 6 continued.

| Site | | Site 30 | | | | | | | | |
|-------------|------|---------|-------|-------------------|-------|--------|-----------|--------|--------|-------|
| Cxt | | 0050 | 0056 | 0058 | 0066 | 1000 | 1011 | 1013 | 1022 | 1027 |
| = Cxt | | 46 | | | | | | | | |
| Anglo-Saxon | A04B | | | | | | | | | |
| | A05 | | | | | | | | | |
| Saxo-Norman | B04 | | | | | | | | | |
| | B05 | | | | | | | | | |
| Early Med. | B14 | 1:1:1 | 1:1:9 | | | | | | | |
| | B07 | | | | | | | | | |
| | B08 | | | | | | | | | |
| | B09 | | | | | | | | | |
| | B10 | | | | | | 3:19:82 | 1:1:2 | | |
| | B27 | | | | | | | | | |
| | B11 | | | | | | | | | |
| | B12 | 9:9:72 | | 31:45:360 | 2:2:3 | 3:3:11 | 27:34:271 | 2:2:25 | 2:2:20 | |
| | B13 | | | | | | | | | |
| | B16 | | | | | | | | | |
| | B18 | | | | | | 1:1:4 | | | 1:1:1 |
| | B18U | | | | | | | | | |
| | B32 | | | | | | 3:3:30 | | | |
| High Med. | B17 | | | | | | | | | |
| | B19 | | | | | | 3:7:83 | | | |
| | B20 | 1:1:16 | | 3:3:132 | | | | | | |
| | B21 | | | | | | 1:2:24 | | | |
| | B22 | 5:5:31 | | *2:14:179 cc16 | | | | | | |
| | B23 | | | | | | | | | |
| | B26 | | | | | | | | | |
| | B30 | | | 1:1:7 | | | | | | |
| | B31 | 1:1:5 | | | | | | | | |
| | B36 | | | | | | | | | |
| | B37 | | | | | | | | | |
| | B34 | | 1:1:2 | | | | | | | |
| | B35 | | | | | | | | | |
| | B | | | | | | | | | |
| Late Med. | C | | | | | | | | | |
| | C01 | | | | | | | | | |
| | C02 | | | | | | | | | |
| | C03 | | | | | | | | | |
| | C04 | | | | | | | | | |
| | C05 | | | | | | | | | |
| | C08 | | | | | | | | | |

* indicates cross context joins

Table 6 continued.

| Site | | Site 30 | | | | | | | | | | | | | | | | | |
|-------------|-----------|---------|-----------|--------|--------|---------|----------|-----------|-----------|-----------|----------|------------------|--------|--|--------|-------|--------|----------|--|
| Cxt | | 1043 | 1046 | 1048 | 1059 | 1067 | 1086 | 1087 | 1088 | 1093 | | | | | | | | | |
| = Cxt | | 1021 | | | | | | | 1100 | 9 | | | | | | | | | |
| Anglo-Saxon | A04B | | | | | | | | | | | | | | | | | | |
| | A05 | | | | | | | | | | 1:1:3 | | | | | | | | |
| Saxo-Norman | B04 | 1:1:9 | | | | | | | | | | | | | | | | | |
| | B05 | | | | | | | | | | | | | | | | | | |
| Early Med. | B14 | | | | | | | | | 1:1:1 | | | | | | | | | |
| | B07 | | | | | | | | | 2:12:67 | | | | | | | | 1:1:1 | |
| | B08 | | | | | | | | | | | | | | | | | | |
| | B09 | | | | | | | | | | | | | | | | | | |
| | B10 | | | | | | | | | | 4:12:141 | *0:6:142 cc20 | 1:3:18 | | | | | | |
| | B27 | | | | | | | | | | | | | | | | | | |
| | B11 | | | | | | | | | | 2:4:74 | | | | | | | | |
| | B12 | 2:2:17 | 35:38:360 | 1:1:11 | 5:5:18 | 1:1:4 | 19:19:82 | 41:41:211 | 27:27:176 | 82:82:539 | | | | | | | | | |
| | B13 | 1:1:3 | | | | | | | | | | | | | | | | | |
| | B16 | | | | | | | | | | | | | | | | | | |
| | B18 | | | | | | | | | | | | | | 1:1:7 | 3:3:4 | 2:7:22 | 13:13:43 | |
| | B18U | | | | | | | | | | 1:1:7 | | | | | | | | |
| | B32 | | | | | | | | | | | | | | | | | | |
| High Med. | B17 | | | | | | | | | | | | | | | | | | |
| | B19 | | | | | | | | | | 1:1:6 | | | | 1:1:21 | | | | |
| | B20 | | | | 3:3:4 | | | | 1:2:20 | 1:6:19 | | | | | | | | | |
| | B21 | | | | | | | | | 2:2:4 | | | | | | | | | |
| | B22 | | | | | 3:3:12 | 1:1:5 | 2:2:15 | 2:4:12 | | | | | | | | | | |
| | B23 | | | | | | | | | | | | | | | | | | |
| | B26 | | | | | | | | | | | | | | | | | | |
| | B30 | | | | | | | | | | | | | | | | | | |
| | B31 | | | | | | | | | 1:1:15 | | | | | | | | | |
| | B36 | | | | | | | | | | | | | | | | | | |
| | B37 | | | | | | | | | | | | | | | | | | |
| | B34 | | | | | | | | | | | | | | | | | | |
| | B35 | | | | | | | | | 2:2:5 | | | | | | | | | |
| | B | | | | | | | | | | | | | | | | | | |
| | Late Med. | C | | | | | | 1:1:18 | | | | | | | | | | | |
| C01 | | | | | | | | 1:1:1 | 1:1:23 | | | | | | | | | | |
| C02 | | | | | | 7:13:98 | 5:5:90 | 86:90:569 | | | | | | | | | | | |
| C03 | | | | | | | | | | 5:6:57 | | | | | | | | | |
| C04 | | | | | | | | | | | | | | | | | | | |
| C05 | | | | | | | | | | | | | | | | | | | |
| C08 | | | | | | | | | | | | | | | | | | | |

* indicates cross context joins

Table 6 continued.

| Site | | Site 30 | | | | | | | | |
|--------------------|------|--------------------|-----------|------------------|--------|-----------|-----------|--------|-------|----------------|
| Cxt | | 1094 | 1095 | 1096 | 1098 | 1099 | 1111 | 1112 | 1113 | 1114 |
| = Cxt | | 13; 33 | 47 | 1146 | | | | | | |
| Anglo-Saxon | A04B | | | | | | | | | |
| | A05 | | | | | | | | | |
| Saxo-Norman | B04 | | | | | | | | | |
| | B05 | | | | | | | | | |
| Early Med. | B14 | | | | | | | | | |
| | B07 | | 2:2:11 | 3:11:201 | | | | | | |
| | B08 | | | | | | | | | |
| | B09 | | | | | | | | | |
| | B10 | | | *2:9:174 cc20 | | | | | | |
| | B27 | | | | | 1:1:49 | | | | |
| | B11 | | | | | | | | | |
| | B12 | 40:40:247 | 23:27:151 | 15:15:230 | 3:8:20 | | 4:4:28 | 3:6:31 | | 7:7:23 |
| | B13 | | | 1:2:79 | | | | | | |
| | B16 | | | | | | | | | |
| | B18 | 1:1:1 | 2:58:243 | 1:1:23 | | | 1:1:2 | | | 5:5:17 |
| | B18U | 3:3:8 | 1:2:19 | *1:13:92 cc29 | | | | | | 1:1:1 |
| | B32 | | | | | | | | | |
| High Med. | B17 | | | | | | | | | |
| | B19 | 2:2:6 | 2:7:70 | | | | | | | |
| | B20 | 3:4:32 | | 4:13:157 | | | | 2:2:8 | 2:2:2 | 1:1:9 |
| | B21 | | 1:1:18 | | | | | | | |
| | B22 | *10:15:137 cc16 | | *0:1:7 cc27 | | | | | | 4:5:82 |
| | B23 | | | *0:1:13 cc24 | | | | | | |
| | B26 | | | | | | | | | |
| | B30 | | | | | 1:1:2 | | | | |
| | B31 | | 1:2:8 | 1:1:8 | | | | | | |
| | B36 | | | | | | | | | |
| | B37 | | | | | | | 1:1:25 | | |
| | B34 | | | | | | | | | |
| | B35 | 1:1:11 | | | | | | | | |
| | B | | | | | | | | | |
| Late Med. | C | | | | | | | | | *0:2:7 cc11 |
| | C01 | | | | | 1:1:13 | | | | |
| | C02 | 37:63:470 | 3:3:38 | | 1:1:4 | 13:13:238 | 27:37:240 | 3:4:68 | | 12:16:78 |
| | C03 | 1:1:29 | | | | | 1:2:75 | | | 1:1:2 |
| | C04 | | | | | | | | | |
| | C05 | | | | | | | | | |
| | C08 | | | | | | | | | |

* indicates cross context joins

Table 6 continued.

| Site | | Site 30 | | | | | | | | |
|-------------|------|---------|--------|-------|-----------|--------|--------|--------|--------|--------|
| Cxt | | 1116 | 1118 | 1121 | 1122 | 1123 | 1124 | 1125 | 1126 | 1127 |
| = Cxt | | | | | | | | | | |
| Anglo-Saxon | A04B | | | | | | | | | |
| | A05 | | | | | | | | | |
| Saxo-Norman | B04 | | | | | | | | | |
| | B05 | | | | | | | | | |
| Early Med. | B14 | | | | | | | | | |
| | B07 | | | | | | | | | |
| | B08 | | | | | | | | | |
| | B09 | | | | | | | | | |
| | B10 | | | | | | | | 1:1:9 | |
| | B27 | | | | | | | | | |
| | B11 | | | | | 1:1:16 | | | 2:2:8 | |
| | B12 | | | | 3:99:1429 | 6:6:60 | 1:3:40 | 4:4:30 | 6:6:34 | 1:1:20 |
| | B13 | | | | | | | | | |
| | B16 | | | | | | | | | |
| | B18 | | | | | 1:1:2 | | 1:2:4 | 3:3:12 | 1:1:5 |
| | B18U | | | | | | | | 1:1:9 | 3:3:16 |
| | B32 | | | | | | | | | |
| High Med. | B17 | | | | | | | | | |
| | B19 | | | | | | | | | |
| | B20 | | 2:2:11 | 4:4:8 | | 1:1:5 | 1:1:4 | 3:3:4 | | 4:4:7 |
| | B21 | | | | | | | | | |
| | B22 | 2:2:108 | 6:6:40 | | 6:6:61 | | | | | |
| | B23 | | | | | | 1:1:8 | | | |
| | B26 | | | | | | | | | |
| | B30 | | | | | 1:1:5 | | | | |
| | B31 | | | | | | | | | |
| | B36 | | | | | | | | | |
| | B37 | | | | | | | | | |
| | B34 | | | | | | | | | |
| | B35 | | | | | | | | | |
| | B | | | | | | 1:3:54 | | | |
| Late Med. | C | | | | | | | | | |
| | C01 | | | | | | | | | |
| | C02 | | 2:2:19 | 2:2:5 | | 1:6:62 | | | | |
| | C03 | | | | | | | | | |
| | C04 | | | | | | | | | |
| | C05 | | | | | | | | | |
| | C08 | | | | | | | | | |

* indicates cross context joins

Table 6 continued.

| Site | | Site 30 | | | | | | | | |
|--------------------|------|---------|--------|--------|--------|---------|----------|---------|---------|-----------|
| Cxt | | 1128a | 1137 | 1138 | 1139 | 1140 | 1142 | 1143 | 1144 | 1147 |
| = Cxt | | | | | | | | | | |
| Anglo-Saxon | A04B | | | | | | | | | |
| | A05 | | | | | | | | | |
| Saxo-Norman | B04 | | | | | | | | | |
| | B05 | | | | | | | | | |
| Early Med. | B14 | | | | 1:1:3 | | | | | |
| | B07 | 2:2:12 | | | | | 2:8:84 | | | |
| | B08 | | | | | | | | 2:2:27 | |
| | B09 | | | | | | | | | |
| | B10 | 1:8:29 | | | | | | 3:3:30 | | |
| | B27 | | | | | | | *0:1:2 | | 1:1:2 |
| | | | | | | | | cc28 | | |
| | B11 | | | | | 7:9:77 | | 2:4:92 | | 3:6:152 |
| | B12 | 6:6:50 | | | 2:2:43 | 7:7:28 | 5:5:27 | 7:7:93 | 3:6:117 | |
| | B13 | | | | | | | | | |
| | B16 | | | | | | | | | |
| | B18 | | | | | 1:1:5 | | 1:1:1 | | |
| | B18U | | | | | | *6:7:106 | *1:7:80 | *0:1:3 | *0:11:112 |
| | | | | | | | cc29 | cc29 | cc29 | cc29 |
| | B32 | | | | | | | | | |
| High Med. | B17 | | | | | | | | | |
| | B19 | | | | | | | | | |
| | B20 | | | 1:1:51 | 1:1:6 | | | 4:6:28 | 2:2:29 | |
| | B21 | | | | | | | | | |
| | B22 | 1:1:5 | | | | | | *0:3:10 | *0:1:3 | 1:1:10 |
| | | | | | | | | cc27 | cc27 | |
| | B23 | *0:1:15 | | | | | | | | |
| | | cc24 | | | | | 1:2:15 | | | |
| | B26 | | 1:1:34 | | | | | | | |
| | B30 | | | | | | | | 1:5:91 | |
| | B31 | | | | | | | | | |
| | B36 | | | | | | | | | |
| | B37 | | | | | | | | | |
| | B34 | | | | | | | | | |
| | B35 | | | | | | | | | |
| | B | *0:1:8 | | | | *1:2:15 | | *0:1:2 | *0:1:1 | |
| | | cc25 | | | | cc25 | | cc25 | cc25 | |
| Late Med. | C | | | | | | | | | |
| | C01 | | | | | | | | | |
| | C02 | | | | 1:1:14 | | | | | |
| | C03 | | | | | | | | | |
| | C04 | | | | | | | | | |
| | C05 | | | | | | | | | |
| | C08 | | | | | | | | | |

* indicates cross context joins

Table 6 continued.

| Site | | Site 30 | | | | | | | | |
|--------------------|------|---------|-----------------|--------|-----------|----------|--------|--------|--------|--------|
| Cxt | | 1149 | 1153 | 1163 | 1164 | 1168 | 1169 | 1171 | 1172 | 1174 |
| = Cxt | | | | | | | | | | |
| Anglo-Saxon | A04B | | | | | | | | | |
| | A05 | | | | | | | | | |
| Saxo-Norman | B04 | | | | | | | | | |
| | B05 | | | | | | | | | |
| Early Med. | B14 | | | | | | | | | |
| | B07 | | | | | | | | | |
| | B08 | | | | | | | | | |
| | B09 | | | | | | | | | |
| | B10 | | | | | | | | | |
| | B27 | | | | | | | | | |
| | B11 | | | | | | | | | |
| | B12 | | 2:2:2 | | 15:17:79 | 7:7:20 | 4:4:16 | 1:1:1 | | 1:1:11 |
| | B13 | | 1:1:4 | | 2:2:81 | | | | | |
| | B16 | | | | | | | | | |
| | B18 | | *0:8:45 cc30 | | 1:1:3 | | | 1:1:4 | | |
| | B18U | | | | | | | | | |
| | B32 | | | | | | | | | |
| High Med. | B17 | | | | 1:1:15 | 1:1:37 | | | | |
| | B19 | | | | | | | | | |
| | B20 | | 6:14:106 | | 17:18:64 | 3:3:8 | 2:3:4 | | | |
| | B21 | | | | | | | | | |
| | B22 | | 1:1:2 | | 2:2:65 | | | 2:2:46 | | |
| | B23 | | | | 1:2:26 | | | | | |
| | B26 | | | | | | | | | |
| | B30 | | | | 4:4:9 | | | | | |
| | B31 | | | | | | | | | |
| | B36 | | | | | | | | | |
| | B37 | | | | | | | | | |
| | B34 | | | | | | | | | |
| | B35 | | | | | 1:1:12 | | | | |
| | B | | | | | | | | | |
| Late Med. | C | | | | | | | 1:1:7 | | |
| | C01 | | | | 4:7:57 | 2:2:13 | 1:1:2 | | | |
| | C02 | 1:1:3 | 4:8:19 | 1:1:15 | 37:37:352 | 10:10:21 | 8:8:31 | 1:1:10 | | |
| | C03 | | 3:4:25 | | | 1:1:5 | | | 2:2:10 | |
| | C04 | | | | 1:7:99 | | | | | |
| | C05 | | | | | | | | | |
| | C08 | | | | | | | | | |

* indicates cross context joins

Table 6 continued.

| Site | | Site 30 | | | | | | | | | | | | | | |
|-------------|-----------|---------|--------|----------|-----------|--------|--------|------|------|------|---------|-----------|---------|-----------|----------------|---------|
| Cxt | | 1175 | 1178 | 1179 | 1181 | 1182 | 1183 | 1188 | 1190 | 1191 | | | | | | |
| = Cxt | | | | | | | | | | | | | | | | |
| Anglo-Saxon | A04B | | | | | | | | | | | | | | | |
| | A05 | | | | | | | | | | | | | | | |
| Saxo-Norman | B04 | | | | | | | | | | | | | | | |
| | B05 | | | | | | | | | | | | | | | |
| Early Med. | B14 | | | | | | | | | | | | | | | |
| | B07 | | | | | | | | | | | | | | | |
| | B08 | | | | | | | | | | | | | | | |
| | B09 | | | | | | | | | | | | | | | |
| | B10 | | | | | | | | | | | | | | | |
| | B27 | | | | | | | | | | | | | | | |
| | B11 | | | | | | | | | | | | | | | |
| | B12 | | | | | | | | | | 7:13:51 | 34:39:191 | 7:7:64 | 3:3:33 | | |
| | B13 | | | | | | | | | | | 1:1:6 | | 1:1:15 | | |
| | B16 | | | | | | | | | | | | | | | |
| | B18 | | | | | | | | | | | 1:1:3 | 1:14:77 | 1:3:15 | *0:1:2 cc30 | |
| | B18U | | | | | | | | | | | | | | | |
| | B32 | | | | | | | | | | | | | | | |
| High Med. | B17 | | | | | | | | | | | | | | | |
| | B19 | | | | | | | | | | | | | | | |
| | B20 | | | | | | | | | | 1:1:11 | 2:3:22 | 5:10:29 | 15:24:114 | 1:2:11 | 2:4:189 |
| | B21 | | | | | | | | | | | | | | | |
| | B22 | | | | | | | | | | | 5:6:153 | 4:4:34 | 6:13:143 | 7:8:170 | 1:1:1 |
| | B23 | | | | | | | | | | | | 1:1:2 | 1:2:12 | | |
| | B26 | | | | | | | | | | | | | | | |
| | B30 | | | | | | | | | | | | | | | |
| | B31 | | | | | | | | | | | | | | | |
| | B36 | | | | | | | | | | | | | | | |
| | B37 | | | | | | | | | | | | | | | |
| | B34 | | | | | | | | | | | | | | | |
| | B35 | | | | | | | | | | | | | | | |
| | B | | | | | | | | | | | | | | 1:5:86 | |
| | Late Med. | | | | | | | | | | C | | | | | |
| C01 | | | | | | | | | | | | | | | | |
| C02 | | 2:2:5 | 1:4:29 | 10:10:26 | 12:12:33 | 8:8:49 | 2:2:40 | | | | | | | | | |
| C03 | | | | | 10:12:147 | | | | | | | | | | | |
| C04 | | | | | | | | | | | | | | | | |
| C05 | | 1:1:14 | | | | | | | | | | | | | | |
| C08 | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

* indicates cross context joins

Table 6 continued.

| Site | | Site 30 | | | | | | | | |
|--------------------|-------------|---------|--------|---------|-------|-------------------|--------|---------|----------|--------------|
| Cxt | | 1192 | 1193 | 1198 | 1204 | 1205 | 1209 | 1214 | 1216 | 1217 |
| = Cxt | | 1225 | | | | | | | | |
| Anglo-Saxon | A04B | | | | | | | | | |
| | A05 | | | | | | | | | |
| Saxo-Norman | B04 | | | | | | | | | |
| | B05 | | | | | | | | | |
| Early Med. | B14 | | | | | | | | | |
| | B07 | | | | | | | | | |
| | B08 | | | | | | | | | |
| | B09 | | | | | | | | | |
| | B10 | | | | | | | | | |
| | B27 | | | | | | | | | |
| | B11 | | | | | | | | | |
| | B12 | | 2:2:3 | 6:6:20 | | | 2:2:7 | 7:12:68 | | 34:34:129 |
| | B13 | | | | | | | | | |
| | B16 | | | | | | | | | |
| | B18 | | | | | *1:53:305 cc30 | | | | 1:2:58 |
| | B18U B32 | | | | | | | | | 1:7:43 |
| High Med. | B17 | | | | | | | | | 3:11:80 |
| | B19 | | | | | | | | | 1:6:156 |
| | B20 | 1:3:20 | 1:1:1 | 2:3:39 | | | 2:2:10 | | 4:5:17 | 12:24:199 |
| | B21 | | | | | | | | | |
| | B22 | | 7:8:21 | | | | | | 3:3:230 | 23:43:552 |
| | B23 | | | | | | | | | |
| | B26 | | | | | | | | | 2:4:135 |
| | B30 | | | | | | | | | |
| | B31 | | | | | | | | | |
| | B36 | | | | | | | | | 1:2:5 |
| | B37 | | | | | | | | | |
| | B34 | | | | | | | | | |
| | B35 | | | | | | | | | |
| | B | | | | | | | | | |
| Late Med. | C | | | | | | | | | 1:2:9 |
| | C01 | | | | | | | | | 1:1:5 |
| | C02 | | 3:3:12 | 7:11:67 | | | 4:4:44 | | 5:7:78 | 87:87:437 |
| | C03 | | | 2:2:91 | 1:1:1 | | | | 7:12:265 | 109:142:1117 |
| | C04 | | | | | | | | | |
| | C05 | | | | | | | | | |
| | C08 | | | | | | | | | |

* indicates cross context joins

Table 6 continued.

| Site | | Site 30 | | | | | | | | | | | | | |
|-------------|-----------|-----------|-----------|-------|--------|------|------|------|------|------|-----------|---------|--------|-----------|--------|
| Cxt | | 1218 | 1224 | 1229 | 1231 | 1232 | 1235 | 1239 | 1240 | 1241 | | | | | |
| = Cxt | | 10 | | | | | | | | | | | | | |
| Anglo-Saxon | A04B | 1:1:4 | | | | | | | | | | | | | |
| | A05 | | | | | | | | | | | | | | |
| Saxo-Norman | B04 | | | | | | | | | | | | | | |
| | B05 | | | | | | | | | | | | | | |
| Early Med. | B14 | | | | | | | | | | | | | | |
| | B07 | | | | | | | | | | | | | | |
| | B08 | | | | | | | | | | | | | | |
| | B09 | | | | | | | | | | | | | | |
| | B10 | | | | | | | | | | | | | | |
| | B27 | | | | | | | | | | | | | | |
| | B11 | | | | | | | | | | | | | | |
| | B12 | | | | | | | | | | 32:32:261 | 1:1:7 | 2:2:5 | 24:24:116 | 1:1:12 |
| | B13 | | | | | | | | | | | | | | |
| | B16 | | | | | | | | | | | | | | |
| | B18 | | | | | | | | | | 1:1:8 | 1:1:5 | | | |
| | B18U | | | | | | | | | | | | | | |
| | B32 | | | | | | | | | | | | | | |
| High Med. | B17 | | | | | | | | | | | | | | |
| | B19 | | | | | | | | | | 1:1:16 | | | | |
| | B20 | | | | | | | | | | 1:4:101 | 1:1:17 | 1:3:19 | | |
| | B21 | | | | | | | | | | 4:4:9 | 4:4:32 | 1:3:18 | 1:1:10 | 3:7:24 |
| | B22 | | | | | | | | | | 3:10:79 | 3:13:67 | 1:6:65 | | |
| | B23 | | | | | | | | | | 1:1:29 | | | | |
| | B26 | | | | | | | | | | 1:13:73 | 1:9:52 | | | |
| | B30 | | | | | | | | | | 1:1:11 | | | | |
| | B31 | | | | | | | | | | 2:2:28 | | | | |
| | B36 | | | | | | | | | | | | | | |
| | B37 | | | | | | | | | | | | | | |
| | B34 | | | | | | | | | | 1:1:1 | | | | |
| | B35 | | | | | | | | | | 91:93:682 | | | | |
| | B | | | | | | | | | | | | | | |
| | Late Med. | | | | | | | | | | C | | | | |
| C01 | | 1:1:18 | | | | | | | | | | | | | |
| C02 | | 17:31:217 | 1:1:152 | 1:1:4 | 1:1:34 | | | | | | | | | | |
| C03 | | 9:17:150 | 60:68:447 | | | | | | | | | | | | |
| C04 | | | | | | | | | | | | | | | |
| C05 | | | | | | | | | | | | | | | |
| C08 | | | | | | | | | | | | | | | |

* indicates cross context joins

discussed above, but also fragments of Hambleton and Humber wares, the latest sherds found in these contexts.

The make-up for the 'concrete' surface 1094, layer 1127, contained small quantities of 13th to 14th-century pottery and some earlier residual fragments. Surface 1094 and its associated layers (1087, 1137, 1124 and 1126) contained a relatively large quantity of pottery, including ten sherds from a Humber ware jug, weighing 111g, from 1094. In the same chalk surface, context 13, was a B22 jug (No. 27) with thirteen cross-matching sherds from layer 58; it is likely that this vessel was deposited in clay and chalk layer 58 and spread to 13/33/1094. The associated chalk pebble layer 1124 contained an unrecognised jug (No. 49) whose decoration has affinities with that on Beverley 1 type pottery (B16) although a contemporary date cannot be certain. The raised area of 1094, a possible sill-beam setting 1137, contained, among other 13th to 14th-century sherds, a B26 jug (No. 34). Surfaces 1112 and 1111, above 1094, contained largely Humber wares, although there is a residual sherd of unrecognised fabric (B37) from 1112 (No. 44).

A series of post-holes, pits and surfaces also yielded pottery. Post-holes 1172, 1174, 1178 and 1204 contained largely late medieval sherds, including a sherd of purple glazed Humber ware. Two pits, 1138 and 12, also contained pottery. Pit 1138 only produced a single handle from a Brandsby jug while pit 12, on the other hand, contained a large assemblage of pottery of mixed date, but with Hard Orange ware (B22) predominating. Among the vessels are jugs, comprising 78 (No. 26) and 22 sherds respectively. The Staxton component of this group is large, 63 sherds, but very fragmentary while the Humber ware total is smaller but more substantial, with one jug made up of twelve sherds. A date in the 14th century is likely for the filling of this pit.

The build-up of chalk rubble 46/50 contained single sherds of 12th to 14th-century date. This surface abutted onto the stone feature 44, which itself contained no pottery, but rubble from it, context 45, had two small sherds of 13th to 14th-century pottery among fragmentary earlier sherds.

Surfaces 39 and 6/36 both produced pottery, the latest date of which is 14th to 15th-century. A Hambleton jug (No. 50) from 36 has cross matching sherds in deposit 37 and in the chalk rubble layer 23, both in Phase 4.3; but there is also a sherd from silty clay gravel 1110 in Phase 5, by which time it is residual.

A rectangular feature, 18, which contained tiny fragments of Staxton and Humber ware, cut surface 24. A similar feature, 29, contained a single sherd of a York glazed jug. Layer 1163, the build-up for surface 24, contained a single sherd of Humber ware, while 24 itself contained a mixed assemblage with the sherd of a 16th-century Cistercian cup as the latest pottery. Associated layers, 1169 and 1216, contained primarily Brandsby and Humber wares, most of which are very fragmentary, with the exception of one Chalky Humber ware jug which comprises six sherds weighing 231g. Cobbled surface 1164, over 1216, contained a fragmentary and mixed

assemblage of pottery, the latest being Humber ware. Among it is a Skipton-on-Swale jug comprising seven sherds weighing 99g.

Small amounts of pottery were recovered from pebble surface 31, associated with stone footing 30, the latest being Humber and Hambleton wares. From 30 itself only a single sherd of Staxton ware was recovered. It is a body sherd reshaped into a small disc (see Chapter 11). Context 22 produced pottery of 13th to 14th-century date with small quantities of earlier sherds.

Layer 1128a, contained pottery of a mixed date but no later than late 13th to 14th century. There are cross matching sherds with the pond silts of Phase 4.1, from which they may originate.

Phase 4.3

Pottery from Phase 4.3 totals 28.46% of the Phase 4 total pottery. The sherds from stone footing 19 date to the 13th to 14th centuries. The clay revetment 11, on the other hand, contained a mixture of pottery types, among them sherds of possible 14th to 15th-century Humber ware. There is a vessel with cross-matching sherds from the wall and the revetment, suggesting they might have been constructed at the same time. The tumble from 19, layer 1193, contained sparse quantities of pottery of the same late medieval date.

Substantial sherds were recovered from the chalk rubble layers 9/1093 and 10/1224.

The clay and rubble surface 9/1093 produced a mixed assemblage, with the dominant presence of Humber wares. There is also a possible cistern present in this layer (not illustrated); it is a fragment of neck with an applied thumbled collar, a common feature of Humber ware cisterns. Layer 10/1224 is also dominated by Humber wares, although there are four sherds from a large handle of a Gritty ware B19 jug (No. 21). Dated to the late 13th to 14th centuries, this vessel may well be residual by this phase, although there is evidence that the gritty wares in West Yorkshire continued in use into the 15th century (Moorhouse and Slowikowski 1987, 111).

The three successive chalk pebble layers 1122, 1123 and 1139 contained fragmentary pottery, the latest of which were Humber wares. The exception to this is layer 1122, the uppermost of the three, where 97 sherds, forming the major part of a Staxton jar (No. 4), were found. This type is generally thought to have gone out of use by the 14th century, if not earlier, although it has been suggested that it may have continued well into the 14th and even 15th centuries (Le Patourel 1979, 84). There were no Humber wares in this layer.

The deposits 5/23 and 37 both produced mixed assemblages. In layer 5/23 the latest sherds are Hambleton and Humber wares, but among the early medieval sherds is a large sherd from a Staxton ware jug (No. 2), a rare form in this fabric. The bung-hole from a Humber ware cistern (No. 55) was also found. Cisterns are also a relatively rare find on the site although they were an important part of the Humber ware industry. The Hambleton jug (No. 50) has five sherds from this layer;

Table 7. Site 71 Phase 5 quantification of pottery by context number (vessel:sherd:weight).

| Site | Site 71 | | | | | | | | | | | | | | | |
|------------|------------|------------------|-------------------|-----------------|-----------------|-------|--------|--------|------------------|----------------|-------|----------------------|-------------------|-----------------|--------|--|
| Cxt | 005 | 080 | 082 | 094 | 095 | 097 | 121 | 137 | 138 | 145 | 146 | 147 | 148 | 189 | 201 | |
| = Cxt | 006 | | | | | | | | | | | | | | | |
| Early Med. | B05 (late) | 1:1:15 | | | | | | | | | | | | | | |
| | B10 | 1:1:15 | 1:1:5 | | | | | | | | | | | 1:1:24 | | |
| | B28 | | | | | | | | | | | | | 23:23:249 | 1:1:22 | |
| | B12 | | *38:39:461 cc1 | 1:1:13 | | | 2:3:18 | | 5:5:119 | 3:3:15 | | 16:20:336 | | 4:4:46 | | |
| | B13 | | | | 1:1:10 | | | | | | | | | 1:1:24 | | |
| | B16 | | 1:1:15 | | | | | | | | | 1:1:29 | | | | |
| | B18 | | | 1:1:3 | | | | | 2:2:14 | | | | 1:1:14 | | 1:2:3 | |
| | B18U | | | | | | | | | | | | | | | |
| High Med. | B17 | *3:4:47 cc7 | *1:4:63 cc7 | | | | | | | *0:2:7 cc23 | | *2:3:15 cc23 | *0:2:6 cc23 | | | |
| | B19 | *1:2:28 cc3 | | | 2:2:13 | | | | | | | | | | | |
| | B20 | | | | 1:1:2 | 1:1:1 | | | | | | | | | | |
| | B22 | *5:20:158 cc2 | 1:3:23 | | | | | 1:1:34 | 1:1:20 | | 1:1:3 | *12:23:299 cc2 | *17:24:267 cc2 | | | |
| | B23 | *0:11:165 cc6 | | | 2:2:12 | | | | *0:13:152 cc6 | *0:3:14 cc6 | | *0:3:7 cc6 | *0:3:13 cc6 | | | |
| | B30 | | | | | | | | | | | | | | | |
| | B34 | 1:2:190 | | | | | | | | | | | 1:2:20 | | | |
| | B35 | | | | | | | | 1:1:3 | | | 1:1:4 | | | | |
| Late Med. | B | *0:2:11 cc9 | | *1:5:181 cc9 | *0:1:10 cc35 | | | | | 1:1:25 | | *1:11:203 cc9, 35 | | *1:1:18 cc35 | | |
| | C02 | | | | | | | | | | | | *0:1:42 cc21 | | | |
| | C03 | | 1:1:7 | | | | | | | | | | | | | |

its cross matching sherds are described above. The pottery from layer 37 includes sherds from a Brandsby jug with cross-matching sherds in 24 and the chalk rubble layer 36.

As with the other contexts in this phase, build-up layer 1168 contained a mixed assemblage of pottery in a fragmentary condition, the latest of which were Hambleton and Humber wares.

Phase 5, Site 71

The compacted dumps of chalk 80, 82 and 189, produced a variety of pottery, including sherds from the handled jar (No. 45), discussed above. Most of the pottery is dated no later than the 14th century. There is, however, a single sherd of Chalky Humber ware, which could date to the beginning of this phase. There were cross-fits with layer 15 (see Table 1) from the succeeding Phase 6, the result of compacting these layers to form a trackway.

Surface 95 contained a small amount of largely residual pottery dating to the 13th or 14th centuries.

Table 8. Site 71 Phase 6 Quantification of pottery by context number (vessel:sherd:weight)

| Site | | Site 71 | | |
|-------------------|------------|-------------------|-------|-------|
| Cxt | | 15 | 70 | 84 |
| = Cxt | | | | |
| Early Med. | B05 (late) | *0:1:3 cc4 | | |
| | B14 | 1:1:10 | | |
| | B12 | *44:44:552 cc1 | | |
| | B18 | 4:4:11 | | |
| | | | | |
| High Med. | B17 | 4:17:124 | | |
| | B19 | *3:7:181 cc3 | | |
| | B22 | *29:44:303 cc2 | | 1:1:7 |
| | B23 | *1:28:211 cc6 | | |
| | B30 | 1:1:4 | | |
| | B | 2:4:63 | | |
| | | | | |
| Late Med. | C01 | 2:4:583 | 1:1:3 | |
| | C11 | *1:1:15 cc22 | | |

* indicates cross context joins

Phase 6, Site 71

The bulk of the pottery from this phase is residual. The latest sherds are Hambleton and Rawmarsh wares, both of which date to the late 14th to 15th centuries, but could continue into the 16th century. The compaction of the

surfaces of the preceding Phase 5 account for the relatively large number of vessels with sherds from those layers as well as layer 15 in Phase 6.

The pottery from Site 30, Phases 5-8 and from Site 71, Phase 8 has been recorded and tabulated. The tables form part of the Archive.

Forms

There is an extremely high percentage of jugs, 92.63% of the total identifiable form assemblage. Even when taking into consideration the fact that jugs are much more easily identified from body sherds than other forms, this is unusual. The quantity of jugs on the North Manor was regarded as unusually high at 61%, yet this is lower than the proportion here.

The percentage of jars found on the Pond and Dam sites is unusually low at only 4.81%, however, this is likely to be an underestimate. Of the unidentified body sherds, 21.67% was sooted externally and could therefore come from jars used as cooking pots. The sooted sherds added to the sherds from positively identified jars would increase the putative jar total to 12.38%, which would nevertheless still be relatively low. On both the North Manor and South Manor, the jar was the dominant form.

Kitchen wares such as jars, peat pots and bowls are the common forms of the early medieval period, but they are in a minority here. As elsewhere at Wharram, the predominant fabric for these is Staxton ware (B12).

Another unusual aspect of this assemblage is the variety of sources particularly for the jugs, with examples otherwise as yet unknown at Wharram. Among them are the products of the Brill/Boarstall kilns in Buckinghamshire, examples of Tees valley ware and Saintonge ware from south-west France. Other fabrics, such as B22 and B35, come from unrecognised sources and, like the York and Scarborough wares, are perhaps more regional than local. Large quantities of Hard Orange ware (B22) have been found at Barton on Humber, suggesting a source in the Humber area (Didsbury and Young forthcoming). This large quantity of imported jugs suggests not only a possible specialised function but also a relatively high status assemblage. Ceramic objects associated with the domestic function of high status households, such as dripping pans, chafing dishes, condiments and salts, are rare, with only one possible salt or condiment identified. Ceramic objects normally associated with ordinary domestic use are also rare. The number of sooted vessels is relatively low, 9.04% of the total sherd assemblage, although this may be because the percentage of forms which are usually sooted, jars and peat pots, is also relatively low.

It is the large proportion of jugs, which stands out, and particularly so in Phase 4 on Site 30, dated to the 14th to 15th centuries (Table 10). The proportion of jars to jugs in Phase 2 (AD 1200-1299) is what might normally be expected from a rural domestic assemblage. In Phase 4 (Site 30) the number of jugs rockets while the jars drastically decline. A decline in the use of ceramic cooking pots and the more common use of metal vessels

Table 9. Recognisable forms by fabric, in chronological order (vessel count).

| FABRIC | FORMS | | | | | | | | | | |
|----------------|-----------|-------------|-----------|--------------------|-------------|----------|-----------------|----------------|----------|----------|----------|
| | Jar | Peat pot | bowl | spouted pitcher | jug | curfew | drinking jug | handled jar | urinal | cistern | cup |
| Group 3 | | | | | | | | | | | |
| B04 | 2 | | | | | | | | | | |
| B05 | 1 | | | | 1 | | | | | | |
| Group 4 | | | | | | | | | | | |
| B07 | 7 | | | | | | | | | | |
| B09 | | | | | 1 | | | | | | |
| B10 | | | | | 25 | | | | | | |
| B11 | | | | | 14 | | | | | | |
| B12 | 62 | 2 | 5 | | 2 | 4 | | | | | |
| B13 | | | 1 | 1 | 8 | | | | | | |
| B16 | | | | | 5 | | | | | | |
| B18 | | | | | 118 | | | | | | |
| B18U | 3 | | 1 | | 20 | | | | | | |
| B27 | | | | | 2 | | | | | | |
| B28 | | | | | 5 | | | | | | |
| B32 | | | | | 5 | | | | | | |
| Group 5 | | | | | | | | | | | |
| B | | | 1 | | 10 | | | 1 | | | |
| B17 | | | | | 29 | | | | | | |
| B19 | | | 1 | | 25 | | | | | | |
| B20 | 1 | | 5 | | 142 | | | | | | |
| B21 | | | | | 8 | | | | | | |
| B22 | | | 1 | | 221 | | | | | | |
| B23 | | | | | 13 | | | | | | |
| B26 | | | | | 7 | | | | | | |
| B30 | | | | | 12 | | | | | | |
| B31 | 1 | | | | 8 | | | | | | |
| B34 | | | 1 | | 6 | | | | | | |
| B35 | | | | | 112 | | | | | | |
| B36 | | | 1 | | | | | | | | |
| B37 | | | | | 2 | | | | | | |
| Group 6 | | | | | | | | | | | |
| C | | | | | 6 | | | | | | |
| C01 | | | 1 | | 43 | | | | | | |
| C02 | 1 | | 7 | | 465 | | | | 1 | 3 | |
| C03 | | | | | 204 | | | | | | |
| C04 | | | | | | | 4 | | | | |
| C11 | | | | | 2 | | | | | | |
| C12 | 1 | | | | | | | | | | |
| Group 7 | | | | | | | | | | | |
| C05 | | | | | 1 | | | | | | |
| C08 | | | | | | | | | | | 1 |
| Totals | 79 | 2 | 25 | 1 | 1522 | 4 | 4 | 1 | 1 | 3 | 1 |

Table 10. Comparison of the proportion of jars and jugs throughout the medieval phases.

| Phase | % total vessels | | % total recognised forms | |
|-------|-----------------|-------|--------------------------|-------|
| | Jugs | Jars | Jugs | Jars |
| 1 | 35.71 | 7.14 | 57.14 | 12.50 |
| 2 | 12.50 | 12.50 | 29.17 | 42.86 |
| 3 | 31.65 | 5.04 | 38.85 | 12.96 |
| 30/4 | 52.29 | 1.44 | 54.55 | 2.63 |
| 71/4 | 25.19 | 8.15 | 38.52 | 21.15 |
| 71/5 | 38.71 | 6.45 | 47.31 | 13.64 |
| 71/6 | 48.94 | 8.51 | 58.51 | 14.55 |

has been well documented (Le Patourel 1978). Of these jars, 24.24% are sooted and presumably still being used as cooking vessels, a similar, or even higher, proportion to preceding phases.

Although a large number of jugs come from York, Brandsby or Scarborough, as on other areas of Wharram, there are in addition, examples of jugs from further afield (see above). They usually occur in proportions of less than 1%. Moorhouse (1983, 45-87) has discussed the varied reasons why pottery may have travelled long distances, possibly as an incidental container of other goods or as part of the baggage of travelling households. Manorial contacts as well as the availability of pottery in the local markets will have influenced the type of pottery found. On the Pond and Dam sites the fact that it is jugs which have travelled rather than jars, suggests that they

were not used purely as containers. They are more likely to have travelled as part of the baggage of the manorial household.

The original place of use of this pottery is uncertain. It may have accumulated as the debris from a source near by but if this was a household, a more varied domestic assemblage would be expected.

Tables 1 - 7 show how the proportion of fabric types varies throughout the phases, with the greatest variety occurring in Phase 4 on Site 30. This is also the phase with the largest assemblage, 3458 sherds, but 37 different fabric types is nevertheless a high total. Most occur in proportions of less than 1%. Staxton ware remains at a high proportion throughout the phases, even though it is residual by Phase 5 on Site 71. The fabrics in Ceramic Groups 2 and 3 occur in Phase 3 and later, and are also residual, although indicating some pre-Conquest activity nearby.

Twenty-one vessels had visible residues. Of these, the majority, ten in total, had internal white residues, and a further nine had internal white residues and were also sooted externally. It can be suggested that the latter were used for boiling water, which produced limescale. The former may have resulted from the long-term storage of water, but confirmation of this is not possible without further analysis. Only two vessels showed an internal black residue. The majority of vessels with residues are Staxton type B12, three of which are jars, one is a jug and the rest are unidentifiable body sherds. The rest are jugs of types B22, B23 and C02. The internal white residue from the Humber ware urinal (No. 53) may be uric acid.

Residues in the pottery from across the village will be discussed in the final volume of the Wharram series.

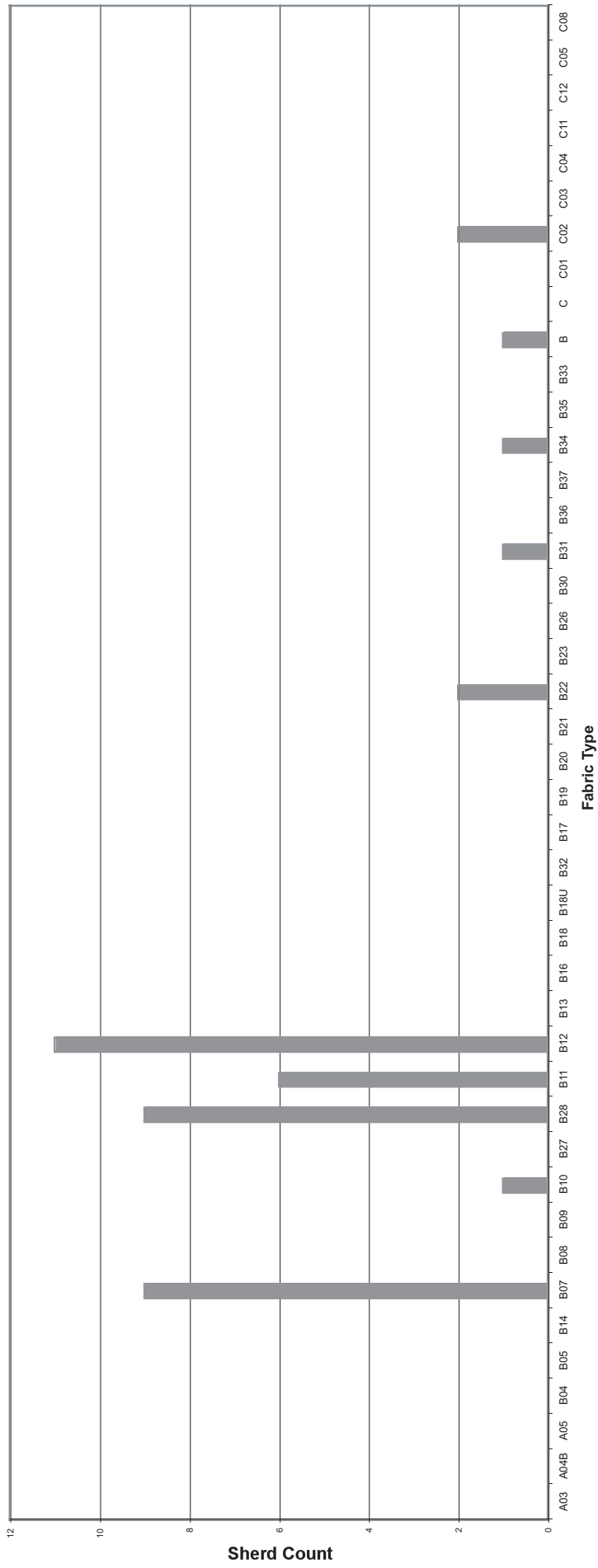


Fig. 42. Histogram of the quantification of fabric types by sherd count: Phase 1. (A.M. Slowikowski)

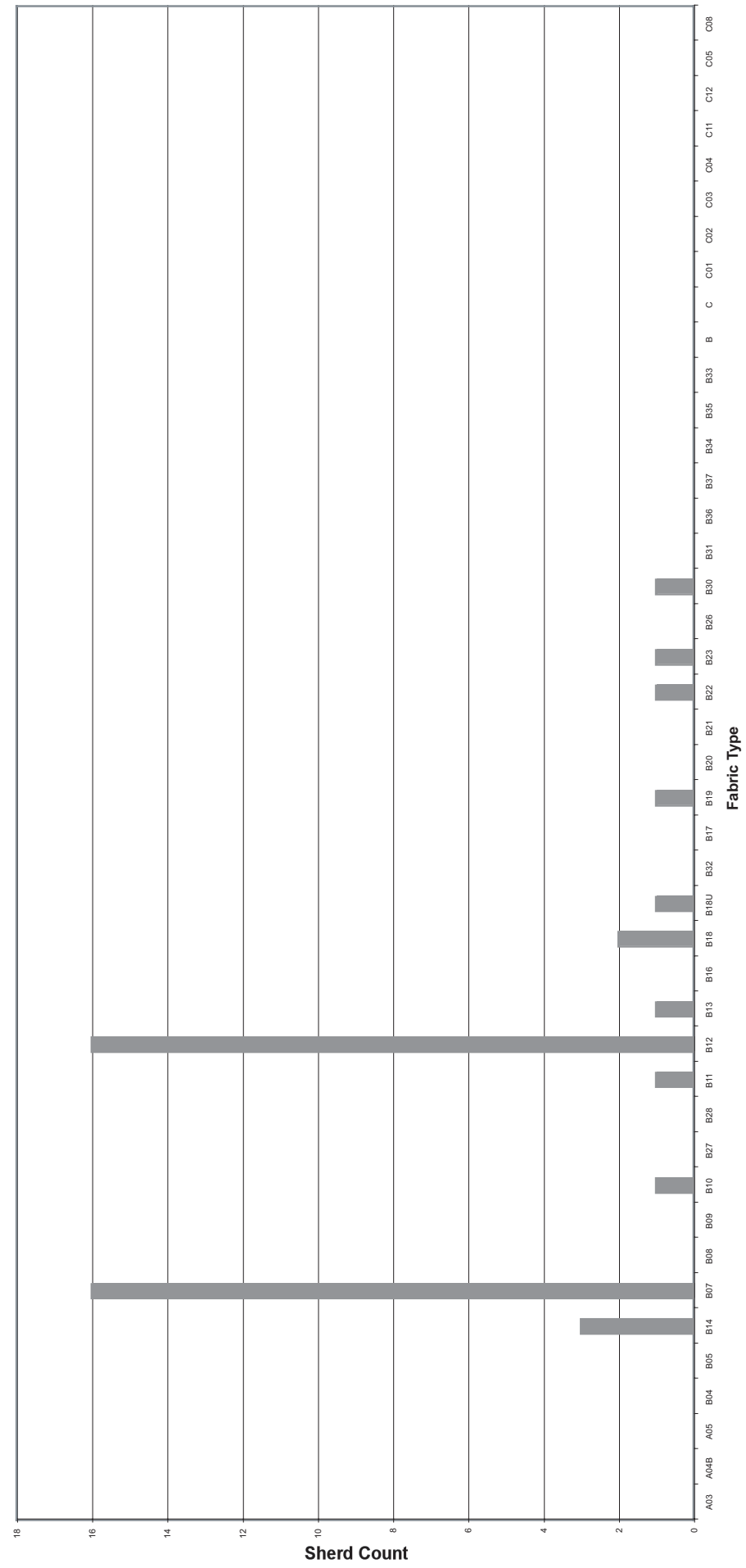


Fig. 43. Histogram of the quantification of fabric types by sherd count: Phase 2. (A.M. Slowikowski)

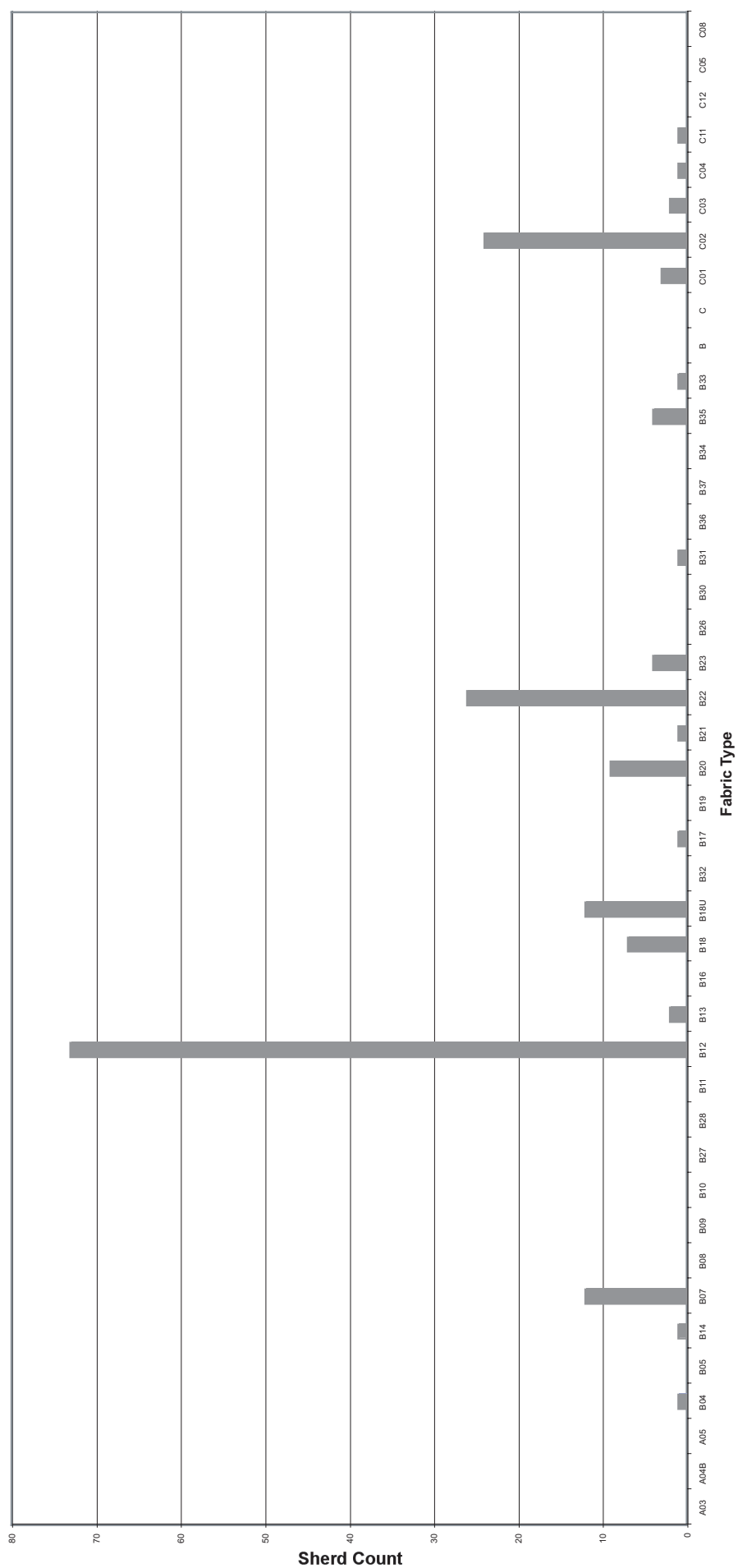


Fig. 44. Histogram of the quantification of fabric types by sherd count: Phase 3. (A.M. Slowikowski)

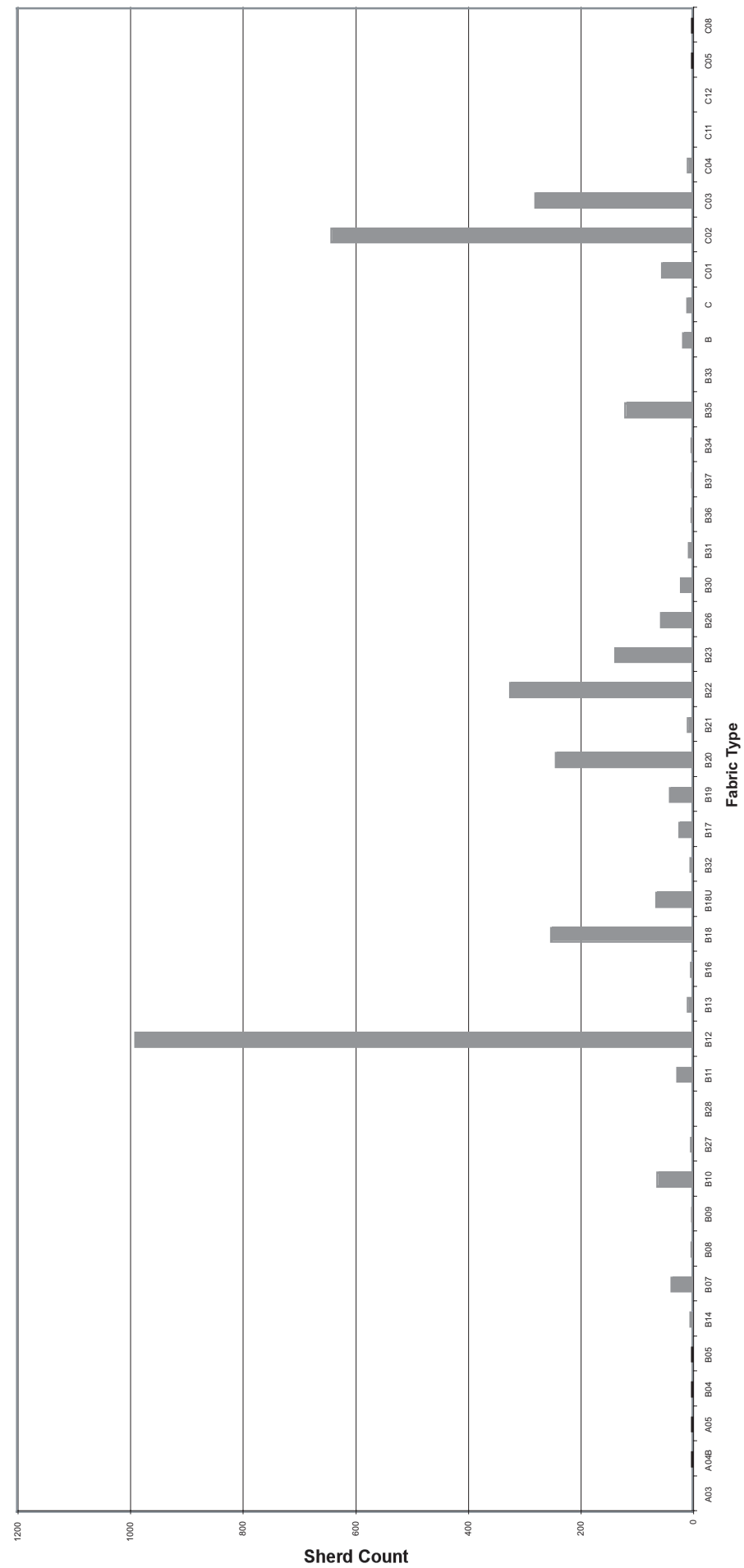


Fig. 45. Histogram of the quantification of fabric types by sherd count Site 30: Phase 4. (A.M. Slowikowski)

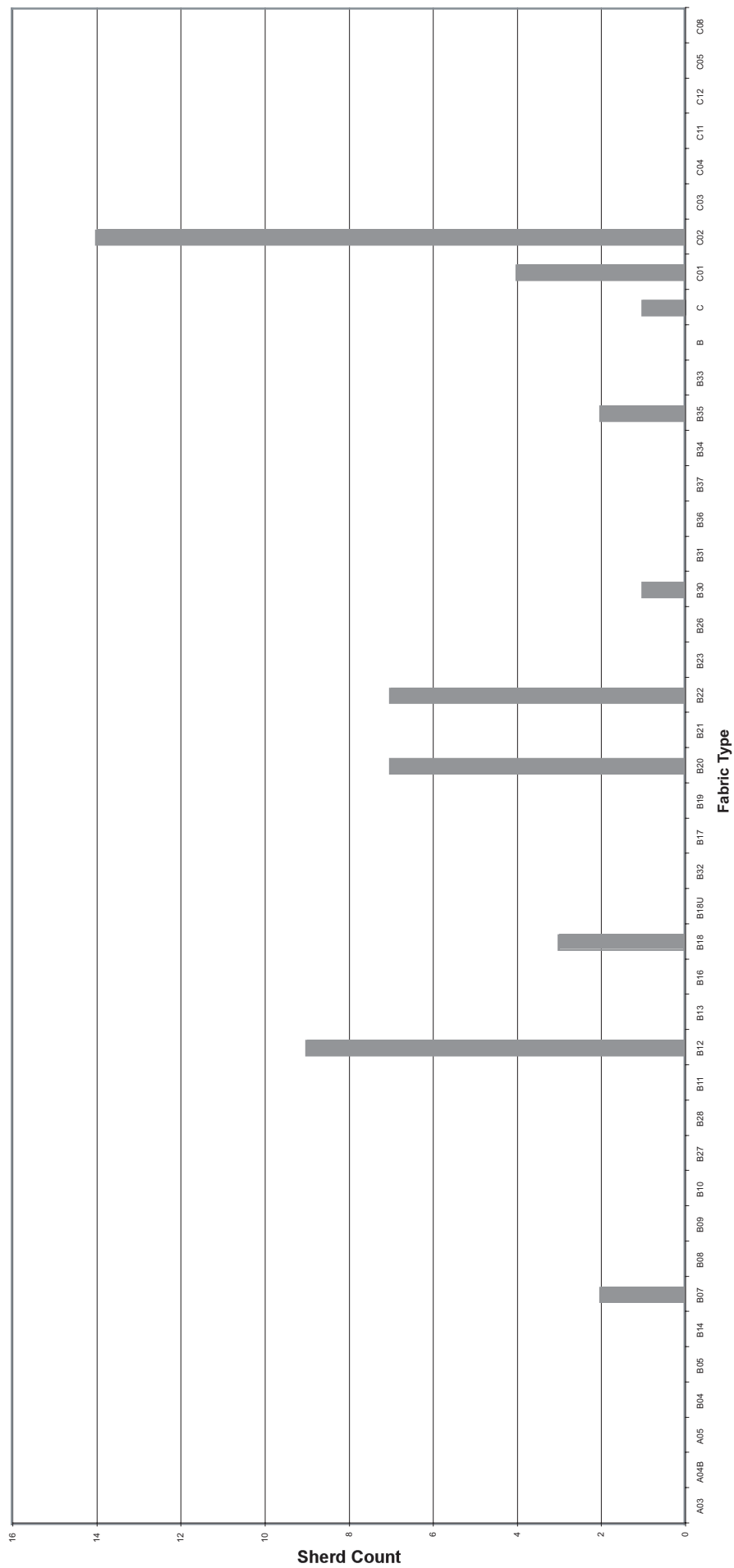


Fig. 46. Histogram of the quantification of fabric types by sherd count Site 30: Phase 5. (A.M. Slowikowski)

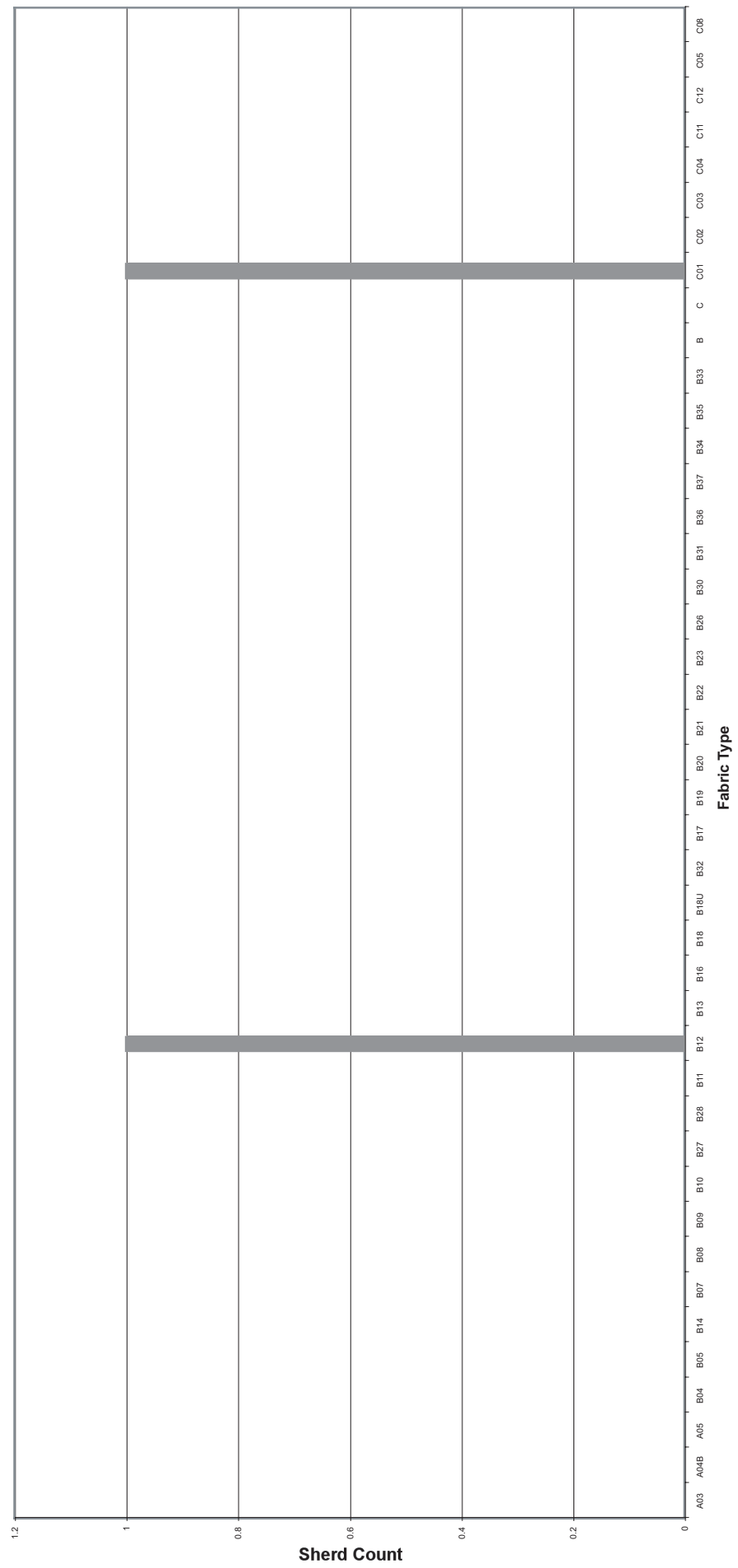


Fig. 47. Histogram of the quantification of fabric types by sherd count Site 30: Phase 6. (A.M. Slowikowski)

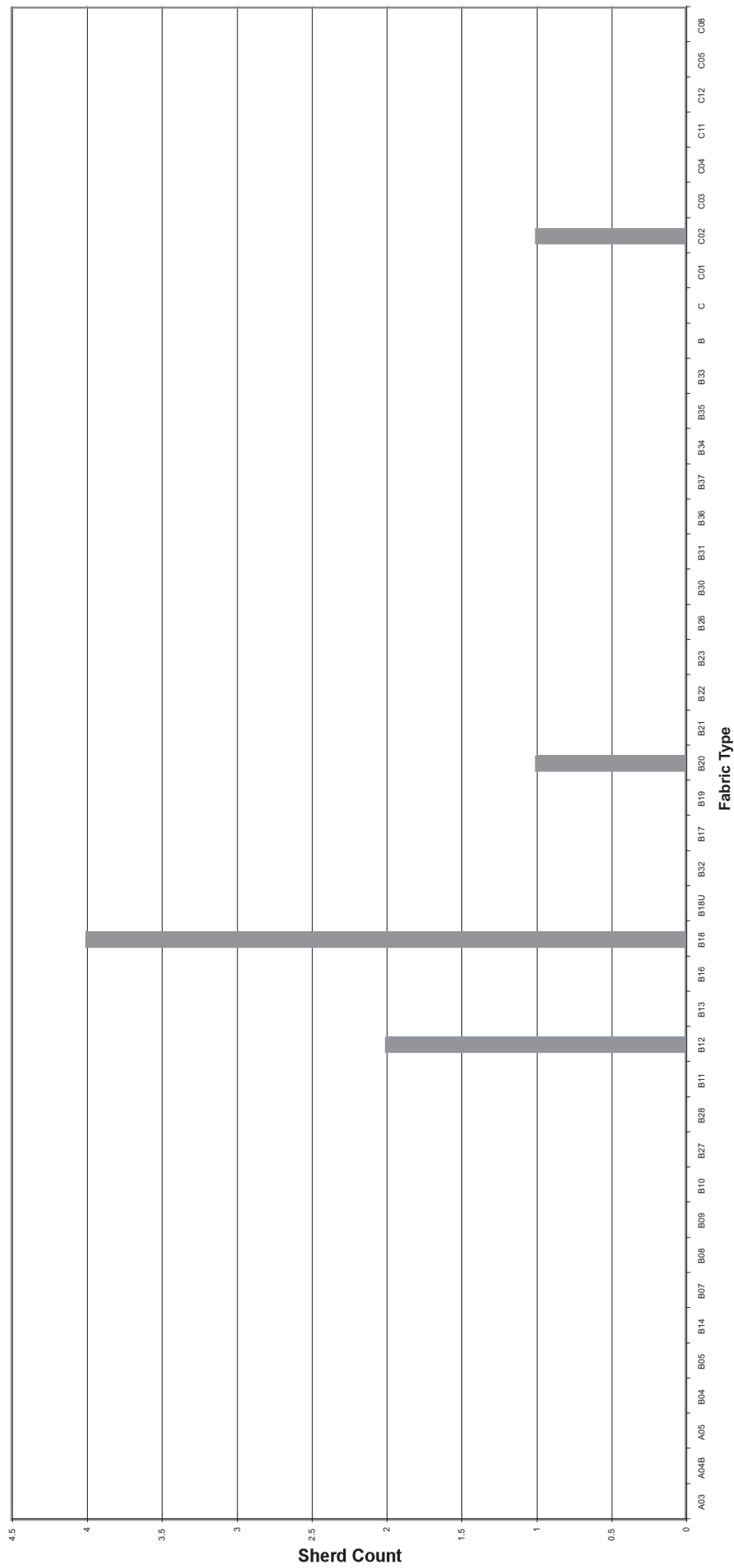


Fig. 48. Histogram of the quantification of fabric types by sherd count Site 30: Phase 7. (A.M. Slowikowski)

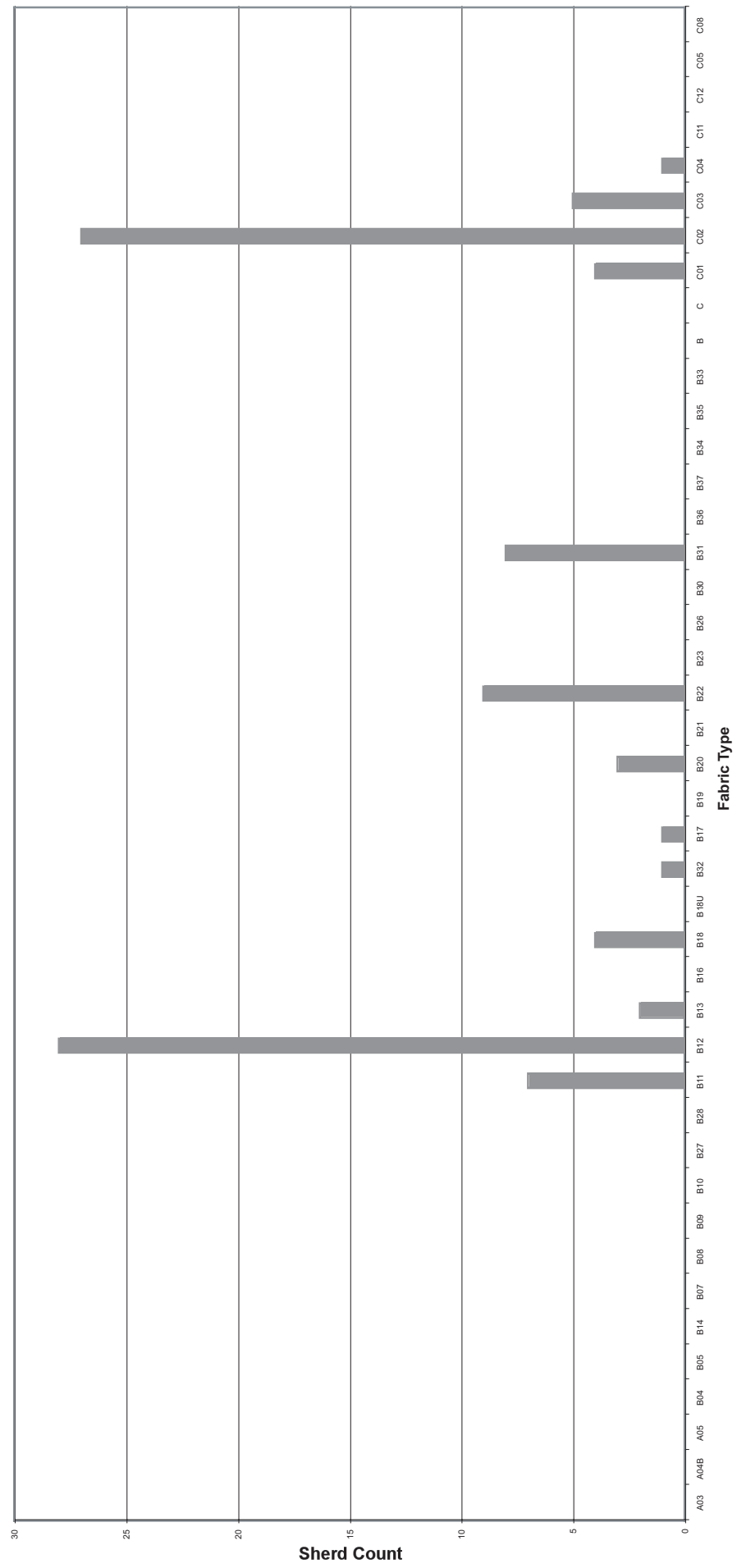


Fig. 49. Histogram of the quantification of fabric types by sherd count Site 30: Phase 8. (A.M. Slowikowski)

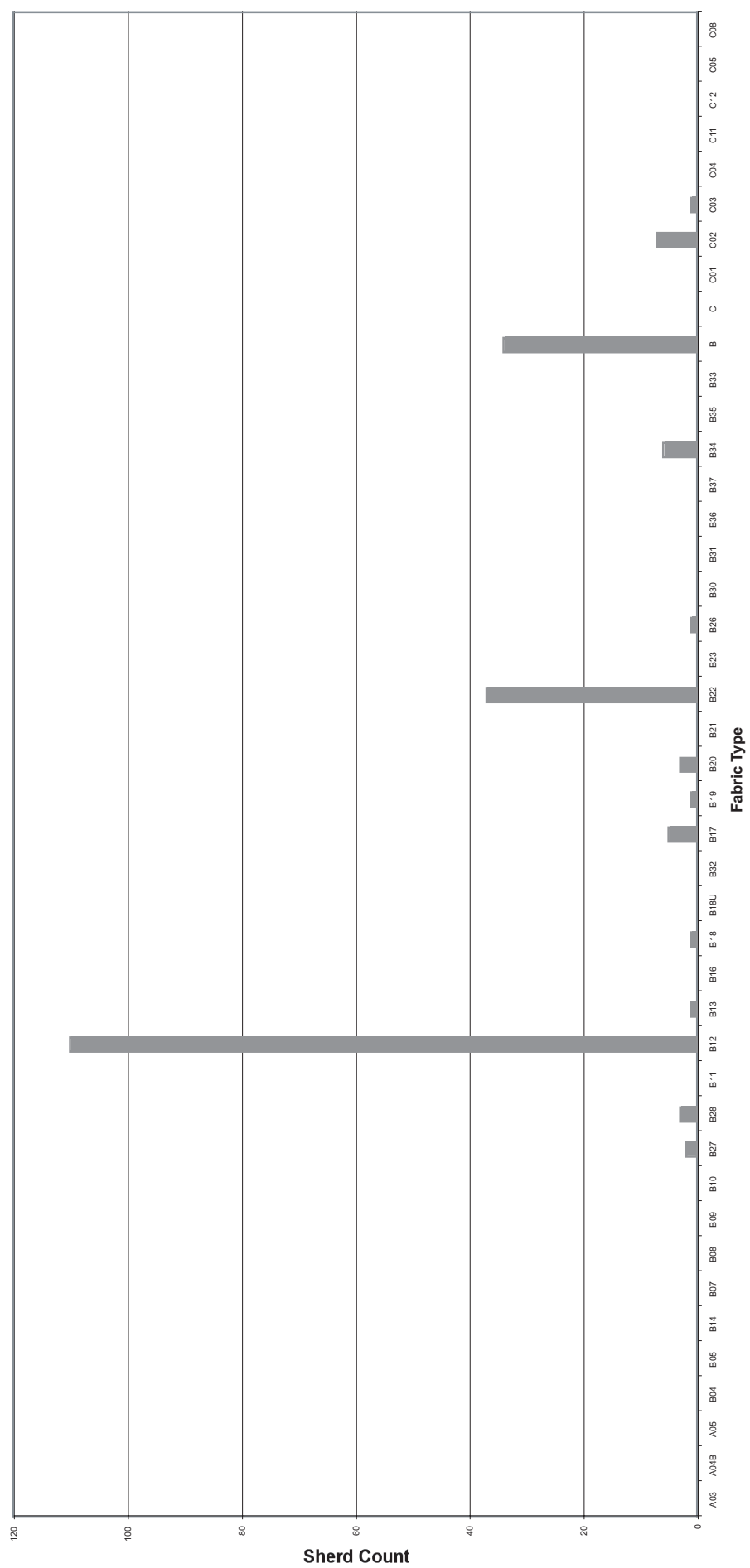


Fig. 50. Histogram of the quantification of fabric types by sherd count Site 71: Phase 4. (A.M. Slowikowski)

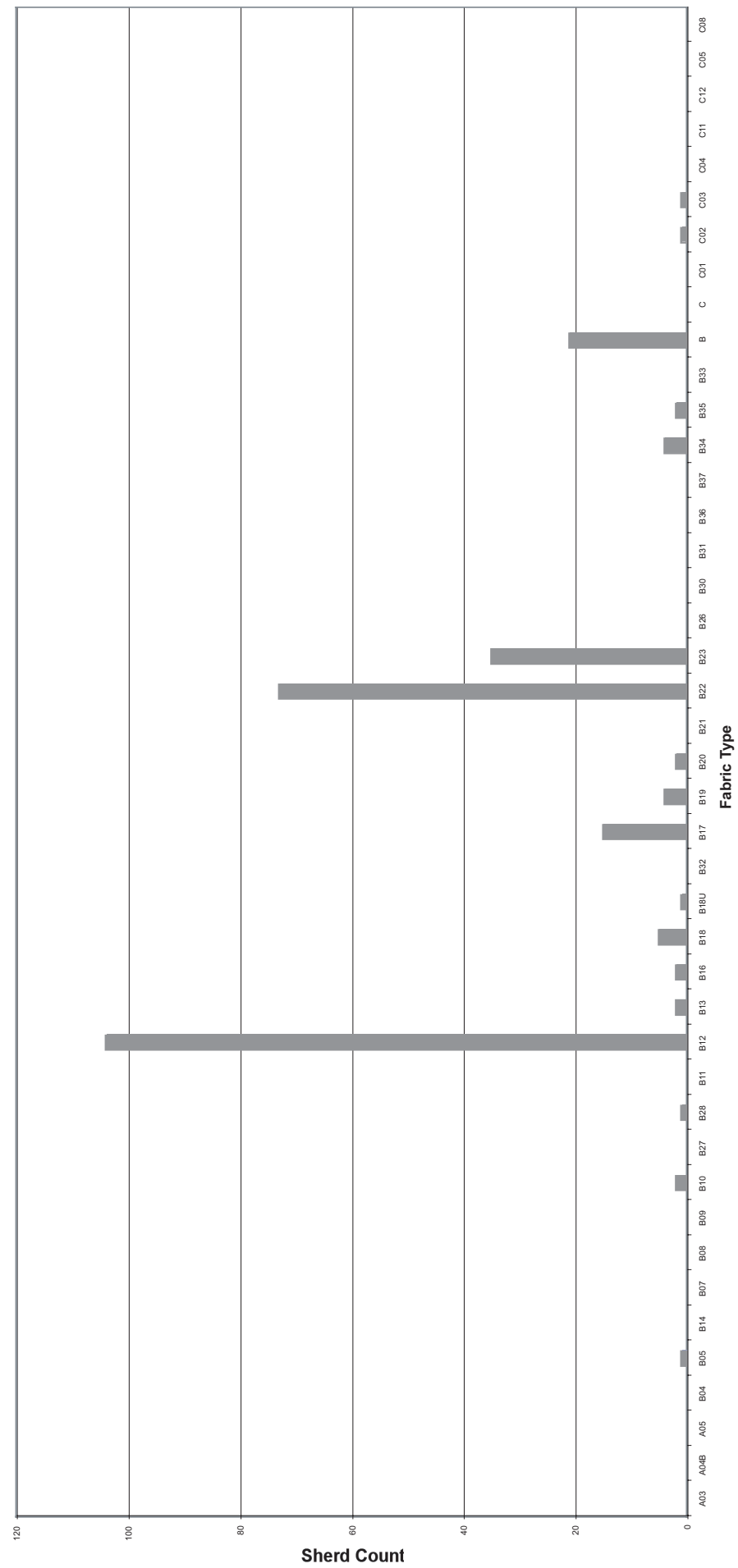


Fig. 51. Histogram of the quantification of fabric types by sherd count Site 71: Phase 5. (A.M. Slowikowski)

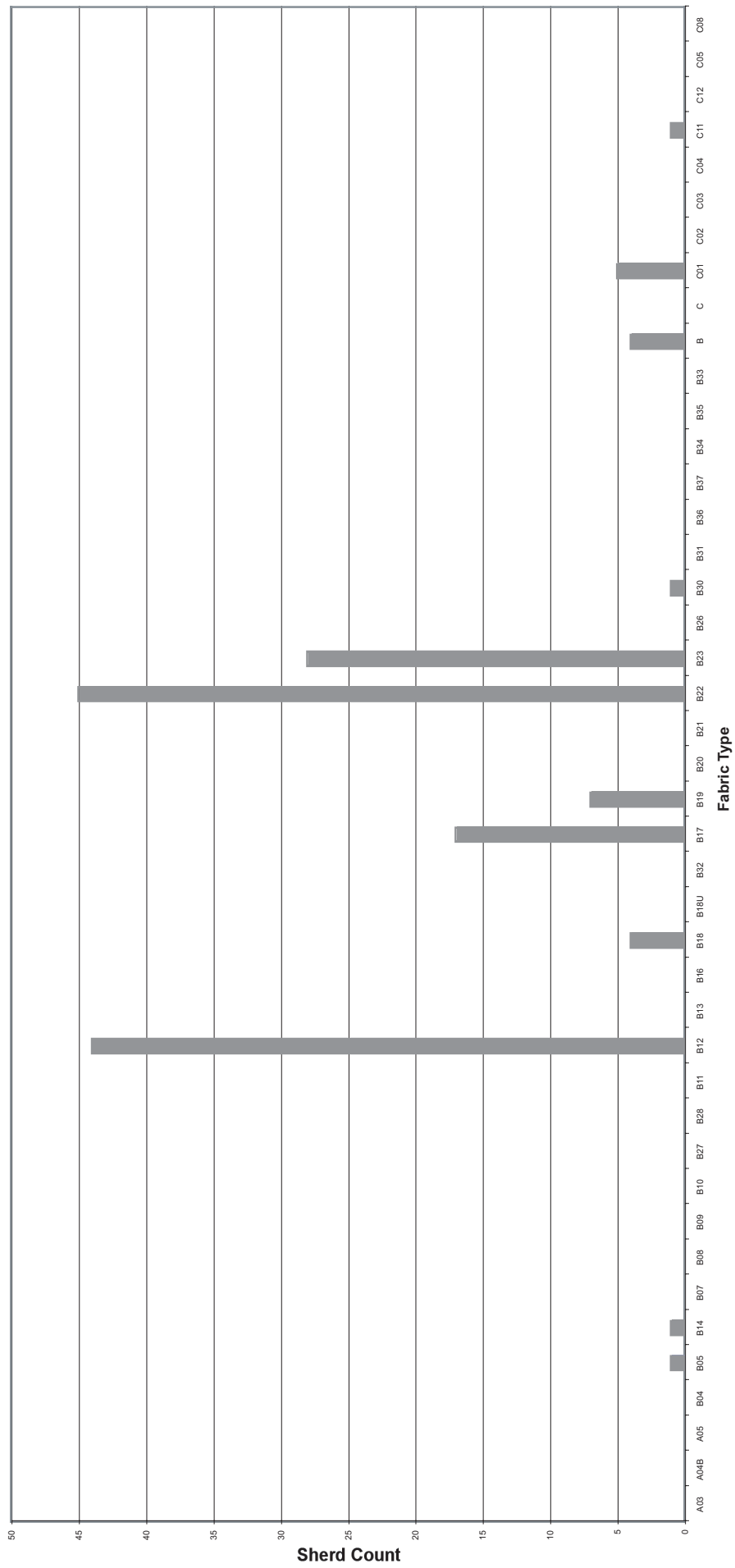


Fig. 52. Histogram of the quantification of fabric types by sherd count Site 71: Phase 6. (A.M. Slowikowski)

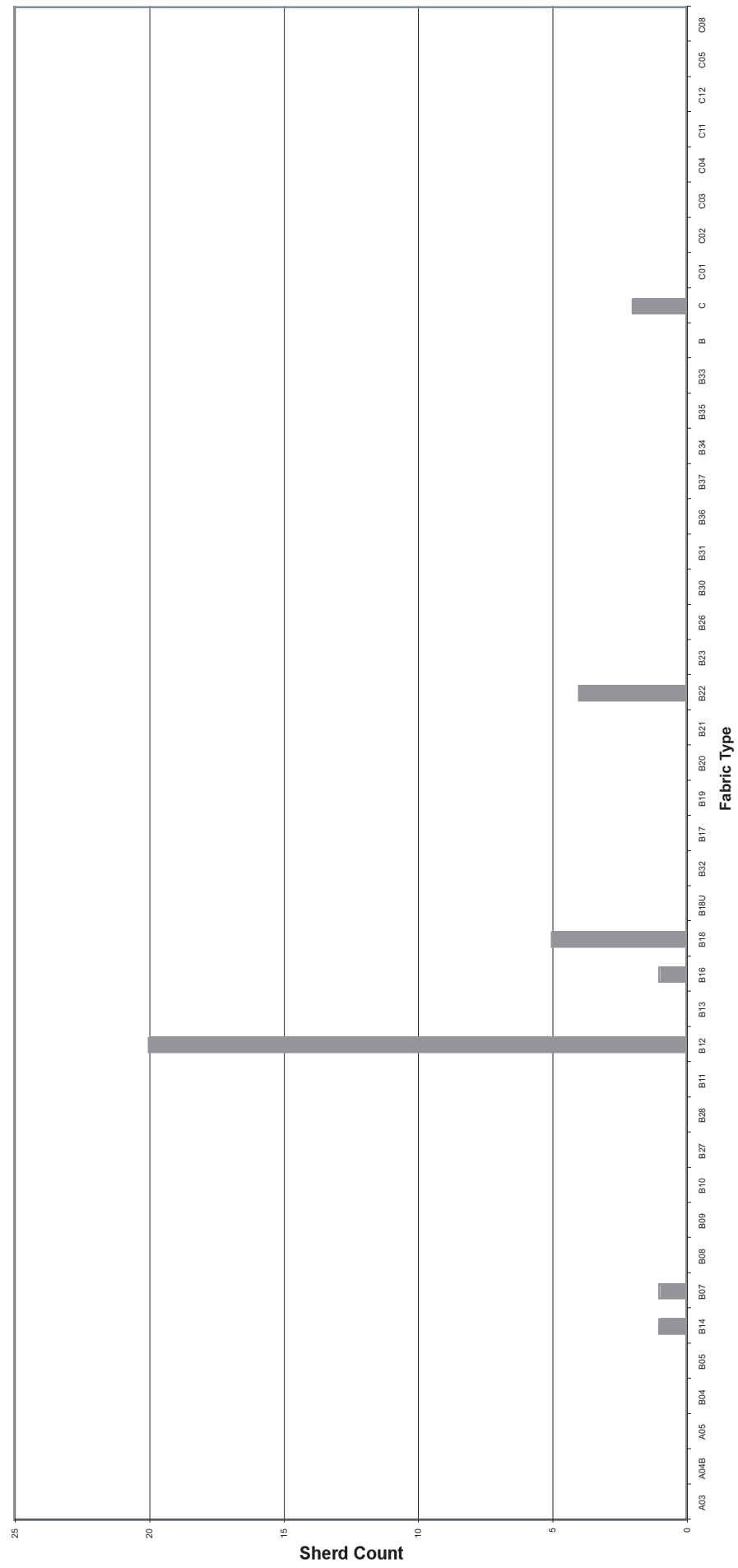


Fig. 53. Histogram of the quantification of fabric types by sherd count Site 71: Phase 8. (A.M. Slowikowski)

Part Four

The Small Finds

edited by E.A. Clark

9 Introduction

Although a few objects were retrieved when the environmental samples were processed, the majority of the finds recorded in this chapter were recovered by hand during routine excavation. Some objects are likely to have been missed in the difficult conditions under which the excavation took place (see Chapter 2).

Finds have been examined and identified by eye; microscopic examination, radiography, specialist cleaning and conservation, and other techniques have been used when appropriate. All objects have been catalogued and those catalogues form part of the site archive.

The wet nature of this site has allowed the preservation of organic materials which are normally destroyed in the dry chalk soil of the Wolds. The finds from the Pond and Dam sites therefore add, for the first time, wood and leather to the stone, clay, metal and bone from which the majority of objects found at Wharram are made. Both these materials would have been readily available and the objects recorded here are only a tiny proportion of what might have been used.

Apart from the wood and leather, the finds from this area of the village add little to the range of objects already known, and very few reflect any use of the pond and stream.

In 1976 a new recording system was introduced at Wharram; this system, and the need for it, is fully explained in the introduction to *Wharram VII*. The excavation of Site 30 was already in progress and finds recorded under the old system have been retrospectively incorporated into the new system.

The reports in Part Four include discussion and select catalogues. Within each chapter the objects are recorded using a single numerical sequence for illustrated and unillustrated material; the same sequence is continued within the archive catalogue for those many items which are not published. For clarity, references to unpublished items appear thus: Archive 259.

10 Stone Objects (Fig. 54)

by E.A. Clark and G.D. Gaunt with
Grinding Stones by S.R. Watts

Introduction and methodology

Some 300 fragments of stone from the Pond and Dam sites have been examined and their lithologies identified by G.D. Gaunt using a hand lens and low-power

microscope in reflected, and in some cases concentrated, light. Both the lithological and descriptive catalogues form part of the Archive. Measurements, where given, are the maximum dimension and many are approximate due to the nature of the objects.

As in previous Wharram volumes, the objects fall into three main groups: those used for decorative and leisure purposes; those used for a range of functional purposes; and building stone.

Catalogue and discussion

Emphasis during excavation on the identification of stones used in the milling process has led to an under-representation of other categories of stone as much was discarded before it could be examined. Despite this, only some 43% of the total originate from stones used for grinding, a slightly lower proportion than on the South Manor Area where just over 50% of the fragments originated from grinding stones (*Wharram VIII*). Of this 43% only very few can be identified as millstones rather than quernstones. Apart from the sandstone blocks, which probably came from the church, the remainder of the stone suggests a typical domestic assemblage, but with a narrow range of objects - only the adze and Nine Men's Morris board are previously unknown types at Wharram.

Objects used for decorative and leisure purposes

Jet object

- 1* Cylindrical object, Jet. Almost certainly artificial shape. Broken one end; intact end has incised central dot and two intersecting lines forming a St Andrew's cross. Diam. of intact end 15mm; remaining l. 31mm. 30/1114; SF275; Phase 4

Gaming board (Plate 14)

- 2 Part of sandstone block, Birdsall Calcareous Grit. Intact face, 210mm x 195mm, is tooled and has a gaming board (158mm x 108mm) scratched into the surface. Four other sides are partly tooled. The game of Merrills, or Nine Men's Morris, is well known throughout Britain and elsewhere. Boards, frequently scratched into stones, are known from many counties of England, and in 1993 Everett recorded eleven from other sites in Yorkshire. Six of these Yorkshire boards were found in or around churches and Everett suggests that, as some are in inaccessible places, masons may have played on stones before they were used in building - the discarded Wharram example may have a similar origin. The game is still played in Wolds villages. 30/1046; SF44; Phase 4.1

Two *pebbles* (Archive 22 and 23) increase the number found throughout the village which may have been used as counters.



Plate 14. Gaming board, Stone No. 2. (Photo: P. Gwilliam)

Stones used for functional purposes

Spindlewhorls

Chalk spindlewhorls are a frequent find at Wharram and these, like the previously published examples, are of a chalk type found in the valley, and may therefore have been made locally.

3* Spindlewhorl, chalk. Hunstanton Chalk in the Ferriby Chalk Formation. (Walton Rogers 1993, form A2). Incised circle on the lower face and two more on sloping sides. Two equal-sized chips on opposing sides, possibly for secondary use. Diam. 32mm; ht 8mm. Diam. of perforation 11mm on top face and 8mm on lower face. 30/39; SF272; Phase 4.2

4* Spindlewhorl, chalk. Pink band in Ferriby Chalk Formation. Domed shape. (Walton Rogers 1993, form A1). Domed sides

decorated with crudely incised fine lines in zig-zag pattern, with some random horizontal lines. Collar around perforation on lower face. Diam. 39mm; ht 19mm. Diam. of perforation 12mm on top face and 9mm on lower face. 30/1122; SF131; Phase 4.3

Tools

Both tools recovered from this area are of prehistoric date; another fragment (Archive 24) of igneous rock similar to No. 5, shows no sign of use.

5* Adze, igneous. Basic or ultrabasic intrusive. Surface layer altered over time. Half a pebble adze, of late Neolithic to early Bronze Age date. Broken through the perforation which shows no wear or polishing. 30/66; SF22; Phase 4.1

6 Axe head, uncertain lithology. Terry Manby comments that this is probably a Group 6 axe. 30/39; SF271; Phase 4.2

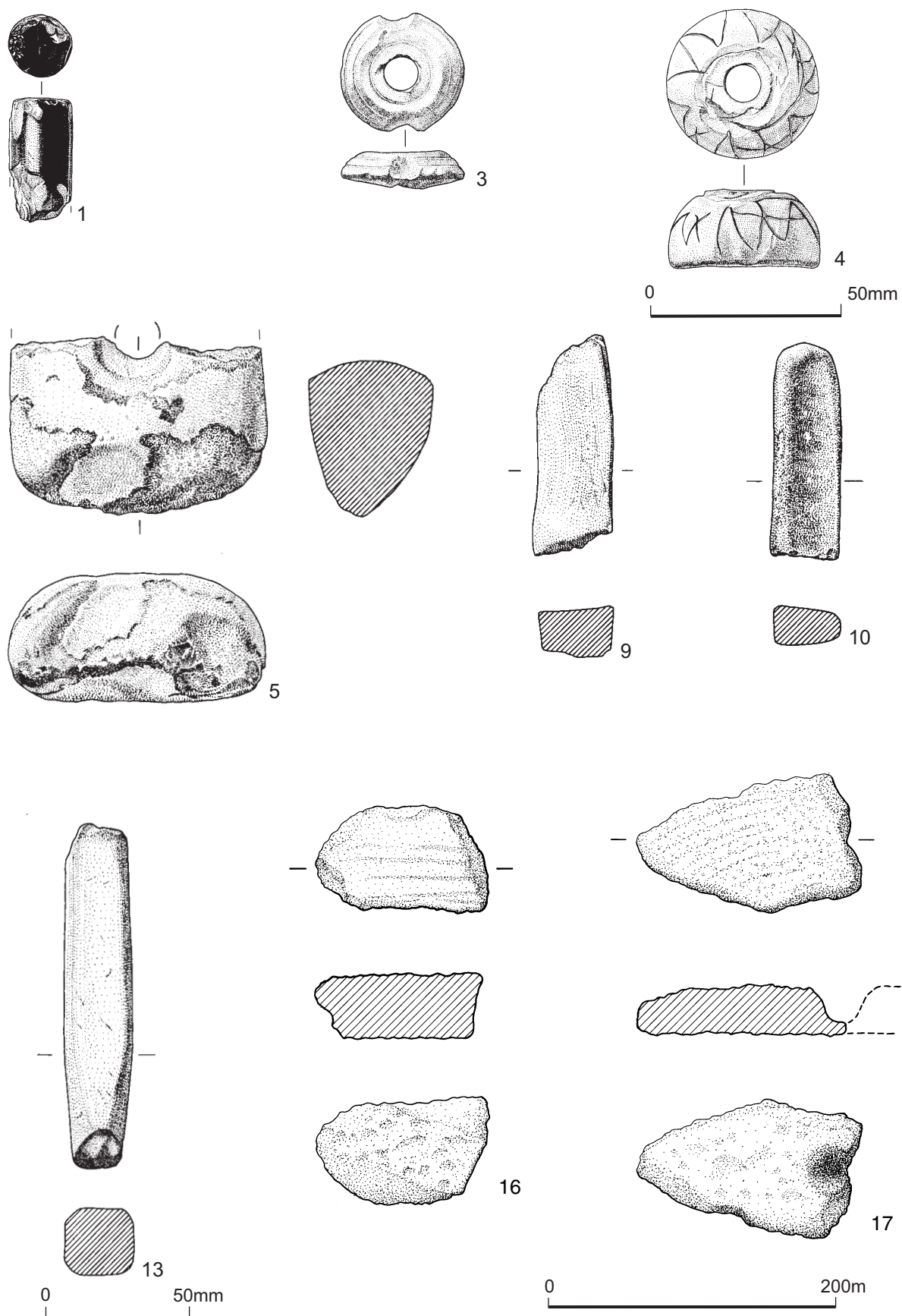


Fig. 54. Stone objects: jet object No. 1, spindlewhorls Nos 3-4 (scale 2:3), tool No. 5, hones, rubbing stone and cobbles Nos 9-10, 13 (scale 1:2) and grinding stones Nos 16-17 (scale 1:4). (P. Dunn except Nos 16-17 which are by R. Causer)

Hones, rubbing stone and cobbles

Of the seven hones found in these excavations, six are of shapes and stone types already known from other parts of the village. One cobble (No. 14) has been artificially smoothed and may be a rubbing stone. Of the four remaining erratics, two, Archive 25 and 27, show some signs of wear on one surface.

- 7 Fragment of hone, schist. Eisborg Schist (formerly 'Norwegian Ragstone'). Only part of two original side faces remain, with honing on one. L. 80mm; w. 16mm; th. 7-13mm. 30/599; SF274; Phase 6
- 8 Fragment of hone, Eisborg Schist. Heat-cracked along lineation and surface rough possibly from heat. One end broken, remaining l. 67mm; w. at break 15mm. Intact end bulbous, asymmetrically curved and tapering. One side flattened from use. 71/196; SF121; Phase 4
- 9* Fragment of hone, Phyllite. Roughly rectangular section, broken both ends, dished from considerable wear on one face. Max. remaining l. c.80mm; w. 25mm; th. 13-20mm. 30/1571; SF119; Phase 2.2
- 10* Fragment of hone, sandstone. Lower Palaeozoic greywacke of southern Scotland or Cumbria. Square section, edges somewhat rounded. Remaining end is rounded. Honed on one face. Max. remaining l. 74mm; w. 22mm. 30/12; SF129; Phase 4.2
- 11 Fragment of hone, sandstone. Middle Jurassic. Oval section 40mm x 22mm. Max. remaining l. 20mm. 30/1 (topsoil); SF270;
- 12 Fragment of hone, sandstone. Upper Carboniferous or Jurassic. Rectangular section, 62mm x 13mm. Intact end concave, other end probably broken but weathered. Max. remaining l. 60mm. 30/1046; SF624; Phase 4.1
- 13* Hone, sandstone. Possibly 'oilstone'. Square section 23mm, tapering at both ends (15mm at narrow end) which are roughly shaped and worn. Probably 20th-century. L. 120mm. 30/1278; SF80; Phase 1.1

Rubbing stone

- 14 Stone, sandstone. Middle Jurassic. Max. l. 58mm; h. c. 33mm. One flat surface, artificially smoothed; l. 45mm; w. of straight end 32mm and tapers to point at other end. 71/141; SF992; Phase 2

Grinding stones

More than 180 individual fragments of querns or millstones were found during excavations in the area of the dams and pond. Joining fragments or those that were found together have been recorded as one entry and the table is, therefore, based on the catalogue of 128 entries. As with the fragments from the North Manor site (Watts 2004), Crinoid Grit-type sandstones predominate, accounting for 51.6% of the fragments, with Mayen lava, Millstone Grit and other Middle or Upper Jurassic sandstones being represented by 16.4%, 14.8% and 17.2% respectively (Table 11). Although most of the fragments are small, worn pieces and the number of complete stones represented is likely to be less than the number in the catalogue implies, nevertheless the above figures suggest that Crinoid Grit was an important source of milling stones for the village.

Just under one quarter of the fragments were recovered from Phase 2 or Phase 3 contexts and nearly two thirds were in Phase 4 deposits (Table 11). It seems, therefore, that many pieces were reused either in the construction of the clay or chalk and earth dams or in the surfaces and features on the western side of the millpond, such as the eight fragments that were used in resurfacing a cobbled area, context 1164 (Archive 77-80, 105, 106, 122 and 123). Although it is perhaps likely that many of the fragments were brought to the dam area for reuse from elsewhere in the village, it is also possible that some may have derived from the water-mill that is presumed to have stood here. When the mill went out of use, which seems to have happened by the mid-12th century, its millstones are likely to have been removed, either for reuse in another mill or simply broken up for reuse as building stone in the immediate vicinity. No milling stones were found in direct association with the probable mill site.

Unfortunately, few of the fragments retain any diagnostic features and the majority are too small to ascertain if they came from upper or lower stones or what

Table 11. The distribution of querns and millstones by stone type and phase.

| Site 30 | | | | | | | | | | | |
|----------------|-----|----|----|----|-----|-----|---|-----|-----|-------|------|
| Phase | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | U/S | Total | % |
| Lava | | 1 | 4 | 16 | | | | | | 21 | 16.4 |
| MG | | 4 | 2 | 10 | | | | | 2 | 18 | 14 |
| CG | | 5 | 6 | 15 | | | | 1 | 5 | 32 | 25 |
| Poss CG | | 1 | 3 | 17 | | | | | | 21 | 16.4 |
| M/UJ | | 1 | 1 | 17 | | | | | 2 | 21 | 16.4 |
| Site 71 | | | | | | | | | | | |
| MG | | | | 1 | | | | | | 1 | 0.8 |
| CG | | 1 | 2 | 7 | 1 | 1 | | 1 | | 13 | 10.2 |
| M/UJ | 1 | | | | | | | | | 1 | 0.8 |
| Total | 1 | 13 | 18 | 83 | 1 | 1 | 0 | 2 | 9 | 128 | |
| % | 0.8 | 10 | 14 | 65 | 0.8 | 0.8 | 0 | 1.6 | 7 | | 100 |

MG = Millstone Grit, CG = Crinoid Grit, M/UJ = Middle or Upper Jurassic Sandstone

their original diameters may have been. Indeed, 35 fragments have no features at all and are only identified as milling stones by the fact that the type of stone from which they are made is not known to have been brought into the village for any other use. Consequently, whether the fragments derived from hand-operated querns or power driven millstones is, in most cases, a matter for conjecture.

Nevertheless, the grinding surface is still apparent on more than half of the fragments showing that most were simply randomly pecked with a sharp pointed iron tool to provide a suitable rough milling face. The surviving grinding surfaces are generally rather worn with glazed high spots and concentric wear rings indicative of hard or long term use, which is in keeping with the fact that most of the stones are worn rather thin. Only one fragment (No. 16) shows clear evidence of the more sophisticated furrow dressing. Such dressing does not seem to have been a particular feature of Anglo-Saxon and earlier medieval milling stones, and the fact that the other side has been clearly pecked suggests that the stone was turned over for reuse (Watts 2000; Watts 2002, 99).

The prominent concentric scoring and wear on fragments Nos 18 and 20 is consistent with them having been from millstones rather than querns. Similar concentric marks were very apparent on some of the millstones from the mid-9th-century horizontal water-mill at Tamworth (Wright 1992, 71). In addition, No. 18 also retains evidence of the central feed hole or eye, the original diameter of which, *c.* 120mm-130mm, is considered to be too large for a quern.

Number 20 has a smooth, curved groove *c.* 18mm wide across the remains of the pecked grinding surface. This is similar to the U-shaped circular grooves between the outer corners of the rynd chases noted on a number of upper stones from Tamworth (Wright 1992, 76, 79). The reason for such wear is unclear but it may be the result of continual rubbing by a volume of grain fed into the eye of the upper millstone, before it was drawn between the milling faces of the two stones. Again the amount of abrasion is indicative of a power-driven millstone.

The largest fragment found, No. 19, came from a Phase 4 context and had been reused in resurfacing work on the Western Hillside Terrace. It comprises about one third of a large upper stone, originally *c.* 940mm in diameter. Although larger than the millstones found at Tamworth, which were *c.* 600mm - 800mm in diameter, it is of comparable size to the earlier medieval millstones found at Hemington Fields, Leicestershire and West Cotton, Raunds, Northamptonshire, for example (Wright 1992, 76; Clay 1990, 295; Chapman forthcoming). Its size is indicative of a millstone rather than a quern and it may have derived from the water-mill that is thought to have stood here in the 11th and 12th centuries (see Ch. 32). Its worn grinding surface is pecked although two lines across it may be the remains of furrow dressing. It has the probable remains of a rynd chase cut into the grinding surface and also a small rectangular hole in the upper surface.

Unfortunately, too little remains of the rynd chase to assess its shape but evidence from other medieval millstones suggests it would have had a forged iron rynd with two or, more probably, four arms. The rynd spans the eye of the upper stone and enables it to be centred and located on top of the spindle, which projects through the centre of the lower stone from the drive mechanism below (Watts 2002, 100, 102). A similar small rectangular hole on the top of the stone was also noted on two of the millstones from Hemington Fields and on a millstone found on the site of the Bishop's Palace at Wookey, near Wells, Somerset. It has been suggested that the holes were for holding a weight to help balance the stone so that it turned evenly. Balancing millstones is a 19th-century concept and would generally have been unnecessary with monolithic stones with rigid rynds. It is, therefore, considered to be more likely that the hole was for a wooden peg that rapped the feed shoe, as the stone turned, to knock grain down into the eye of the stone (Clay 1990, 295; Watts 2002, 100-101). The stone is identified as a fossiliferous decalcified sandstone, probably from the Lebberton Member of the Middle Jurassic Cloughton Formation in the Howardian hills. This is not an efficient milling stone but this and other fragments found at Wharram Percy demonstrate the variety of stone types utilised for milling.

Three fragments, Nos 15, 17 and 21, have the remains of small upright handle holes in their upper surfaces which are typical of querns of the Anglo-Saxon/early medieval periods (Watts 2000, 111-15). Querns would have been particularly essential for milling grain when lack of water or other conditions rendered the watermill(s) inoperable. They were also used for grinding malted grain for brewing and spices such as mustard. Although, as previously mentioned, the fragments of disused and broken querns were probably brought down to this area from elsewhere for reuse, the possibility that querns were also kept in the mill that stood here should not be discounted. Millstones and querns have been found together at a number of milling sites, such as those from a series of late 10th-century to early 12th-century water-mills at West Cotton, Raunds, Northamptonshire (Chapman forthcoming; Watts 2002, 41, 74).

Despite their generally small size and lack of diagnostic features, the fragments of quern and millstone from the Pond and Dam sites can be added to the growing body of information from Wharram Percy indicating not only the intensive milling activity on site but also the variety of stone types that were utilised for that particular purpose.

15 Fragment, Mayen lava. From edge of stone. Remains of upright handle hole, worn very smooth inside, *c.* 26mm deep. Worn, pecked grinding face. L. 95mm; w. 63mm; th. 34mm. 30/47; SF2; Phase 4.1

16* Fragment, sandstone. Millstone-Grit type. Remains of narrow furrow dressing on grinding surface. Other side shows evidence of pecking; stone possibly turned over for reuse. L. 115mm; w. 71mm; th. 47mm. 30/1281; SF218; Phase 3

- 17* Fragment, sandstone. Millstone-Grit type. From edge of stone with remains of upright handle hole, c. 20mm deep and c. 25mm diam. with possible rust-staining within it. Grinding surface slightly concave, pecked with evidence of concentric wear. Original diam. c. 420mm. L. 158mm; w. 88mm; th. 33mm. 30/1636; SF205; Phase 2
- 18 Three joining fragments, sandstone. Crinoid Grit. From centre of stone with remains of eye, c. 125mm diam. Grinding surface pecked with some smoothing of high spots and evidence of concentric wear. L. 186mm; w. 154mm; th. 43mm. 30/1258; SF67; Phase 3
- 19 Seven fragments, sandstone. Middle Jurassic, probably from a local decalcified sandstone in the Lebburston Member of the Cloughton Formation. About one third of large, upper stone, its size indicative of a millstone rather than a quern. Original diameter c. 940mm. Apparent remains of an eye, c. 120-130mm diameter, although the stone is very damaged at this point. Also possible remains of rynd chase, c. 40mm wide and 8mm deep, the remaining section 35mm long. Pecked grinding surface is worn, with smoothed high spots. There are also two lines across it, possibly the remains of furrow dressing. Rectangular hole on top, 35mm by 50mm. L. 680mm; w. 430mm; th. 85mm edge, 80mm centre. 30/1046; SF26; Phase 4.1
- 20 Fragment, sandstone. Middle or Upper Jurassic. Pecked grinding surface. Smooth curved groove across edge of surviving grinding surface, c. 18mm wide. L. 109mm; w. 104mm; th. 52mm. 30/11; SF262; Phase 4.3
- 21 Fragment, sandstone. Middle or (less likely) Upper Jurassic. Just under one quarter of upper stone with remains of upright handle hole, 38mm deep, c. 25mm diameter. Pecked grinding face, flat with slight concavity in middle. Worn, especially toward edge where pecking almost smoothed away. Concentric wear marks. Top more roughly worked. Edge of stone damaged but original diam. in excess of 400mm. L. 242mm; w. 189mm; th. 49mm edge, 69mm towards centre. 71/257; SF185; Phase 1.1

Stone used in the construction of buildings

Sixty-two fragments and blocks of sandstone of Birdsall Calcareous Grit type were recovered from Sites 30 and 71 (No. 2, Archive 151-211). Of these, ten blocks, all with dressed faces, came from context 1046 where another 22 were examined but left *in situ*. One of the blocks (No. 2) has a gaming board scratched into a surface, and another (Archive 167) has a possible mason's mark. Birdsall Calcareous Grit from quarries at the neighbouring village of Birdsall was used extensively at Wharram for stone buildings from the Roman period onwards. These blocks, which appear to be unused, are likely to have been dumped in the pond area during or after the building of the church. The shape of two other fragments of Birdsall Calcareous Grit type (Archive 157 and 179) suggests they were originally part of the fabric of the church. Of the rest, some have areas of tooling and some have been affected by heat. Not surprisingly, many are water-worn.

Fragments of other local sandstones and limestones from the Upper Carboniferous and the Middle and Upper Jurassic of North Yorkshire (Archive 212-40) are also likely to have been brought to the village for use in buildings and walling. Two joining fragments of Purbeck Marble (Archive 235), known to have been used extensively from the medieval period onwards, are, like the Birdsall Calcareous Grit type blocks, likely to have originated in the church, perhaps from a memorial;

another six fragments were recovered from the site of the post-medieval vicarages (*Wharram XII*).

The fragments of Brandsby Roadstone (Archive 241-60) used as roofing stone show the same features as others found at Wharram. They range in thickness from 9mm to 40mm, the majority being between 10-20mm. Two fragments of sandstone, smooth on both sides, may be from floor tiles, as is the modern fragment of grey siltstone (Archive 261-3).

11 Clay Objects

by E.A. Clark

Three fragments of loomweights and eight clay discs were recovered from the Pond and Dam sites. Where enough remains to identify shape, the loomweights are bun-shaped and all are of a similar texture to others found at Wharram. The discs, most formed from medieval or late medieval pottery and ranging from 55mm to 62mm in diameter, are likely to have been used as counters.

Loomweights (Fig. 55)

- 1* Complete segment, less than half of a bun-shaped weight. Depth at perforation c. 46mm. Collar around perforation, behind which are two incisions, and the possible edge of a third on the break. 30/10/15; SF20; Phase 4
- 2* Complete segment, less than one quarter of a ?bun-shaped weight. Possible remains of collar around perforation. Depth at perforation c. 32mm. Two small perforations, made pre-firing, enter one surface at an acute angle. 30/23; SF130; Phase 4.3
- 3 Two joining fragments forming part of the outer edge and inner perforation of a weight. Max. remaining l. 28mm. 30/unstratified; SF943

Discs

- 4 Sub-round disc. Max. diam. 62mm; th. 7mm. Pottery fabric B12, Staxton ware. 30/1 (topsoil); SF936
- 5 Sub-round disc with one straight section, very abraded. Max. diam. 35mm; th. 5mm. Pottery fabric ?B22, Brandsby/Humber ware. 30/11; SF937; Phase 4.3
- 6 Sub-round disc. Max. diam. 40mm; th. 6mm. Pottery fabric B12, Staxton ware. 30/11; SF939; Phase 4.3
- 7 Sub-round disc. Max. diam. 56mm; th. 9mm. Pottery fabric C03, Chalky Humber ware. 30/16; SF 940; Phase 8
- 8 Sub-round disc. Max. diam. 40mm; th. 6mm. Pottery fabric B12, Staxton ware. 30/30; SF938; Phase 4.2
- 9 Semi-circular, probably an accidental break of a sub-round disc. L. across flat edge 52mm; th. 11mm. Pottery fabric ?B20, Brandsby-type. 30/1119; SF935; Phase 8
- 10 Possibly part of a sub-round disc formed from a wheel-thrown pot base. L. across remaining flat edge 60mm; th. 6mm. Two fine grooves radiate from original edge on one surface. Fabric: hard, oxidised ware with abundant mixed sand possibly c. 0.1mm. 30/1128a; SF636; Phase 4.1
- 11 Sub-round disc, with one straight section. Max. diam. 40mm; th. 6mm. Pottery fabric B10, Splashed Pimply ware, micaceous. 30/1143; SF941; Phase 4.1

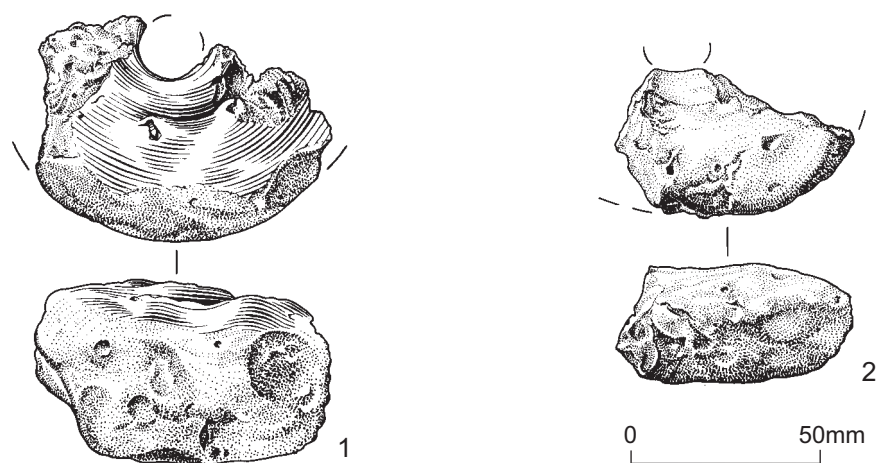


Fig. 55. Clay objects: loomweights Nos 1-2. Scale 1:2 (P. Dunn)

Clay pipes

Parts of three bowls and eleven fragments of pipe stem will be further discussed in *Wharram XII*, with the large assemblages from the farmhouse and vicarage.

Clay tile

One hundred and fifty-nine fragments of clay tile were retrieved, mainly from Site 30 (131 fragments) with twenty-two from Site 71 and six from the small trench Site 67. On Site 71 most were from the topsoil, whereas on Site 30 49% came from medieval contexts, mainly the chalk surfaces of Phase 4. Most were examined by S. Watts and catalogued according to the types described in *Wharram VIII*. Some 81% of the fragments are of Types 2: Orange (61%) and 3: Dull Purple Red (21%), with Type 4: Orange Pimpily making up another 11%. All these types are known to have occurred elsewhere in the village. A fragment of Type 2 ridge tile was found in a post-medieval context on Site 71. The full catalogue forms part of the Archive.

Four fragments of possible floor tile were also found, three in medieval contexts, the fourth among the planks and wattles of Phase 1.

Brick

Thirty-five fragments of brick were recovered from Site 30, over 50% from medieval contexts. Most are small and fragmentary though some retain part of one or more faces. The only complete brick was found in a Phase 8 context. A small fragment (A114), which retains part of two adjoining faces, is from a Phase 3 context on Site 71 (context 225).

12 A Note on the Glass Objects

Some 350 fragments of glass were recovered from the Pond and Dam sites. Approximately half of this is window glass and includes some painted fragments

which will be discussed in *Wharram XI* with further fragments from the church. The vessel glass is post-medieval and will be discussed with a large collection of post-medieval glass in *Wharram XII*. Margaret Guido kindly examined two small glass beads and suggests that they are probably post-medieval lace bobbin beads; both were found in topsoil.

13 Coins

by B. Sitch and C. Barclay

Five coins were found in the excavations. A late Iron Age silver coin of the Corieltauvi tribe, datable from 5-1 BC, is the earliest coin found at Wharram. It is fully catalogued and discussed in *Wharram IX* (Sitch 2004, 238, no. 1) in relation to the Roman period coins from the village.

The remaining four coins all originate from the 18th century, and will be discussed further with other post-medieval coins in *Wharram XII*. The catalogue forms part of the Archive.

14 Non-ferrous Metal Objects

by A.R. Goodall

Only a small number of non-ferrous metal objects were found, in contrast to the large quantity of ironwork from the same area. Most of the finds are from the late medieval and post-medieval chalk surfaces that formed successive surfaces of the dam (Site 30), or from the topsoil.

No broad conclusions can be drawn from the assemblage: none of the objects relates to milling on the site and most are domestic in origin. The possible horse pendant (No. 20) and the harness buckle (No. 5) add to the exceptionally large number of objects relating to horses found in this area of the village.

The objects may have been present in the fabric of the dam because they were lost there, or because they had

been lost previously and later incorporated into the structure of the dam. This latter would account for the residuality of some of the finds; for example, the shield-shaped pendant with a pseudo-heraldic device (No. 20) was found in post-medieval make-up although it is more likely to be of medieval date and the dress hook fastener (No. 1) may be related to the small hooked fasteners found on late Saxon sites, although the Saxon examples more commonly have rivet holes within the circular or sub-triangular plate rather than on projecting lugs. Among the objects from Site 71 were an early medieval pin (No. 10) and a simple medieval strap-end or buckle plate (No. 9).

Copper-alloy objects (Fig. 56)

Dress fasteners

- 1* Copper-alloy dress hook with a kite-shaped plate and two perforated lugs for attachment to a garment. It has a long tapering hook. L. 25mm. 30/1026; SF43; Phase 4
- 2 Copper-alloy sheet fragment, possibly from a disc or the cap of a button. Max. dimension 15mm. 30/556; SF903; Phase 3
- 3 Copper-alloy button. The loop is missing. Diam. 18mm. 71/15; SF3; Phase 4
- 4 Button, flat-topped, without decoration and with a wire loop. It is made from a high-tin alloy, possibly speculum (copper and tin). Incomplete. Original diam. 28mm. 30/587; SF902; Phase 7.2

Buckles and buckle-plates

- 5 Copper-alloy harness buckle. Square frame with recessed pin bar; corrosion on the pin bar indicates that the missing pin was of iron. L. 35mm. 30/1 (topsoil); SF908
- 6* Undecorated buckle frame of copper alloy, probably from a shoe. The separate pin bar is missing. L. 34mm. 30/6; SF912; Phase 4.2
- 7* Small buckle frame of tinned copper alloy. It would originally have had a separate pin bar, possibly of iron. It is very delicately made and may have come from a lady's shoe, possibly late 18th-century in date. The frame is incomplete. L. 25mm. 30/579; SF909; Phase 7.1
- 8* Copper-alloy plate which appears to have an ornamentally-shaped end. There is one irregular rivet hole and decoration of incised lines outlining the edges of the plate. This could be a strap-end, buckle or hinge plate, or possibly from a book clasp. Incomplete. L. 29mm. 30/1153; SF87; Phase 4.2
- 9 Object made of copper-alloy sheet, probably a crudely-made buckle plate. It has two rivets surviving and a further two rivet holes. L. 53mm. 71/228; SF183; Phase 4

Pin

- 10* Copper-alloy pin with heavy biconical head above a small double collar. There appears to be some faceting on the head. The shaft is broken. L. 44mm. 71/136; SF19; Phase 1.2

Mounts

- 11 Small rectangular mount of copper alloy. It has a central rivet hole and two edges are slightly raised. 7mm x 6mm. 30/1254; SF86; Phase 3
- 12 Oval brass mount with pelleted borders. It is flat backed and there is no means of attachment. Some ferrous staining may indicate that there was originally another part across the middle of the object, made of iron. L. 47mm. 30/1 (topsoil); SF911

- 13 Copper-alloy disc or mount with three perforations arranged in a line across the centre. One surface is scratched and there are traces of possible solder. Diam. 16mm. 30/23; SF906; Phase 4.3

Miscellaneous

- 14 Short length of copper-alloy chain consisting of seven small S-shaped links. Each link is c. 7.5mm in length. 30/1059; SF23; Phase 4
- 15* Small copper-alloy stud head decorated with concentric repoussé rings and with a central rivet hole. Diam. 14.5mm. 30/1153; SF85; Phase 4.2
- 16 Round-headed tack made from gunmetal (copper and tin alloy), with a tapering square-sectioned shank. Found associated with fragments of charred coniferous wood. L. 13mm. 30/25; SF904; Phase 4.2
- 17 Perforated convex disc of copper alloy, possibly the end-plate of a knife handle. The disc is now bent. Diam. c.30mm, diam. of perforation 11mm. 30/33; SF919; Phase 4.2
- 18 Copper-alloy fragment, possibly from the body of a cast cooking vessel. 30/5; SF915; Phase 4.3
- 19* Rectangular copper-alloy plate with a slot in the middle and rivet holes at each corner, perhaps from a lock or a keyhole escutcheon. 22.5mm x 16mm. 30/40; SF92; Phase 4.1
- 20* Shield-shaped copper-alloy harness pendant made from thin metal. It has a heraldic or pseudo-heraldic ornament of two bends sinister made by means of a series of stamps and is surrounded by a stamped border. The pendant does not appear to have been enamelled or plated to indicate different tinctures and therefore was probably not intended to represent a specific coat of arms. Despite its later context, the pendant is most probably of medieval date. L. 52mm. 30/1157; SF81; Phase 5
- 21* Copper object, one end rounded, the other incomplete. There are two perforations and the incomplete end may have been broken through another larger perforation. L. 28.5mm. 30/1156; SF910; Phase 8
- 22 Three strands of fine copper-alloy wire twisted together. L. 18mm. 30/1; SF905; Topsoil
- 23 Small fragment of copper-alloy wire. Twisted and heavily corroded. 71/213; SF215; Phase 4

Sheet, strip and other fragments

Numbers 24 and 25 are fragments of copper-alloy sheet; 24 with fragments of carbon adhering and 25 with a perforation.

- 24 30/556; SF913; Phase 3
 - 25 30/13; SF916; Phase 4.2
 - 26 Copper-alloy fragment, possibly partially melted. It may indicate small-scale metalworking or repair. L. 27mm. 30/18; SF907; Phase 4.2
- Numbers 27-30 are strip fragments; 27 is partly U-shaped in section, 30 may be a metal other than copper-alloy.
- 27 71/94; SF11; Phase 5.
 - 28 71/2; SF257; Phase 8
 - 29 71/-; SF182; Phase -.
 - 30 30/1142; SF723; Phase 4

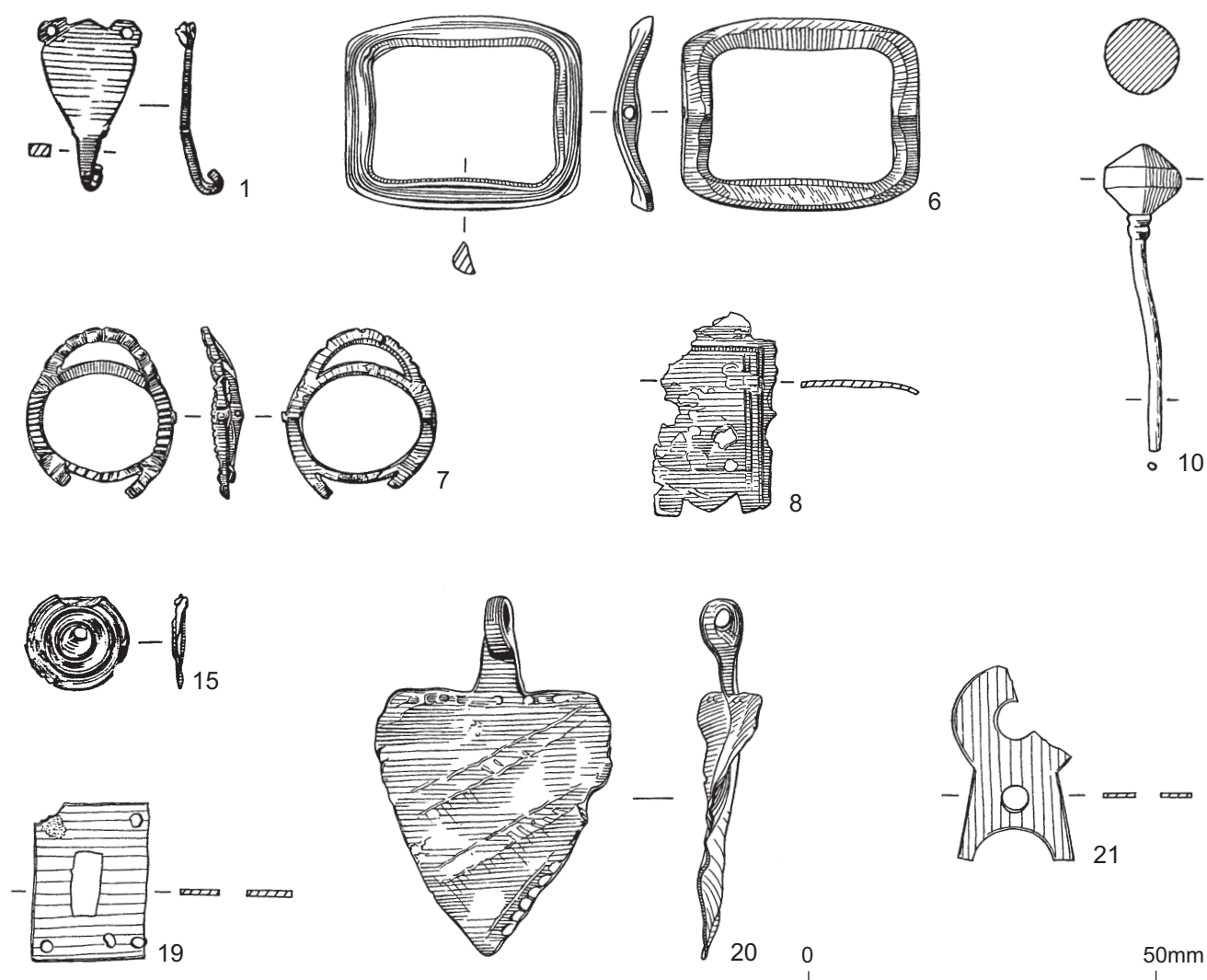


Fig. 56. Copper-alloy objects: dress fastener No. 1; buckles and buckle plates Nos 6-8; pin No. 10; miscellaneous Nos 15, 19-21. Scale 1:1 (P. Dunn except No. 10 which is by E. Marlow-Mann)

Lead and ?pewter objects

31 Lead disc with notched or scalloped edge. Diam. 45mm. 30/23; SF919; Phase 4.3

32 Lead object, curved, rectangular in section, tapering at both ends. L. c. 80mm. 30/7; SF918; Phase 4.3

33 Star-shaped piece of sheet metal, possibly tin or pewter, with a hollow centre. Probably the waste material from which a series of discs of 32mm diameter have been cut, perhaps in the manufacture of studs or buttons. 30/1 (topsoil); SF927

34 Fragment of lead window came of post-medieval type. 30/1 (topsoil); SF926

35 Twisted fragment of window lead with broad, ribbed flange. 71/7; SF270; Phase 8

Numbers 36-49 are fragments of sheet, offcut and caulking.

36 67/40 (topsoil); SF5

37 30/7/8; SF923; Phase 4.3

38 71/144; SF256; Phase 1.2

39 71/91; SF10; Phase 6

40 71/2; SF258; Phase 8

41 30/1148; SF928; Phase 4.1

42 30/1149; SF920; Phase 4.1

43 30/unstratified; SF917

44 30/1 (topsoil); SF925

45 30/1 (topsoil); SF922

46 30/1 (topsoil); SF921

47 30/1 (topsoil); SF924

48 30/65; SF379; Phase 4.1

49 30/1234; SF101; Phase 4.3

15 Iron Objects excluding Nails (Figs 57-9) by I.H. Goodall and E.A. Clark, with spur (No. 36) by B. Ellis

Introduction

Some 1250 pieces of iron were recovered from the Pond and Dam sites, of which 861 are nails. Of the remaining pieces, 43% are horseshoes, a significantly larger proportion than in the South and North Manor Areas where 3% and 0% respectively were found. Some of the horseshoes retain their nails and a large number of loose horseshoe nails were also recovered. It is likely that the shoes had been removed from the animals' feet, collected together (perhaps in order to reuse the metal) and then dumped. The largest concentration is of Type 3 horseshoes, datable from the mid-13th to the mid-14th centuries, in Phase 4 contexts (see Chapter 22 for a discussion of horse bones found in the same phase).

Apart from the spade shoe (No. 4) and the large bag hook (No. 5), the range of objects is small and adds little to those types of objects already recorded from Wharram. Collars, staples and chain fragments in Phase 7 may relate to some activity connected with the post-medieval sheepwash.

Methodology

All the iron has been x-rayed and catalogued. The full catalogue forms part of the Archive. In accordance with previous iron reports, objects found in the modern Phases 7 and 8 are only published if of special significance, although many may have originated in medieval phases. However, on this site the collection of horseshoes is sufficiently significant to justify publication from all contexts. Many objects are fragmentary and the symbol + after a dimension indicates that a complete measurement was not possible. The objects have been drawn from the x-rays.

Discussion and catalogue

Tools

As elsewhere in the village, tools for both agricultural purposes and for craft working have been found. An awl, a chisel blade, a possible saw wrest and one arm from another pair of sheep shears (Archive 195-8) are among the other tools found.

- 1 Chisel blade tip. L. 37+mm. 30/24; SF690; Phase 4.2
- 2* Shears blade, broken. Inlaid mark on cusped blade. The small size of these shears suggests use for cutting thread or hair. L. 51+mm. 30/1169; SF434; Phase 4
- 3* Blade fragment from pair of scissors. L. 83+mm. 30/6; SF369; Phase 4.2

- 4* Side of U-shaped spade-iron with damaged inner groove to receive wooden blade of spade. L. 150+mm. 71/151; SF22; Phase 2
- 5* Bag hook, complete. Sub-rectangular handle, deep hook. L. 120mm. 30/500; SF381; Phase 3
- 6* Clapper from bell, suspension loop broken. L. 82+mm. 71/82; SF260; Phase 5

Knives

The identifiable knife blades, all of which have whittle-tangs for insertion into handles, are of two types: those whose edges both taper to the tip and those whose backs and cutting edges run parallel before both taper to the tip. A small clasp knife with a bone handle is discussed in Chapter 18.

- 7* Whittle-tang knife with blade and cutting edge, the latter shaped by sharpening, parallel before both taper to the tip. L. 74mm. 30/1290; SF93; Phase 3
- 8* Whittle-tang knife, tang broken. Blade and cutting edge taper to tip. L. 121+mm. 30/1169; SF433; Phase 4
- 9* Whittle-tang knife, blade and tang broken. Blade and cutting edge parallel up to break. L. 101+mm. 30/39; SF377; Phase 4.2
- 10* Whittle-tang knife, tang broken. Blade and cutting edge taper to tip. L. 102+mm. 30/1239; SF97; Phase 4
- 11* Whittle-tang knife, tang and blade both broken. Blade and cutting edge parallel up to break. L. 102+mm. 30/23; SF376; Phase 4.3
- 12* Whittle-tang knife with tapering bolster between tang and blade, both broken. L. 86+mm. 30/7; SF371; Phase 4.3
- 13* Whittle-tang knife, blade broken. Blade and cutting edge parallel up to break. L. 100+mm. 30/1251; SF202; Phase 3

Two blades (Archive 201 and 202) are too fragmentary to classify.

Building ironwork, fittings and locks and keys

Staples

- 14 U-shaped staple, arms broken. L. 32+mm; w. 30mm. 30/1093; SF717; Phase 4.3
- 15* U-shaped staple, complete. L. 84mm; w. 34mm. 30/1251; SF438; Phase 3
- 16 Rectangular staple with clenched arms. One arm broken. L. 15mm; w. 36mm. 30/1088; SF1023; Phase 4
- 17 Rectangular staple with clenched arms. Single arm survives. L. 32mm; w. 14mm. 71/196; SF130; Phase 4
- 18* Rectangular staple, distorted and tips broken. L. 115+mm. 30/1190; SF435; Phase 4.3

Another six U-shaped staples (Archive 203-8) were found in Phase 7 contexts, and two (Archive 209-10) in the topsoil.

Collars, rings and washer

- 19* Collar, circular. Diam. 61mm; depth 24mm. 30/561; SF405; Phase 3
- 20 Collar, circular. Diam. 48mm; depth 13mm. 30/589; SF419; Phase 6

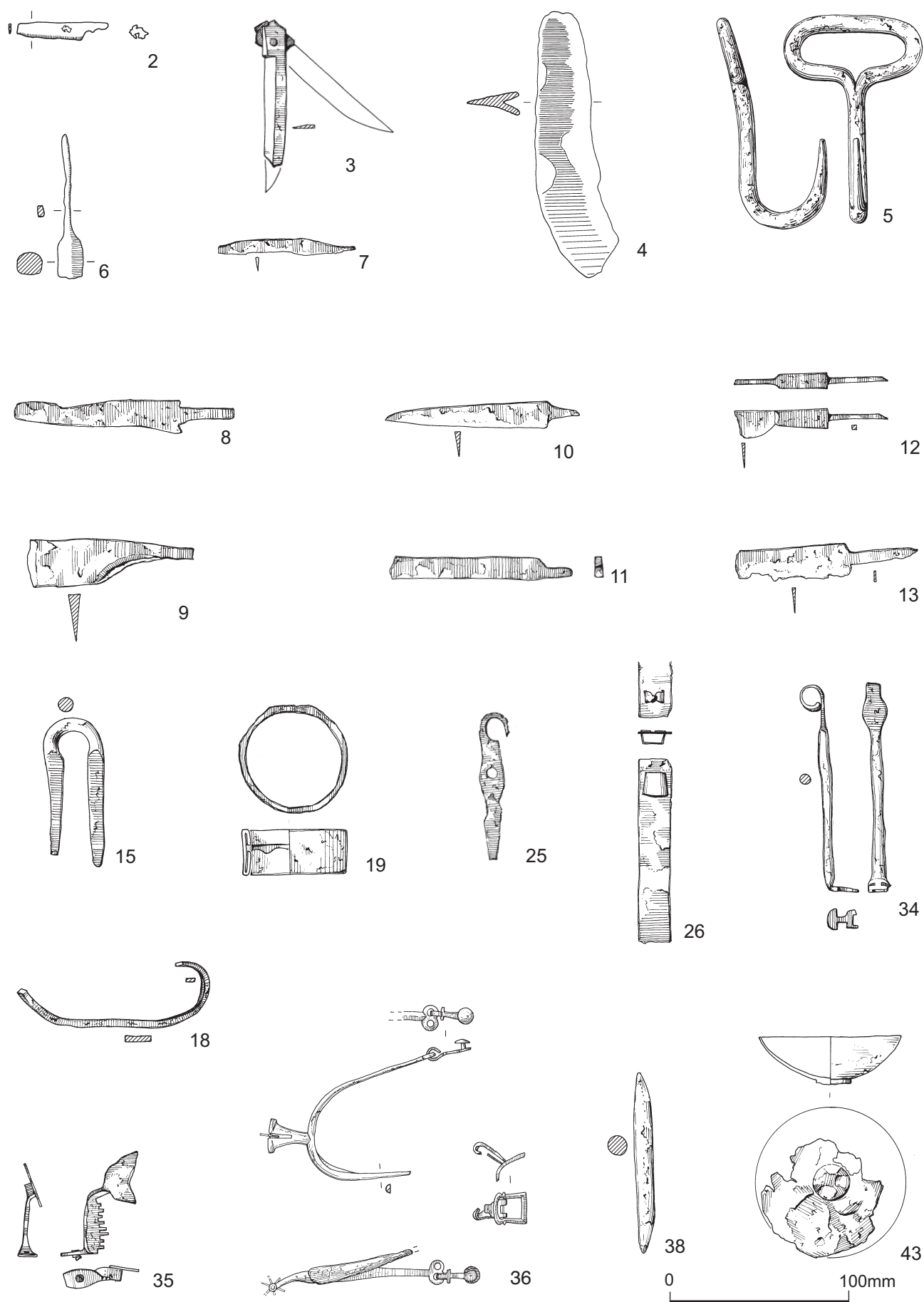


Fig. 57. Iron objects: tools Nos 2 (inlaid mark Scale 2:3), 3-6; knives Nos 7-13; staples Nos 15 and 18; collar No. 19; hinges and straps Nos 25-6; locks and keys Nos 34-5; spur No. 36; buckle No. 38; vessel No. 43. Scale 1:3. (P. Dunn except Nos 2, 4 and 6 which are by E. Marlow-Mann and No. 36 by M. Chisnall)

Among 24 other collars found, the majority with a diameter of between 47 and 54mm, twelve (Archive 211-22) are from Phase 7 contexts.

- 21 Ring, broken. Diam. 34mm; th. 5mm. 71/233; SF178; Phase 3

Another ring was in Phase 8, and a further one in the topsoil where a washer was also found.

Chains

Eight lengths of chain (Archive 238-45) were found in post-medieval contexts, the longest comprising nineteen links.

- 22 Chain link, broken. Sub-rectangular. L. 15mm; w. 11mm. 30/1354; SF735; Phase 3
- 23 Chain link, broken. Slender, sub-rectangular. L. 17+mm; w. 11mm. 30/23; SF688; Phase 4.3

Hinge pivot

- 24 Hinge pivot with tapering shank. L. 200mm; h. 68mm. 30/599; SF421; Phase 6

Hinges and straps

These objects may have been used in buildings or on furniture; two narrower ones (Nos 27-8) may originate from small chests or caskets, as might a binding strip (Archive 256) found in the topsoil. Another nine hinge and strap fragments (Archive 246-55) came from post-medieval contexts.

- 25* Strap end. Tapering strap with two rivet holes and broken end loop. L. 81mm. 30/1639; SF128; Phase 1.1
- 26* Strap fragments (multiple), some with partially flanged sides. W. 17mm. 30/533; SF383; Phase 3
- 27 Strap fragment, distorted. L. 152+mm; w. 11mm. 30/5; SF685; Phase 4.3
- 28 Strap fragment, curved. L. 55+mm; w. 14mm. 30/23; SF854; Phase 4.3
- 29 Strap fragment. L. 45+mm; w. 18mm. 30/1153; SF830; Phase 4.2
- 30 Strap fragment, curved. L. 42+mm; w. 30mm. 71/211; SF138; Phase 4

A hook, wire fragments and three *clench bolts* (Archive 257-70) may relate to recent activity on the site.

Locks and keys

- 31 Lock bolt mount. Securing plate fragment with one rectangular holding staple. L. 34+mm. 30/552; SF707; Phase 3
- 32 Padlock bolt. Tip of spine with two broken leaf springs. L. 33+mm. 30/1011; SF827; Phase 4
- 33 Padlock key with looped bow, swollen stem and broken bit. Non-ferrous plating. L. 80mm. 30/1128a; SF526; Phase 4.1
- 34* Padlock key with expanded terminal and laterally set bit. L. 118mm. 30/1093; SF423; Phase 4.3
- 35* Ward from lock. Toothed bar with two terminals, one broken, by which it was attached to lock case. Bar has projecting teeth which face of key bit had to pass. L. 62mm. 30/556; SF404; Phase 3

Personal fittings

Spur by B. Ellis

- 36* Rowel spur shown by analysis to be plated with tin. *Circa* 1700. Rust-damaged extremities, short neck with rowel originally of six points. Straight D-sectioned sides only one of which is now complete with a figure-8 terminal supporting a buckle above a stud attachment for the leathers. L. 100mm. 30/6; SF200; Phase 4.2

Despite its medieval context this spur is typical of *c.* 1700.

Buckles

- 37 Rectangular buckle frame. L. 30mm; w. 22mm. 30/39; SF378; Phase 4.2
- 38* Baluster bar from buckle. L. 97+mm. 30/1259; SF74; Phase 3
- 39 Buckle pin (missing on site). 71/192; SF24; Phase 4

Footwear

- 40 Toe iron. Arm fragment. L. 80+mm. 30/501; SF849; Phase 3 (*intrusive*)
- 41 Heel iron, complete. L. 74mm; w. 81mm. 30/604; SF894; Phase 5
- 42 Heel iron, one arm incomplete. L. 65mm; w. 70+mm. 30/589; SF825; Phase 6

Further heel irons (Archive 272-6) were found both in topsoil and in Phase 7. The ring from a patten (Archive 271) was found in the topsoil.

Vessels

- 43* Vessel. Shallow, incomplete sheet-iron bowl, originally 90mm diameter, with 20mm diameter footing on underside, and central hole, both perhaps related to lost pedestal foot. 30/1086; SF422; Phase 4
- 44 Sheet-iron vessel with curved body and rim, the rim bent round. W. 43+mm. 71/15; SF185; Phase 6

Another fragment similar to No. 44 (Archive 277) was found in the topsoil.

Buckets

- 45 Overlapping riveted terminal from strap from bucket. L. 73+mm; w. 27mm. 30/2; SF460; Phase 5

Other fragments from buckets were found in Phase 7 and in topsoil (Archive 278-80).

Horseshoes (Fig. 58)

Over one hundred and sixty horseshoes and horseshoe fragments were found, an exceptionally high number, a not insignificant number of them complete, although the majority are arm, arm and toe, or heel fragments. They are almost all typologically medieval in date, although some were found in post-medieval contexts and topsoil.

Four types of medieval horseshoe have been identified in Britain (Clarke 1995, especially 84-100), and although they were used in succession, there were inevitably periods of overlap as one type succeeded another. No example of Type 1, in use from the 10th into the 12th century, was found, but the other three types, Types 2-4, are represented, as well as a few post-medieval types in contexts of that date and in topsoil.

The terms used for the parts of horseshoes are the toe, arms (called branches by modern blacksmiths) and tips, the latter often with thickened calkins. Calkins are noted where they were observed, but the corroded condition of some horseshoes made it impossible to ascertain whether or not they were present.

The horseshoes are catalogued by type, and within each type by phase. They vary in their completeness: a few are complete, but most are not, and are described as toe fragments, as arms where they are more or less complete arms; other fragments are described as arm fragments and arm tips as appropriate.

Type 2 horseshoes: horseshoes with wavy edge, countersunk nailholes, with webs up to 20mm in width, in use in the 12th and 13th centuries.

Phase 1

- 46*** Complete. 3 x 3 nailholes, calkins. L. 97mm; w. 100mm; web 12mm. *30/612; SF488; 1.1*

Phase 3

- 47** Arm fragment, 3 nailholes. L. 70+mm; web 12mm. *30/1016; SF25; Phase 3*
- 48** Arm tip, 1 nailhole. L. 62+mm. *30/1252; SF841; Phase 3*

Phase 4

- 49** Complete. 3 x 3 nailholes, calkins. L. 108mm; w. 107mm; web 16mm. *30/1000; SF15; Phase 4*
- 50** Complete. 3 x 3 nailholes, calkins. L. 106mm; w. 105mm; web 19mm. *30/1000; SF14; Phase 4*
- 51** Toe and arms fragment. 2 x 2 nailholes. L. 53+mm; w. 101+mm; web 19mm. *30/1000; SF3; Phase 4*
- 52** Toe and arm fragment. 2 nailholes. Overall w. 83+mm; web 19mm. *30/1164; SF806; Phase 4.2*
- 53** Toe and arm fragment. Heavily corroded. L. 115+mm; web 20mm. *30/1000; SF4; Phase 4*
- 54** Toe and arm fragment. 3 nailholes, calkin. L. 107+mm; web 17mm. *30/1087; SF741; Phase 4*
- 55** Arm. 3 nailholes, calkin. L. 107+mm; web 19mm. *30/1128a; SF768; Phase 4.1*
- 56** Arm. 3 nailholes, calkin. L. 107+mm; web 21mm. *30/1124; SF763; Phase 4*
- 57** Arm. 3 nailholes, calkin. L. 106mm; web 16mm. *30/13; SF875; Phase 4.2*
- 58** Arm. 3 nailholes. L. 107+mm; web 20mm. *30/1000; SF12; Phase 4*
- 59** Arm. 3 nailholes. L. 102mm; web 17mm. *30/1124; SF764; Phase 4*
- 60** Arm. 3 nailholes. L. 97+mm; web 20mm. *30/1000; SF13; Phase 4*
- 61** Arm fragment. 2 nailholes. L. 97+mm; web 15mm. *30/1000; SF16; Phase 4*
- 62** Arm fragment. 3 nailholes. L. 97+mm; web 15mm. *30/1046; SF738; Phase 4*

- 63** Arm fragment. 3 nailholes, calkin. L. 96+mm; web 15mm. *30/1000; SF17; Phase 4*
- 64** Arm fragment. 3 nailholes, 2 with fiddle-key nails. L. 92+mm; web 19mm. *30/1095; SF747; Phase 4.1*
- 65** Arm fragment. 3 nailholes. L. 87+mm; web 13mm. *30/1059; SF739; Phase 4*
- 66** Arm fragment. 3 nailholes. L. 83+mm; web 12mm. *30/37; SF1007; Phase 4.3*
- 67** Arm fragment. 2 nailholes. L. 78+mm; web 16mm. *30/1164; SF822; Phase 4.2*
- 68** Arm fragment. 2 nailholes. L. 74+mm; web 16mm. *30/1000; SF8; Phase 4*
- 69** Arm fragment. 2 nailholes, calkin. L. 74+mm; web 19mm. *30/1164; SF793; Phase 4.2*
- 70** Arm fragment. 1 nailhole with fiddle-key nail. L. 53+mm; web 14mm. *30/1095; SF746; Phase 4.1*

Topsoil

- 71** Complete. 3 x 3 nailholes, 2 with nails with fiddle-key heads. L. 100mm; w. 97mm; web 21mm. *30/1 (topsoil); SF887*

Type 3 horseshoes: horseshoes with plain edge, countersunk nailholes, and webs over 20mm in width. In use from the mid-13th to the mid-14th century.

Phase 4

- 72** Complete. 4 x 4 nailholes. L. 145mm; w. 119mm; web 38mm. *30/1225; SF841; Phase 4*
- 73** Complete. 4 x 4 nailholes, calkins. L. 127mm; w. 107mm; web 25mm. *30/1164; SF779; Phase 4.2*
- 74*** Complete. 3 x 3 nailholes, calkins. L. 123mm; w. 111mm; web 26mm. *30/1164; SF782; Phase 4.2*
- 75** Complete but for one lost arm tip. 3 x 4 nailholes, calkin. L. 120mm; w. 103mm; web 31mm. *30/1188; SF771; Phase 4*
- 76** Complete. 4 x 4 nailholes, calkins. L. 124mm; w. 117mm; web 28mm. *30/1164; SF784; Phase 4.2*
- 77** Complete. 4 x 3 nailholes. L. 124mm; w. 110mm; web 24mm. *30/1164; SF790; Phase 4.2*
- 78** Complete. 3 x 3 nailholes, calkins. L. 120mm; w. 102mm; web 28mm. *30/1112; SF748; Phase 4*
- 79** Complete. 3 x 3 nailholes, calkin. L. 116mm; w. 100mm; web 27mm. *30/1164; SF791; Phase 4.2*
- 80** Complete but for one lost arm tip. 4 x 3 nailholes, calkin. L. 114mm; w. 119mm; web 25mm. *30/1164; SF780; Phase 4.2*
- 81** Complete. 4 x 4 nailholes, calkins. L. 115mm; w. 111mm; web 25mm. *30/1093; SF744; Phase 4.3*
- 82** Complete but for part of one arm. 3 x 2 nailholes. L. 111mm; w. 102mm; web 25mm. *30/1164; SF781; Phase 4.2*
- 83** Complete. 3 x 4 nailholes. L. 117mm; w. 105mm; web 29mm. *30/1225; SF840; Phase 4*
- 84** Complete. 3 x 3 nailholes. L. 115mm; w. 107mm; web 25mm. *30/1164; SF783; Phase 4.2*
- 85** Complete but for one arm tip. 3 x 3 nailholes. L. 108mm; w. 92mm; web 22mm. *30/1188; SF772; Phase 4*

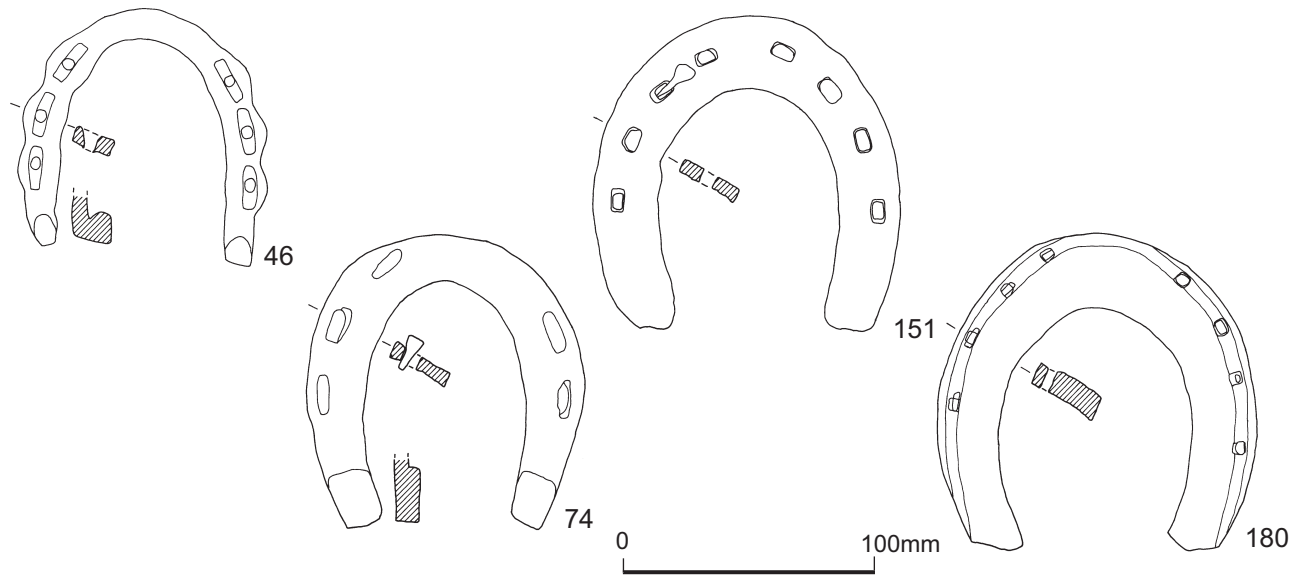


Fig. 58. Iron objects: horseshoes Nos 46, 74, 151 and 180. Scale 1:3 (E. Marlow-Mann)

- | | |
|--|---|
| <p>86 Complete. 3 x 3 nailholes. L.106mm; w. 98mm; web 24mm. 30/1217; SF834; Phase 4</p> <p>87 Complete but for one arm tip. 3 x 3 nailholes. L. 100mm; w. 102mm; web 22mm. 30/1086; SF740; Phase 4</p> <p>88 Complete but for one arm tip. 4 x 3 nailholes. L. 107mm; w. 108mm; web 23mm. 30/1164; SF785; Phase 4.2</p> <p>89 Complete. 3 x 3 nailholes, calkins. L. 90mm; w. 90mm; web 21mm. 30/1164; SF788; Phase 4.2</p> <p>90 Toe and two broken arms. L. 95+mm; web 25mm. 30/1113; SF749; Phase 4</p> <p>91 Arm, toe and broken arm. L. 108mm; web 23mm. 30/1164; SF803; Phase 4.2</p> <p>92 Arm, toe and broken arm. 3 x 1 nailholes. L. 101mm; w. 87+mm; web 22mm. 30/1000; SF9; Phase 4</p> <p>93 Arm, toe and broken arm. 4 x 1 nailholes, calkin. L. 117mm; w. 80+mm; web 29mm. 30/1225; SF1012; Phase 4</p> <p>94 Toe and arm. L. 110mm; web 28mm. 30/1164; SF802; Phase 4.2</p> <p>95 Toe fragment and arm. 3 nailholes and calkin. L. 107mm; web 23mm. 30/1125; SF765; Phase 4</p> <p>96 Toe fragment and arm. 4 nailholes, calkin. L. 99mm; web 23mm. 30/1164; SF796; Phase 4.2</p> <p>97 Toe and two broken arms. 3 x 1 nailholes. L. 65+mm; web 23mm. 30/1217; SF836; Phase 4</p> <p>98 Toe and two broken arms. 2 x 1 nailholes. W. 76+mm; web 27mm. 30/1188; SF773; Phase 4</p> <p>99 Toe and two broken arms. 2 x 0 nailholes. W. 93+mm; web 22mm. 30/1087; SF742; Phase 4</p> <p>100 Toe fragment. 1 x 2 nailholes. W. 72+mm; web 27mm. 30/1188; SF773; Phase 4</p> <p>101 Arm. Nailholes not visible. L. 125+mm; web 32mm. 30/1188; SF774; Phase 4</p> | <p>102 Arm, calkin. 4 nailholes, 3 with nails with eared heads. L. 110mm; web 26mm. 30/1164; SF800; Phase 4.2</p> <p>103 Arm. 4 nailholes. L. 111mm; web 28mm. 30/1164; SF787; Phase 4.2</p> <p>104 Arm. 3 nailholes and 1 in toe. Calkin. L. 100+mm; web 22mm. 30/1164; SF794; Phase 4.2</p> <p>105 Arm fragment. 3 nailholes. L. 123+mm; web 25mm. 30/23; SF881; Phase 4.3</p> <p>106 Arm fragment. 3 nailholes. L.118+mm; web 27mm. 30/1164; SF786; Phase 4.2</p> <p>107 Arm fragment. 3 nailholes. L. 110+mm; web 20mm. 30/1216; SF833; Phase 4.2</p> <p>108 Arm fragment. 3 nailholes, 2 with nails with eared heads, and calkin. L. 106+mm; web 25mm. 30/1164; SF807; Phase 4.2</p> <p>109 Arm fragment. 3 nailholes, calkin. L. 106+mm, web 24mm. 30/1188; SF775; Phase 4</p> <p>110 Arm fragment. 4 nailholes, calkin. L. 104+mm; web 24mm. 30/1164; SF798; Phase 4.2</p> <p>111 Arm fragment. 3 nailholes, calkin. L. 100+mm; web 20mm. 30/1216; SF832; Phase 4.2</p> <p>112 Arm fragment. 2 nailholes, calkin. L. 93+mm; web 30mm. 30/1188; SF776; Phase 4</p> <p>113 Arm fragment. 3 nailholes, calkin. L. 91+mm; web 26mm. 30/1216; SF831; Phase 4.2</p> <p>114 Arm fragment. Nailholes not visible. L. 85+mm; web 22mm. 30/1188; SF770; Phase 4</p> <p>115 Arm fragment. 3 nailholes, one with nail with eared head. L. 78+mm; web 23mm. 30/1164; SF795; Phase 4.2</p> <p>116 Arm fragment. 1 nailhole with nail with eared head. L. 63+mm. 30/1164; SF804; Phase 4.2</p> <p>117 Arm tip. 2 nailholes, calkin. L. 84+mm; web 23mm. 30/1164; SF792; Phase 4.2</p> |
|--|---|

- 118** Arm tip. 2 nailholes and calkin. L. 77+mm; web 25mm. *30/1164; SF810; Phase 4.2*
- 119** Arm tip. 1 nailhole, calkin. L. 75+mm; web 20+mm. *30/1164; SF821; Phase 4.2*
- 120** Arm tip. 2 nailholes, calkin. L. 75+mm; web 23mm. *30/1239; SF201; Phase 4*
- 121** Arm tip. 1 nailhole, calkin. L. 72+mm; web uncertain. *30/1225; SF1014; Phase 4*
- 122** Arm tip. 1 nailhole. L. 70+mm; web uncertain. *30/1164; SF816; Phase 4.2*
- 123** Arm tip. 2 nailholes, calkin. L. 65+mm; web 21mm. *30/1164; SF818; Phase 4.2*
- 124** Arm tip. 1 nailhole, calkin. L. 62+mm; web over 24mm. *30/1164; SF808; Phase 4.2*
- 125** Arm tip. 1 nailhole, calkin. L. 58+mm; web over 20mm. *30/1225; SF1013; Phase 4*
- 126** Arm tip. 1 nailhole, calkin. L. 55+mm; web uncertain. *30/1188; SF929; Phase 4*
- 127** Arm tip. 1 nailhole, calkin. L. 50+mm; web over 20mm. *30/1164; SF819; Phase 4.2*

Phase 5

- 128** Arm fragment. 3 nailholes. L. 99+mm; web 21mm. *30/2; SF884; Phase 5*

Phase 8

- 129** Near complete. One arm broken. Distorted. 3 x 3 nailholes. L. 111mm; web 26mm. *30/1119; SF762; Phase 8*

Topsoil

- 130** Complete. 4 x 4 nailholes. L. 144mm; w. 112mm; web 26mm. *30/1117 (topsoil); SF751*
- 131** Complete. 4 x 4 nailholes. L. 141mm, w. 117mm; web 30mm. *30/1 (topsoil); SF871*
- 132** Complete. 4 x 4 nailholes. L. 135mm; w. 113mm; web 31mm. *30/1 (topsoil); SF872*
- 133** Complete. 4 x 4 nailholes. L. 125mm, w. 96mm; web 25mm. *30/1117 (topsoil); SF750*
- 134** Complete but for one lost arm tip. L. 108mm; w. 115mm; web 28mm. *30/1 (topsoil); SF873*
- 135** Complete. 3 x 3 nailholes. L. 93mm, w. 95mm; web 22mm. *30/1250 (topsoil); SF838*
- 136** Complete but for part of one arm. 4 x 3 nailholes. L. 115mm; web 22mm. *30/1117 (topsoil); SF753*
- 137** Toe and two broken arms. 3 x 2 nailholes. L. 112+mm; web 22mm. *30/1117 (topsoil); SF754*
- 138** Toe and two broken arms. 2 x 1 nailholes. L. 72+mm; web 29mm. *30/1117 (topsoil); SF758*
- 139** Toe and two broken arms. 2 x 2 nailholes. L. 64+mm; web 23mm. *30/1 (topsoil); SF867*
- 140** Toe and one arm. 4 nailholes. L. 108mm; web 30mm. *30/1 (topsoil); SF870*
- 141** Toe and one arm. 3 nailholes. L. 104mm; web 26mm. *30/1 (topsoil); SF890*

- 142** Toe and one arm. 3 nailholes. L. 92mm; web 23mm. *30/1 (topsoil); SF893*

- 143** Arm fragment. 3 nailholes. L. 114+mm, web 27mm. *30/1 (topsoil); SF863*

- 144** Arm fragment. 4 nailholes. L. 125+mm; web 27mm. *30/1 (topsoil); SF888*

- 145** Arm fragment. 2 nailholes. L. 110+mm; web 24mm. *30/1117 (topsoil); SF756*

- 146** Arm fragment. 4 nailholes. L. 105+mm; web 24mm. *30/1 (topsoil); SF847*

- 147** Arm fragment. 3 nailholes. L. 107+mm; web 25mm. *30/1 (topsoil); SF864*

- 148** Arm fragment. 3 nailholes. L. 102+mm; web 27mm. *30/1 (topsoil); SF861*

- 149** Arm fragment. 3 nailholes. L. 72+mm; web 23mm. *30/1 (topsoil); SF868*

- 150** Arm fragment. 4 nailholes. L. 83+mm; web 26mm. *30/1 (topsoil); SF891*

Type 4 horseshoes: horseshoes with plain edge, rectangular nailholes, and broad web. In use in 14th and 15th centuries.

Phase 4

- 151*** Complete. 4 x 4 nailholes. L. 127mm; w. 123mm; web 29mm. *30/1164; SF778; Phase 4.2*

- 152** Complete. 4 x 4 nailholes. L. 120mm; w. 103mm; web 29mm. *30/1164; SF789; Phase 4.2*

- 153** Complete but for one broken arm. 3 x 1 nailholes. L. 100mm; w. 98+mm; web 24mm. *30/23; SF850; Phase 4.3*

- 154** Complete but for one broken arm. 3 x 0 nailholes, calkin. L. 73mm; web 23mm. *30/1164; SF801; Phase 4.2*

- 155** Toe fragment and arm. 4 nailholes. L. 104+mm; web 23mm. *30/1164; SF797; Phase 4.2*

- 156** Toe and arm fragment. 4 nailholes. L. 102+mm; web 20mm. *30/1164; SF817; Phase 4.2*

- 157** Toe and two arm fragments. 3 x 3 nailholes. W. 105+mm; web 24mm. *30/5; SF858; Phase 4.3*

- 158** Toe and two arm fragments. 2 x 1 nailholes. W. 18mm; web 19mm. *30/1125; SF766; Phase 4*

- 159** Arm and tip fragment. 4 nailholes. L. 104+mm; web 22mm. *30/1164; SF799; Phase 4.2*

- 160** Arm and tip fragment. 3 nailholes. L. 100+mm; web 23mm. *30/23; SF855; Phase 4.3*

- 161** Arm fragment. 1 nailhole. L. 33+mm. *30/23; SF853; Phase 4.3*

- 162** Arm tip. 2 nailholes. L. 81+mm; web 27mm. *30/1188; SF931; Phase 4*

- 163** Arm tip. 1 nailhole, calkin. 2 nailholes. *30/1164; SF820; Phase 4.2*

- 164** Arm tip. 1 nailhole. L. 52+mm. *30/1164; SF809; Phase 4.2*

- 165** Arm fragment. 1 nailhole. L. 37+mm; web 17+mm. *30/9; SF857; Phase 4.3*

166 Arm tip. 1 nailhole. L. 93+mm. 30/9; SF846; Phase 4.3

Phase 5

167 Arm fragment. 2 nailholes. L. 45+mm. 30/2; SF1011; Phase 5

Topsoil and unstratified

168 Complete. 4 x 4 nailholes. L. 127mm; w. 115mm; web 30mm. 30/1117 (topsoil); SF752

169 Complete. 3 x 3 nailholes. L. 105mm (worn); w. 113mm; web 27mm. 30/1 (topsoil); SF848

170 Complete. 4 x 4 nailholes. L. 169mm; w. 169mm; web 40mm. 30/unstratified; SF845

171 Arm, toe and broken arm. 3 x 1 nailholes. L. 92mm; web 20mm. 30/1 (topsoil); SF866

172 Toe and two broken arms. 3 x 2 nailholes. L. 84+mm; web 25mm. 30/1 (topsoil); SF877

173 Toe and two broken arms. 3 x 1 nailholes. L. 83+mm; web 25mm. 30/1 (topsoil); SF885

174 Arm fragment. 4 nailholes. L. 115+mm; web 28mm. 30/1 (topsoil); SF869

175 Arm fragment. 4 nailholes. L. 110+mm; web 23mm. 30/1 (topsoil); SF892

176 Arm fragment. 3 nailholes. L. 102+mm; web 26mm. 30/1 (topsoil); SF859

177 Arm fragment. 2 nailholes. L. 82+mm; web 21mm. 30/1 (topsoil); SF865

Post-medieval horseshoes, all with rectangular nailholes

178 Complete. 4 x 4 nailholes set in fullered groove. L. 125mm; w. 125mm; web 31mm. 30/1251; SF840; Phase 3 (intrusive)

179 Complete. 4 x 4 nailholes set in fullered groove. L. 125mm; w. 125mm; web 20mm. 30/599; SF889; Phase 6

180* Complete. 4 x 4 nailholes set in fullered groove, 5 with nails. L. 126mm; w. 127mm; web 29mm. 30/1 (topsoil); SF844

181 Arm. 4 nailholes in fullered groove. L. 117+mm; web 29mm. 30/1 (topsoil); SF886

182 Complete. 4 x 4 nailholes in fullered groove. Toe clip. L. 171mm; w. 196mm; web 22mm. 30/1250 (topsoil); SF839

183 Complete. 4 x 3 nailholes in fullered groove. L. 127mm; w. 130mm; web 24mm. 30/1250 (topsoil); SF837

184 Arm. 3 nailholes set in fullered groove. Arm tip has shaped end. L. 115+mm; web 25mm. 30/1 (topsoil); SF1009

Another 30 fragments, the majority of them from Phase 4, are unclassifiable as to type of horseshoe (Archive 281-310).

Oxshoes

185 Oxshoe, broken. L. 44mm. 30/589; SF713; Phase 6

A complete shoe (Archive 331) was found in a Phase 8 context.

Horse fittings (Fig. 59)

186* Mouthpiece link from bridle bit. Ends broken, one looped. L. 99+mm. 30/1258; SF68; Phase 3

187* Stirrup. Bag-shaped frame with expanded foot rest and broken loop for stirrup leather. Non-ferrous plating. L. 133mm; w. 117mm. 30/1128a; SF69; Phase 4.1

A bridle fitting (Archive 312) was found in topsoil.

Arrowhead (Fig. 59)

188* Socketed arrowhead with barbed blade. L. 65mm. 30/1164; SF432; Phase 4.2

Cast-iron objects

189 Vessel rim. L. 41+mm x 26+mm. 30/2; SF459; Phase 5 (intrusive)

190 Sheet fragment. 93+ x 59+mm. 30/1113; SF718; Phase 4 (intrusive)

191 Fragment, ? from grate. 30/23; SF375; Phase 4.3 (intrusive)

A vessel rim and body fragment (Archive 314) and several fragments of curved sheet are among eleven other fragments found.

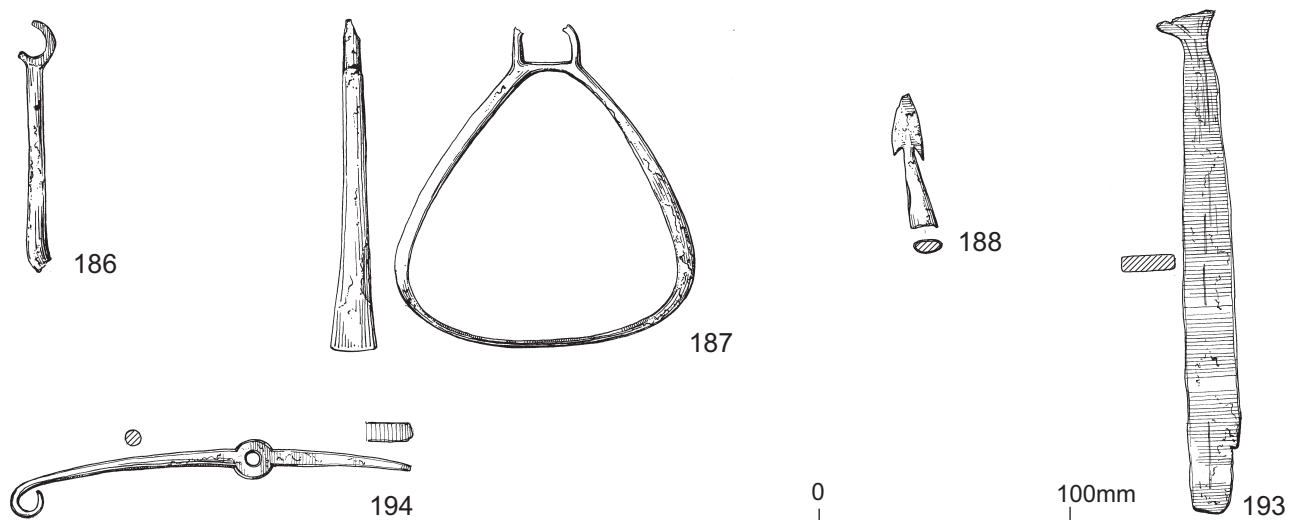


Fig. 59. Horse fittings Nos 186-7; arrowhead No. 188; unclassifiable fragments Nos 193-4. Scale 1:3 (P. Dunn)

Miscellaneous objects

Clip

192 Clip, broken. Pointed oval shape retaining one down-turned end.
L. 30+mm; h. 8mm. 71/196; SF110; Phase 4

Sheet

Of the twelve sheet fragments that were found, six were in Phase 4 (Archive 326-331), two of these with non-ferrous plating.

Unclassifiable fragments (Fig. 59)

193* Object with expanding arm and broadening tip, possibly an incomplete forging. L. 199mm. 30/1474; SF118; Phase 2.1

194* Shaped object. L. 160mm. 30/1225; SF96; Phase 4

Another 51 fragments, one from Phase 1 and many from medieval contexts, show little form and cannot be identified.

16 The Nails

by J.G. Watt

Introduction and methodology

A total of 861 nails were among the iron objects recovered from the Pond and Dam sites. Of these, 514 are nails used in joinery and 299 are from horse or oxshoes; the remaining 48 are unidentifiable scraps of nail and are excluded from

the tables and discussion. The nails were x-rayed with the rest of the iron and then described and catalogued. The catalogue and the x-ray plates are in the Archive.

Nail types

The majority of the nails are of types previously found at Wharram, as described in *Wharram VIII* (Watt 2000, 140-42); oxshoe nails are described in *Wharram IX* (Watt 2004, 251). The dome-headed nail described below is an addition to the type series:-

Dome-headed nail: round-headed nail but with a regular curvature to the head which appears to be purposefully made. Perhaps used as decorative studs. Diameter of head: 9-11mm.

Discussion

Of the stratified nails, just under a quarter were found in the topsoil, mainly on Site 30, only a few (c.7%) were found in contexts from Phases 1, 2 and 3. For the later phases there is a marked contrast between each site. On Site 71 the majority of the nails in Phase 4 are joinery nails (88%) probably reflecting the domestic nature of the assemblage, although proximity to a demolition site is suggested by the high percentage of point fragments. This contrasts with Site 30 where an unusually large number of horseshoes nails were recovered from Phase 4 (63% of

Table 12. Total of all identifiable nails by type and as a percentage of the total.

| Type of nail | Site 30 | Site 71 | Site 67 | Total per type | % of total |
|----------------------------|------------|------------|----------|----------------|------------|
| Brodde: Type 4 | 17 | 1 | - | 18 | 2.2 |
| Headed – Deckhead | 3 | - | - | 3 | 0.4 |
| Headed – Rectangular | 35 | 10 | - | 45 | 5.5 |
| Headed – Circular | 58 | 15 | - | 73 | 9.0 |
| Headed – Offset | 8 | 8 | - | 16 | 2.0 |
| Headed – Oval | 24 | 16 | - | 40 | 4.9 |
| Rosehead | 8 | - | - | 8 | 1.0 |
| Headed – Domed | 3 | - | - | 3 | 0.4 |
| Headed – Unidentifiable | 23 | 13 | - | 36 | 4.4 |
| Point frags | 75 | 51 | - | 126 | 15.5 |
| Shank frags | 33 | 10 | - | 43 | 5.3 |
| Rivet | 1 | - | - | 1 | 0.1 |
| Roundwire | 38 | - | - | 38 | 4.7 |
| Spike: Type 5 | 11 | 22 | - | 33 | 4.1 |
| Stud: Type 7 | 12 | 4 | - | 16 | 2.0 |
| T-head: Type 3 | 15 | - | - | 15 | 1.8 |
| Horseshoe – Fiddle-key | 50 | 7 | - | 57 | 7.0 |
| Horseshoe – Cruciform | 84 | 11 | - | 95 | 11.7 |
| Horseshoe – Trapezoidal | 29 | - | 2 | 31 | 3.8 |
| Horseshoe – Spike | 28 | - | - | 28 | 3.4 |
| Horseshoe – Unidentifiable | 82 | 2 | - | 84 | 10.3 |
| Oxshoe | 4 | - | - | 4 | 0.5 |
| TOTAL | 641 | 170 | 2 | 813 | 100 |

total nails in that phase). This reflects the large number of horseshoes found in the same phase (see Chapter 5). 78% of these horseshoe nails have lost the point suggesting that the shoes had been removed from the feet of the horses, and both they and the nails discarded together.

The joinery nails include the majority of types previously found in the village, with the exception of the tack or lath nail. Compared to other areas within the village, Site 71 produced a considerably higher than average percentage of both oval-headed nails and spikes. Both these nail types, especially the spike, appear very commonly in contemporary sources and might have been used for a wide variety of purposes.

Among the many horseshoe nails the cruciform type, datable to the 11th to 15th centuries, predominates as it did on the North Manor sites (*Wharram IX*). In the Pond and Dam sites the large number of horseshoe nails in Site 30, particularly in Phase 4, has resulted in a higher proportion of these to joinery nails (37%:63%) than in either the North or South Manor Areas (*Wharram IX; VIII*, 140). There the proportions were 24%:76% and 16%:84% respectively.

17 Wooden Objects (Fig. 60)

by C.A. Morris

Introduction

This report concerns seventeen wooden objects which were recovered in the area around the mill pond and dam where conditions favoured the survival of organic and environmental materials.

The objects are identified below in terms of conversion and possible functions. The former refers to how the timber was converted from roundwood raw material into finished product, and uses the terminology outlined in English Heritage's guidelines for recording waterlogged wood (Morris 1990, 12-14, fig. 2). In terms of wood conversion, some of the objects were made from roundwood, whereas others had been converted radially by splitting into radial sections and then being re-worked, or converted tangentially, probably by being tangentially-split or sawn. These forms of woodworking are discussed in detail elsewhere (Morris 2000, 2102-4 and fig. 973)

Species are included in the individual entries where known and are represented mostly by Oak (*Quercus* sp). All the raw materials used for the small wooden artefacts would have been available locally in the neighbouring area and need not have been imported from a great distance.

Catalogue

- 1 Fragment of possible caskhead batten; cut from tangentially split or sawn 'outer split'; plano-convex in cross-section; surviving intact end is rounded, the other end is broken and missing; perforated by two different-sized rectangular holes, 15 x 11mm and 10 x 9mm, the latter containing a fragment of a square cross-sectioned wooden peg. Surviving l. 182mm; w. 40mm; th. 25mm. 30/587; SF576; Phase 7.2

- 2 Four very thin, flat lath or board fragments, two probably conjoined and perforated by circular hole c. 23mm diameter; probably radially split sections. Traces of charring on one piece. The pieces have possibly lost thickness through compression in the ground, drying out etc. and originally could have been part of a caskhead similar to No. 3, although there are no intact surviving edges. Probably *Quercus* spp. (Oak). Similar to Nos 12 and 14. L. (largest fragment) 150mm; w. 41mm; th. 5mm. 30/595; SF574
- 3 Middle stave of a small piece-built caskhead; radially-split board; curved outer edges chamfered on one side only; two circular holes 15mm and 17mm diameter augered through stave, and remnants of a third hole probably originally of similar diameter cut into one long edge. Probably *Quercus* spp. (Oak). L. 277mm; w. 93mm; th. 5mm. 30/610; SF575; Phase 5
- 4* Possible unfinished knife or tool handle? Length of roundwood which has been whittled down the long sides, leaving long narrow facets; ends also whittled to blunt rounded shapes with very small facet cuts; oval in cross-section; long curved notch cut into side along one long edge to provide a grip? L. 112mm; w. 24mm; th. 20mm. 30/1473; SF116; Phase 2.1
- 5* Fragment of the blade of a separate-bladed shovel, radially-split section, found in waterlogged silty deposits on the site of the Mill Pond Dam. Probably rounded, pointed fixing end; blade split longitudinally and probably less than half now survives; rounded blade; convex sloping shoulders; fragment broken from blade side; no peg holes survive, but traces of an irregular-shaped slot and channels cut towards and away from it in cross-section (on the front and back of the blade respectively). L. 303mm; surviving w. 131mm; th. 21mm. *Quercus* spp. (Oak). 30/1569; SF120; Phase 2
- 6 Radially-split lath/offcut fragments. Surviving l. 60mm; w. 35mm; th. 6mm. 71/115; SF17; Phase 1.2
- 7* Fragment of structural timber; made from tangentially converted (split or sawn) 'inner split'; wide squared intact end; tapers away from this end with one edge cut straight and the other curving slightly inwards. Intact end has pegged half lap joint with fragment of roundwood trenail peg in augered hole 17mm diameter; second augered hole 18mm diameter cut through timber at the edge of the lap joint; third augered hole probably 14mm diameter cut transversely through timber from side to side at broken end. *Quercus* spp. (Oak). Surviving l. 204mm; w. 91mm; th. 24mm. L. of trenail 28mm; diam. of head 19mm. 71/131; SF200; Phase 1.1
- 8* Peg fragment; whittled from roundwood; no head; shaft tapers towards broken lower end; circular cross-section. Surviving l. 63mm; diam. of head end 18mm. 71/131; SF201; Phase 1.1
- 9* Trenail; whittled from roundwood; round head with flat top, faceted sides and sloping shoulders; parallel-sided shaft, broken diagonally from just under head at one side; circular cross-section. Surviving l. 52mm; diam. of head 19mm. 71/131; SF202; Phase 1.1
- 10* Offcut chip from half-section roundwood; facet cut at one end; several tool marks (possibly axe chopping marks) at the other end. L. 77mm; w. 46mm; th. 13mm. 71/131; SF203; Phase 1.1
- 11* Offcut/fragment; radially split section; possible intentional hollowing to one side. *Quercus* spp. (Oak). Surviving l. 54xmm; w. 26mm; th. 20mm. 71/131; SF204; Phase 1.1
- 12 Very thin lath fragments; tangentially converted; largest fragment has a possible intact end with straight cut edge and incised cuts on one flat surface? Possible nail hole at other broken end. L. of largest fragment 174mm; w. 50mm; th. 3mm. 71/131; SF205; Phase 1.1
- 13 Eight lath fragments conjoined; tangentially converted; two long straight edges intact, slightly tapering; one end broken, the other possibly intact with straight cut edge. L. (reconstructed) 324mm; w. 89mm; th. 5mm. 71/131; SF206; Phase 1.1

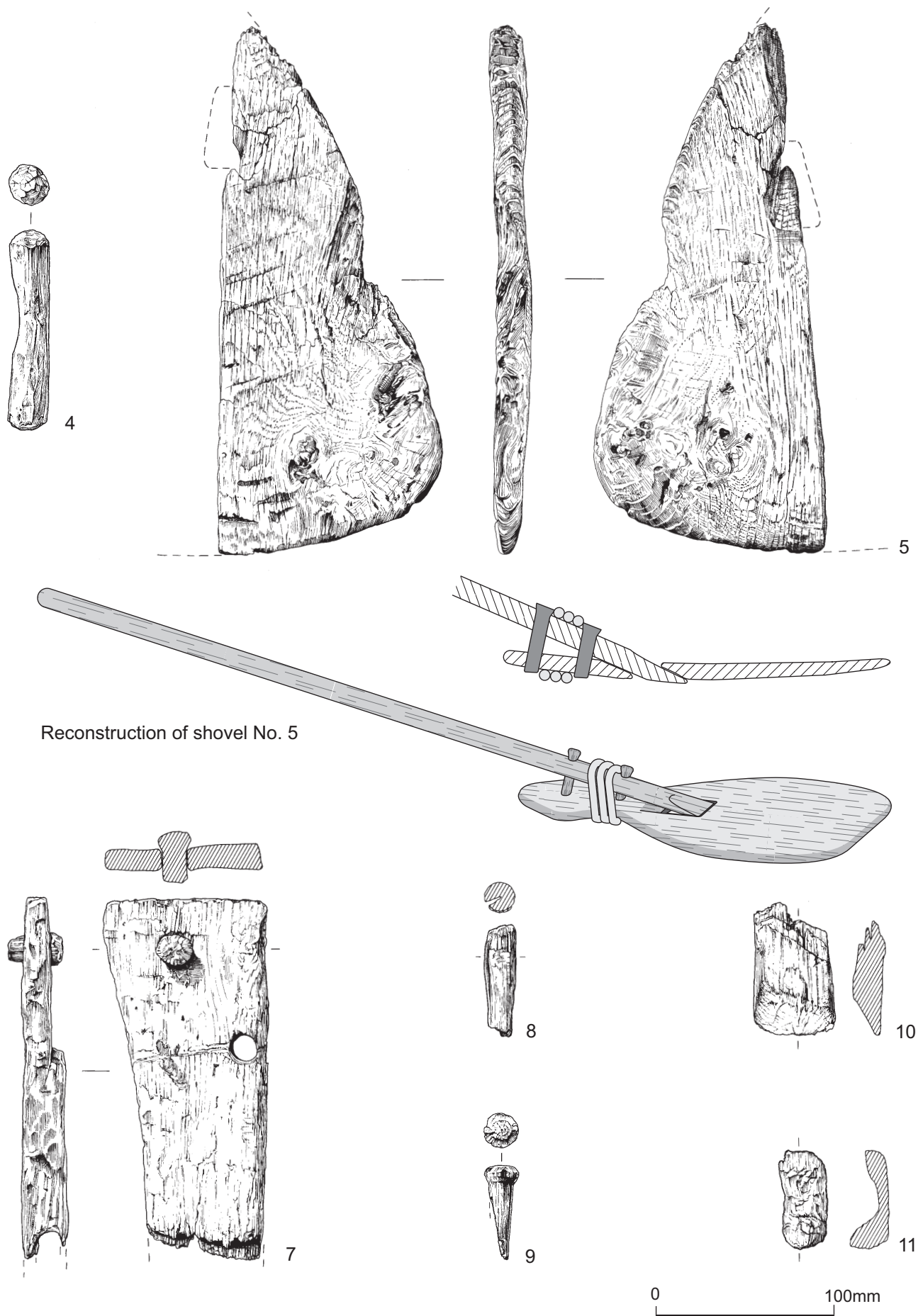


Fig. 60. Wooden objects: Nos 4, 5 and Nos 7-11 (scale 1:3; P. Dunn) and reconstruction of No. 5. (G. Morris)

- 14 Very thin lath fragments; tangentially converted; both largest fragments appear to have parallel sides and broken ends. L. of largest fragment 134mm; w. 98mm; th. 5mm. 71/131; SF207; Phase 1.1
- 15 Three lath fragments conjoined; tangentially converted; two long straight edges intact, slightly tapering; ends broken. L. (reconstructed) 312mm; w. 66mm; th. 6mm. 71/131; SF208; Phase 1.1
- 16 Very thin lath fragments; tangentially converted; largest fragment has a possible intact end with straight cut edge; parallel sides. L. of largest fragment (reconstructed) 151mm; w. 70mm; th. 5mm. 71/131; SF209; Phase 1.1
- 17 Thin lath fragments, tangentially converted; both largest fragments appear to have one intact straight edges; ends broken. L. of largest fragment 144mm; w. 42mm; th. 5mm. 71/131; SF210; Phase 1.1

Discussion

Vessels

Number 1 is a batten which has been fastened by pegs across two or more other pieces of wood to fasten them together. This technique was often used on rectangular chest, box or garderobe-lids, or circular caskheads of the Anglo-Saxon and medieval period, where the batten was fixed perpendicular to the main axis of the other pieces of wood, and it is possible that the Wharram piece was used for either of these purposes.

A heavy 10th to 11th-century garderobe lid from 16–22 Coppergate in York had two transverse rectangular battens fastened by five wooden pegs each (Morris 2000, figs 1131–2). Some caskheads or lids of larger stave-built casks also have transverse battens, e.g. rectangular battens across head staves have been found *in situ* on heads from 10th-century Winchester (Keene 1990, fig. 298, 3427) and 11th-century Dublin (Morris 1984, fig. 111, C271iii), and an impression of a single batten perpendicular to a caskhead stave was found where a cask had been used to line a late 13th-century pit at Exe Bridge, Exeter (Allan and Morris 1984, fig. 178, 72). There are also several medieval caskhead battens from York – one from Bedern Foundry (Morris 2000, fig 1086), and others from Coppergate (Morris 2000, 2411). These battens are not repairs and medieval illustrations often show them *in situ* on casks in use. An English medieval illustration of c. 1325–30 in the Holkham Bible Picture Book shows two casks with two-piece caskheads across which are fixed rectangular battens (British Library Add. MS 47682, fo.9). Most illustrations of casks with battens seem to be wine casks resting horizontally. It is possible that the battens are strengthening devices to reinforce heads on casks which were often used in this position. It is this tradition which probably survives down into the post-medieval period and is represented by the Wharram batten fragment.

Number 3 is the middle stave of a small post-medieval, piece-built caskhead which has been perforated by circular augered holes in several places. Multiple staves of a caskhead are often dowelled together along the long edges but there are no traces of dowels on this piece. The holes in a caskhead are usually either vent-holes or

batten-holes, and the latter are more likely for this object in the absence of dowels in the long edges, although they could be a combination of both types. Battens would have been similar to No. 1.

Tools

Number 4 is probably an unfinished or unused medieval handle for a knife or other tool which would have had a long metal whittle tang. Most medieval knife and tool handles were made of organic materials – sometimes bone, antler, horn or ivory, but the vast majority were made of wood, either whittled from a branch or split section of roundwood, or lathe-turned for a finer product (cf. Morris 2000, 2283–5 for a discussion of medieval wooden knife handles)

Number 5 is part of the blade of a specialised, composite wooden hand-tool with a separate blade and handle fixed together by fitting the handle shaft through a slot in the blade at an obtuse angle and securing it by one or two wooden pegs in small circular holes bored through the ‘fixing’ end of the blade above the slot. Sometimes, an extra thong or rope would bind the handles of these tools to the fixing ends of their blades.

Many separate-bladed shovel blades have been found on sites in England, Scotland, Ireland, Germany and Sweden, and they range in date from the 9th to the 14th centuries. Fifty of these tools have already been published with discussions of their history, manufacture, form and uses (Morris 1980; Morris 1981; Morris 2000, 2313–15, fig. 1135), mostly from the British Isles and Ireland, and a further Irish example, found at Moynagh Lough in Co. Meath, is the earliest dated example (Bradley 1982).

Although the blades are usually rounded or rectangular in shape, their fixing ends can be very different, and five shapes are found (Morris 1981, fig. 5b, a–e). The Wharram Percy blade has a pointed fixing end (Morris 1981, fig. 5a, a). Blades with similarly-shaped fixing ends have been found in Dublin (11th century) and London (Morris 1981, fig. 8, 7 and 22), in Durham (10th to 11th-century) and Coventry (Morris 1980, fig. 2, d and b), and in York (Morris 2000, fig. 1135, 8964), the latter dated to the 10th century. These various examples suggest that the form was popular in the 10th to 11th centuries, straddling the Norman conquest.

These hand tools have sloping shoulders which are useless for putting the foot on to exert pressure for digging. They were hafted in such a way as to create an obtuse angle which would be an advantage for shovelling but little use for digging. The Wharram Percy tool is therefore almost certainly a wooden shovel and not a spade. No medieval examples of this kind of tool have iron shoes to strengthen their blade edges and its most important feature is its capacity for lifting and shifting. It was not used to cut into hard ground or compacted material, but to shovel soft loose materials such as grain, mud, loose earth, manure or mortar (see Morris 1981 for a discussion of uses and two late medieval illustrations of separate-bladed shovels in use). Since the shovel was found in Phase 2 levels, which were associated with the

creation of the first pond behind the clay dam, it seems possible that it was used to move earth, mud and clay in the construction process and was discarded when it broke.

Structural woodwork

All the wooden objects recovered from the channels associated with the pond and dam are structural in nature - they are surviving fragments of larger wooden structures.

The peg and trenail (Nos 8 and 9) are two types of wooden peg which were essential elements of timber technology where wooden planks, boards, blocks or beams need to be fastened together. Pegs such as these are often needed in large quantities, but are generally found singly or in small groups on archaeological sites not associated with the object or structure with which they were used, a fact which can cause problems assigning a specific use. Trenails such as No. 9, and that found with structural timber No. 7, always have slightly flaring rounded heads. When they were hammered into a hole, they would have fitted tightly and the head would not usually project much beyond the hole. Trenails comparable with these from Wharram have been found at sites in York (Morris 2000, fig 1175) and Hull (Watkin 1987, fig 125, 367-9). The peg (No. 8) has no definite division between the 'head' end and the shaft, and its top would not have projected beyond the peg hole. It would have been used in the construction of a timber building or other structure.

The lath fragments (Nos 12-17) are all thin strips of wood, probably tangentially sawn to achieve even thinness, and, although they vary in width, they were all probably used in the same way. They appear very stave-like but they are not parts of stave-built vessels. A possible use would be as a woven lath wall, fence or other structure, possibly internal. Thin laths of wood can be woven in the same way as wattles, and if used for an internal partition wall, no daub or infill would be necessary.

Waste

Numbers 6, 10 and 11 are offcuts and fragments, some probably waste from woodworking larger objects.

18 Bone and Ivory Objects (Fig. 61)

by A. MacGregor and I. Riddler

Handles

- 1* Knife handle; one bone scale only survives, expanding to a chamfered butt; two iron rivets *in situ*. 30/1 (topsoil); SF947
- 2* Knife, iron, the blade with a rounded point and thickened shoulders; strip-tang with bone scales expanding to a swelling butt, secured by small closely-set rivets (pairs of bronze rivets alternating with single iron rivets). 30/6; SF950; Phase 4.2
- 3* Short handle of elephant ivory, rhomboid in section, tapering from a rounded butt. Iron tang intact but remains of ? blade obscured by corrosion. 30/8; SF951; Phase 4.3

This handle could have been held with little more than the finger tips. It is a post-medieval (*c.* 18th-century) type.

- 4* Knife, iron blade (broken) with thickened shoulders; strip-tang with ? bone scales, expanding to a squared-off butt, secured by two iron rivets. 30/574; SF954; Phase 7.1
- 5* Clasp knife, iron, with bone scales, expanding to a crested butt. 30/1474; SF956; Phase 2.1

The small clasp knife has a scale tang handle with two undecorated plates of bone. Scale tang knives were not made in any numbers before the 14th century and the particular form of the handle can be matched by several examples of 15th-century date, from Northampton, York and Colchester, (Williams 1979, 268, fig. 118.44; Ottaway and Rogers 2002, 2762, fig. 1365. 13186; Crummy 1988, 75, fig. 76.3102; Cowgill *et al.* 1987, 26). The much earlier date of the context of this knife is echoed by a bone scale tang handle from Norwich, retrieved from a context of 12th or 13th-century date (Margeson 1993, 123, fig. 88.773).

- 6* ?Fork (broken), iron shank with strip-tang; bone scales with incised decoration of repeated diagonal lines, expanding to a curved butt. 71/7; SF2; Phase 8

Tooth-brush

- 7 Bone tooth-brush (fragmentary); part of flattened head survives, drilled with four rows of holes, narrowing to an oval-sectioned handle. 30/1 (topsoil); SF948

Similar brushes were produced in the 19th and early 20th centuries: the bone-shaping workshop of Messrs Kent of London was closed only in the 1930s (Woodall 1959). The absence of copper-staining indicated that the tufts were in this case of bristle, and not of brass wire as was commonly the case.

Buttons

- 8 Bone button, turned, with a wide rounded rim and four thread-holes. 30/500; SF952; Phase 3
- 9 Bone button, turned, with a rounded rim and four thread-holes. 30/599; SF955; Phase 6
- 10 Bone button, turned, with a rounded rim and four thread-holes. 30/1 (topsoil); SF949
- 11 Bone button, turned, with a wide rounded rim and four thread-holes. 30/545; SF953; Phase 7.2

These buttons are all mass-produced post-medieval types. They are impossible to date precisely: *c.* 18th-century.

Perforated pig metapodial

- 12* A complete perforated pig metapodial (metatarsus IV, left side), pierced by a central, oval perforation. The proximal end has been trimmed; the distal end is unfused. L. 63mm; diam. of perforation 5 x 6mm. 71/80; SF18; Phase 5

Perforated pig metapodia have been recovered from several sites at Wharram Percy, including Area 6 and the

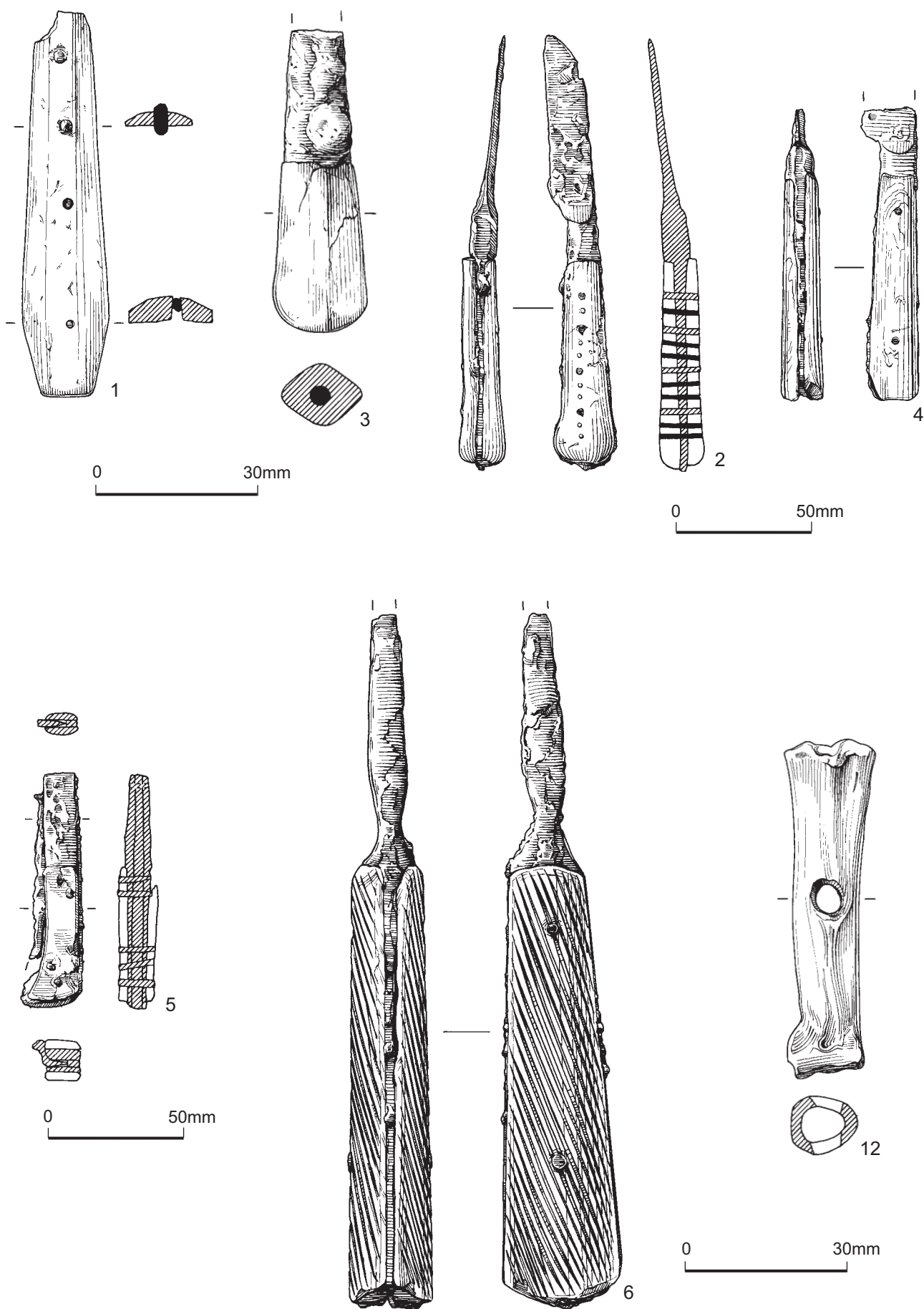


Fig. 61. Bone and ivory objects: handles Nos 1-6; perforated pig metapodial No. 12. Nos 1, 3, 6 and 12 scale 1:1, Nos 2, 4 and 5 scale 1:2 (P. Dunn).

South Manor (Andrews 1979, fig 70.30; MacGregor 2000, 153, fig 72.111-2). All of these examples utilise the central metapodial bones (metacarpus and metatarsus III and IV) and these are the most common bones of this object type in general (Ulbricht 1984, 62; Riddler, Trzaska-Nartowski and Hatton forthcoming). Metatarsals are dominant within the small sample from Wharram Percy, possibly reflecting the suggestion that they provided a better sound quality in use (Ulbricht 1984, 63). Metatarsals were more common both at Schleswig and within the sample from northern eastern Germany recorded by Ursula Lemkuhl (Ulbricht 1984, 62 tab 7; Lemkuhl 1982, 214). Each of the metapodia from Wharram Percy has been pierced centrally. Several, including this example, have also been lightly trimmed at the proximal end. They are not otherwise worked and the original form of the bone is clear in each case.

As MacGregor and Lawson have noted, a consensus has emerged in recent years concerning the interpretation of the object type (MacGregor 2000, 153; Lawson 1995). Ethnographic parallels, in particular, suggest that they are buzz bones, which were threaded with leather or twine and twisted in the hand. When released, they produced a loud buzzing noise (MacGregor 1985, 102-3, fig 59). Heege has suggested that with medieval examples the twine was fastened to wooden handles and these were pulled apart to create the requisite noise (Heege 2002, 320, abb 690).

On the Continent, perforated pig metapodia are first seen in contexts of the 9th century, are particularly popular during the 11th and 12th centuries and continue in use throughout the medieval period (Lemkuhl 1982, 220; Ulbricht 1984, 70). Similar dating occurs in England and particularly at York, which has provided a large sample of these objects (MacGregor, Mainman and Rogers 1999, 1980-81).

19 The Leather (Fig. 62)

by Q. Mould, with No. 11 by
J.H. Thornton

A small amount of leather was recovered from the excavation of Sites 30 and 71 and comprised medieval and post-medieval footwear (10 items), a bag and a small quantity of waste leather (12 items).

The leather examined had been pre-treated in EDTA, then glycerol, and freeze-dried by the (then) Guardianship Conservation Dept. of the Ancient Monuments Laboratory, English Heritage. The description of No. 11 is by the late J.H. Thornton (AML Report 1796).

A heavily worn turnshoe (No. 2) was found in the silt (1473) of the pond created by the clay dam (Phase 2). The remains of the upper that survive show the turnshoe to have been either an ankle boot or a boot that extended higher up the leg. A torn calfskin panel (No. 3) from a bag was found in the same context. As only the left side of the panel remains, too little of the bag survives to be certain

of the construction. The panel was folded and sewn with a closed seam to form a pocket at the bottom and appears to have been similarly folded to form a flap at the top. It differs from the range of flap-closing belt purses known from late 14th-16th century contexts in Britain and the Continent (for reconstructed examples see Volken, Volken and Bourgarel 2001, 46-7, figs 13-14) and may be the remains of a game bag or saddle-bag. Stitching from a lapped seam on the front of the pocket may mark the position of a separate drawstring pouch, like those found on belt purses, or a repair patch to cover two angular holes cut into the panel. Similarly, a shaped piece sewn to the back of the top of the panel may come from a repair patch or a wide suspension strap. A tentative reconstruction as a saddle bag is given alongside the illustration. Numbers 2 and 3 are likely to be contemporary with the context in which they were found.

A heavily repaired turnshoe (No. 10) with at least three patches repairing the sole, had any reusable leather salvaged before being thrown away, with the result that only the lasting margin of the goatskin upper remained. This was found in the Phase 4 silt (1145) on the west pond edge of the chalk and earth dam with a suggested date of ?14th to 15th-century. The sole is of a similar shape to the turnshoe (No. 2) found in a Phase 2 context and the shoe is likely to be of the same date.

The clump sole repair, No. 1, is entirely consistent with its medieval context.

Two layers from the edge of a bottom unit of a shoe (No. 7) were found in the fill (1260) of the channel downstream of the chalk and earth dam. In view of the medieval date suggested for the context, the fragments may come from the middle layers of a multi-layered sandal sole, however, there is little to distinguish them from the bottom unit of a pegged shoe sole of 17th to 19th-century date.

An earlier 19th-century Blucher-style working boot (No. 11) of reversed cow hide, with front-lacing through ten eyelets, which had been cut up to salvage reusable leather before being finally thrown away, was found in post-medieval pond silt, as were a small number of fragmentary welted shoe parts (Nos 12 and 14). A welted insole (No. 15) of a type dating to between the 17th and 19th centuries was found in modern topsoil.

A small quantity of waste leather, none of it independently datable, was also found. Small scraps of primary waste, apparently of unusable bellyskin (Nos 4 and 6), were found in part of the clay dam (1575) and in the fill of spillway 1262, both in medieval phases. A trimming from the edge of a sheepskin (No. 9) was found in the silt on the west pond edge of the chalk and earth dam likely to date to the 14th or 15th century. A piece of secondary waste (No. 13) of sheep/goatskin, discarded following the cutting out of pattern pieces during manufacture, was found in post-medieval pond silt.

Three of the leather items might reflect ecclesiastical and monastic interests in the Wharram area. As suggested above, the small fragment, No. 7, was possibly torn from a sandal sole. Sandals are much less commonly found than

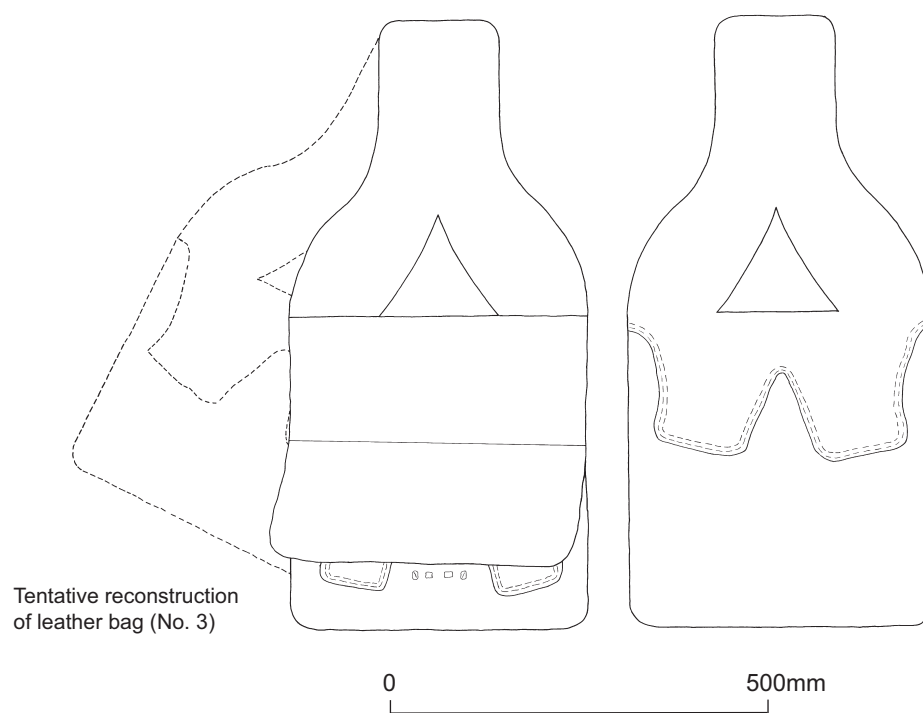
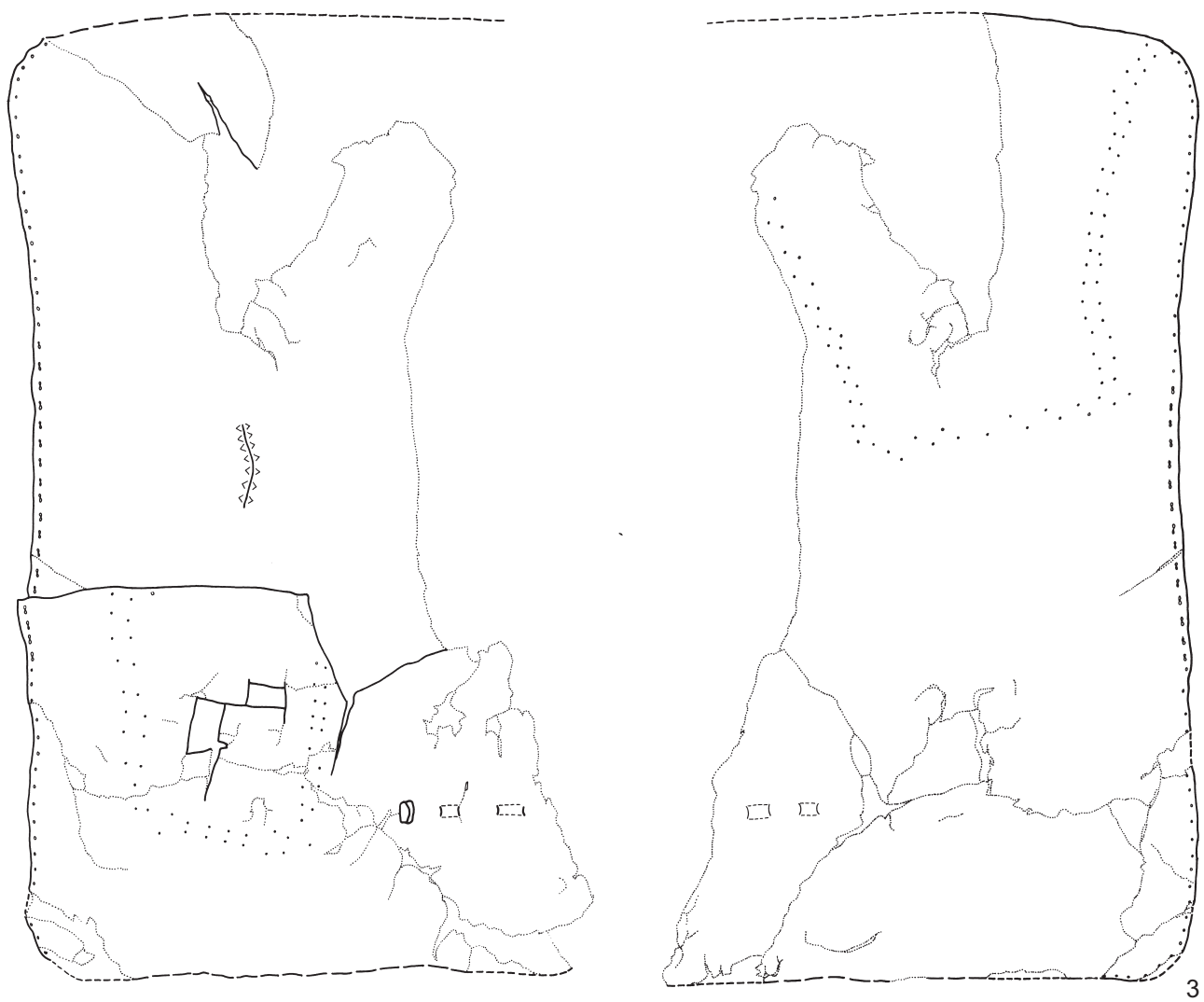
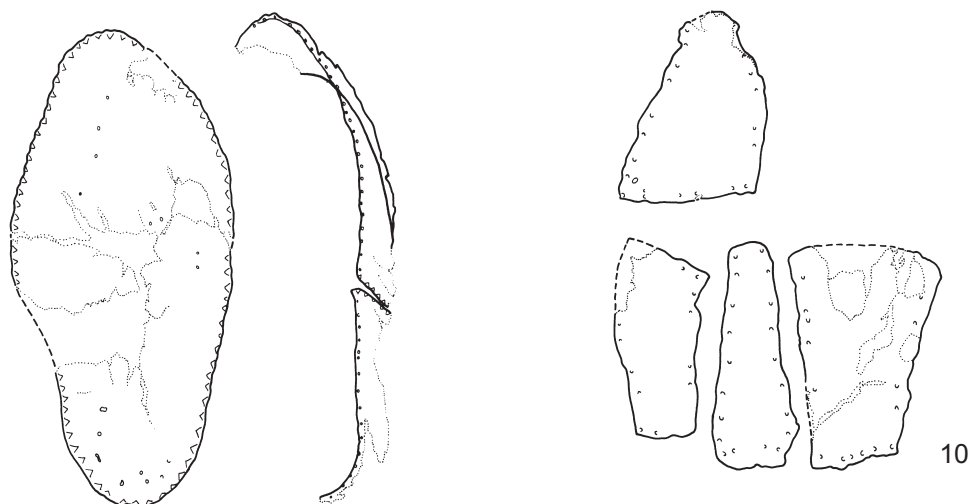
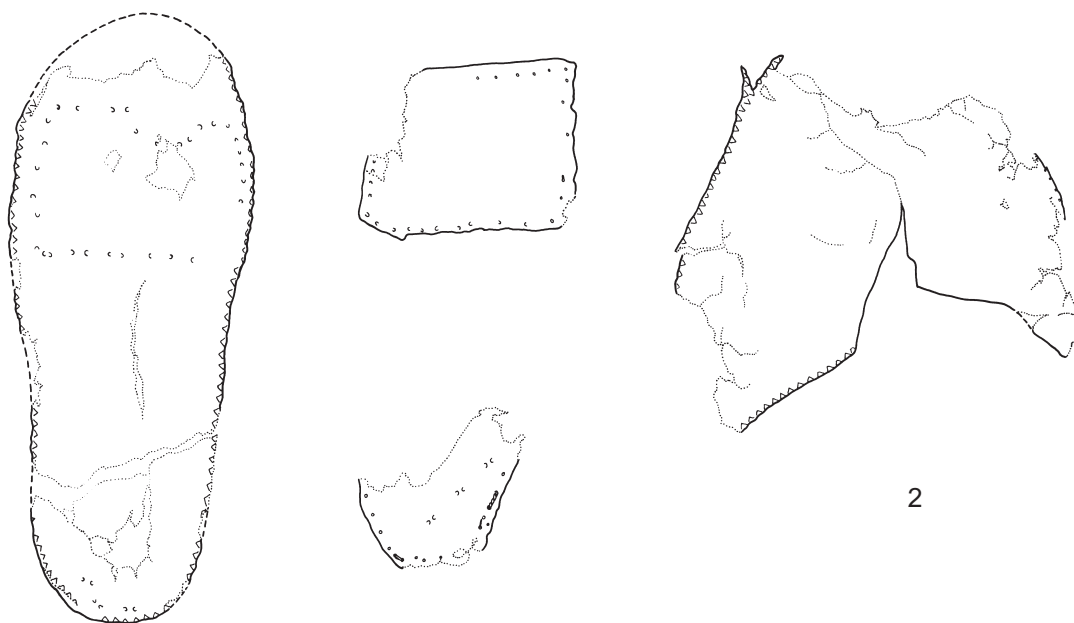


Fig. 62. Leather objects: turnshoes Nos 2 and 10; bag panel No. 3 Scale 1:3; reconstruction of bag, Scale 1:10 (R. Causer)



Key

- grain/flesh stitching
- grain/flesh running stitch
- ::::: grain/flesh stitching from a lapped seam
- ^^^^ edge/flesh stitching
- tunnel stitch
- □ thong slots with thong impression
- folded edge
- reconstructed edge
- torn edge
- original leather edge
- ===== double stitching from a lapped seam on reconstruction

0 100mm

shoes and it has been suggested that they were the favoured footwear of monks and nuns. Leather from monastic sites, however, generally produces 'ordinary' shoes rather than sandals. In addition the small number of scraps of very thin, ?delaminated leather (Nos 4 and 6) have been interpreted as bellyskin; however, there is no grain pattern visible and they may be from split skins. In one case one side was noticeably shiny and it is possible that the fragments are waste from the preparation of parchment.

Medieval

- 1 Leather clump sole repair fragment. Rectangular fragment with three edges with paired grain/flesh stitching, stitch length 5-6mm, apparently worn tunnel stitching now visible on the delaminated grain side. The forth edge is torn. Leather heavily worn, no grain pattern visible, probably delaminated clump sole repair. L. 94mm, w. 24mm. *30/1054; SF 41; Phase 2.2*
- 2* Leather turnshoe for left foot. Turnshoe sole toe torn away, and torn across the upper seat. Wide tread, no waist, tapering to a medium seat. Worn through at great toe joint and centre of seat. Edge/flesh seam, stitch length 5mm. Sole delaminated but worn tunnel stitching at tread and seat from the attachment of clump repairs. A delaminated rectangular repair patch for the tread 84 x 66mm, and remains of a seat clump repair 73 x 56mm are present. Vamp area of upper, torn into two pieces, with length of lasting margin, stitch length 4mm, part of a curving butted edge/flesh seam, stitch length 3mm, and a central, vertical opening slit at centre front. A strap-like piece with cut edges probably cut from the rest of the upper. Other small fragments of upper including five lasting margin fragments. Leather worn sheep/goatskin. Sole l. 221mm, w. tread 95mm, waist area 73mm, seat 65mm. Adult size 1 (Adult 3-4 with 10% allowance for shrinkage). *30/1473; SF113; Phase 2.1*
- 3* Leather fragmentary bag panel. Part of left side of back panel of a large bag, the rest torn away. Bottom section folded upward and joined at the side with a closed grain/flesh seam, stitch length 8mm, to form a pocket 170mm deep. Top edge of the pocket has a straight edge/flesh butted seam, stitch length 4-5mm, dropping into a 'dog-leg' seam close to the broken right side. A line of paired grain/flesh stitches mark the position where a rectangular-shaped piece was sewn to the front panel of the pocket on the grain side either as a repair patch to cover two rectangular holes that have been cut from this area or possibly a separate drawstring purse. To the right of this is a short length of horizontal running thong with a rolled toggle at the end that holds the two sides of the panel together. The opposite end of the panel appears to have been similarly folded over and joined with a corresponding closed grain/flesh seam. A line of paired grain/flesh stitching is present on the grain side (hardly visible on the flesh side) on the back of the second fold from the attachment of either a shaped repair patch to cover the existing torn area or a shaped strap. The central area of the panel is flat and shows no signs of having been folded. The seam in this central area is un-moulded suggesting that the bag was lined with either tawed leather or textile that has not survived. A small central 'defleshing' cut has been repaired on the flesh side with an edge/flesh seam. A second length of seam at the torn end appears to be mending a second cut. Leather worn bovine, probably calfskin. Total l. 665mm, w. 248mm, folded l. 406mm. *30/1473, SF114; Phase 2.1*
- 4 Leather primary waste, eight fragments with no distinguishing features and all edges torn. No grain pattern present, probably bellyskin. *30/1575; SF329; Phase 2.1*
- 5 Leather waste fragment with one cut edge, the others are torn. The leather is worn and compacted with no grain pattern visible suggesting it was cut from a shoe sole. L. 58mm, w. 29mm. *30/1621; SF126; Phase 2.1*

- 6 Leather primary waste. Two small fragments of very thin, ?delaminated leather with torn edges and two small man-made holes visible in each. Leather has no grain pattern visible, one surface is shiny. Possibly a split skin or unusable bellyskin. *30/1262; SF 328; Phase 3*
- 7 Leather layered shoe sole fragment. Two layers, one fitting on top of the other, from the edge of a sole bottom unit. Three irregular lines of grain/flesh holes roughly follow the curved edge and a line of tunnel stitching runs along the edge itself. No thread impressions visible between the grain/flesh holes. Three small holes are present along the inner edge. Either the area of strap attachment from the middle layers of a multi-layered sandal sole or a fragment from a 17th to 19th-century pegged sole. Leather worn, compacted and thick with no grain pattern visible, probably cattle hide. L. 92mm, w. 46mm. *30/1260; SF75, SF76; Phase 3*
- 8 Leather stitched fragment. Fragment with a cut edge with a line of small grain/flesh stitches, stitch length 5mm, possibly from running stitch, other edges are torn. No distinguishing features. Leather worn, no grain pattern visible. L. 40mm, w. 36mm. *71/12; SF 5; Phase 3*
- 9 Leather primary waste, hide edge trimming. Leather sheep/goatskin, probably sheepskin. L. 102mm, w. 23mm. *30/1145; SF 77; Phase 4.1*
- 10* Leather turnshoe for the left foot, upper cut to salvage reusable leather. The greater part of turnshoe sole torn into three pieces. Oval toe, medium tread, no waist, tapering to the medium seat. Worn through at toe and great toe joint, central area missing on left side. Edge/flesh seam stitch length 4.5mm. Sole delaminated but worn tunnel stitching from irregular-shaped repair patches visible. A triangular patch is present at the forepart, l. 77mm, w. 52mm, and two rectangular patches, 90 x 33mm, 76 x 39mm, at the seat and waist area, all with tunnel stitching around the edges. A fourth rectangular patch c. 75 x 35mm, delaminated and distorted, is also likely to come from the sole. The lasting margin, stitch length 4mm, of the right side of the vamp is present with a backward sloping, butted edge/flesh side seam stitch length 3mm, the rest of the vamp area has been cut away. Short area of matching seam and lasting margin of quarters area present on right side along with other areas of lasting margin and fragments of upper. Upper leather sheep/goatskin, probably goatskin. Sole l. approx. 191mm, w. tread 85mm, seat 55mm. Child size 10-11 (Child size 13 with a 10% allowance for shrinkage). Also two small fragments of rand, width 9mm with stitch length 8mm, unlikely to belong with this shoe. *30/1145; SF 79; Phase 4.1*

Post-medieval

- 11 Leather upper sections and part of welt of an ankle boot; reversed cow hide, grain inwards, Blucher pattern, ten-eyelet, welted construction. Vamp fragmentary; the central portion has been cut away presumably to use for some other purpose. The wings and throat have a double row of stitch holes where the tongue was attached, Stitch length 2.5-3mm and the rows 9mm apart. The lasting margin has stitch holes 8-9mm apart and is markedly pleated at the toe. The leg is almost complete, one-piece pattern, except at the top where a piece has broken off one side (left) and the other side has deteriorated. There are ten lace-holes (no eyelets or binding) down each tab and behind these is a row of stitching holes c. 3mm apart, presumably where the inside facing was attached. The sloping front edge has the two parallel rows of stitches corresponding with those in the vamp where it was underlaid. Some thread remains. The lasting margin has the large welt seam holes, c. 9-10mm apart. Both vamp and leg are of reversed cow hide and very thick (c. 3-4mm) the vamp being slightly thicker than the leg. Height of back 185mm.

There are also two fragments of welt curved to follow the contour of the shoe bottom but it is not clear where exactly they came from. One is 150mm long and the other 190mm, both are 10mm wide and 6mm thick. Both carry two sets of stitch holes:

- a) the welt seam c. 8-9mm stitch length corresponding to those in the lasting margin described above;
- b) the sole seam c.4.5mm stitch length with the holes set with diagonal axes (normal when the thread is thick and the holes close together).

A rectangular fragment 73mm x 40mm has many scattered holes that may indicate that it was part of the sole or a repair. One edge is curved, possibly the edge of the sole.

The general shape, pattern and heavy character suggest a date in the 19th century prior to 1850, possibly a work boot or a military boot. The reversed cow hide upper is also typical.
30/604; SF322; Phase 5

12 Leather shoe upper fragments.

- a) two joining fragments with lasting margin stitch length 4mm and two cut edges, the remainder are torn. Cut to salvage reusable leather. Leather worn, no grain pattern visible. L. 85mm, w. 80mm
- b) delaminated upper fragment with remains of a butted edge/flesh seam, other edges torn. Leather worn sheep/goatskin. L. 55mm, w. 28mm

- c) seven small scrap fragments with all edges torn, torn from the fragments above.
30/611; SF324; Phase 5

13 Leather secondary waste, offcut with irregular cut edges. Leather worn sheep/goatskin. L. 52mm, w. 32mm. *30/611; SF 325; Phase 5*

14 Leather shoe ?insole fragment. Four joining fragments with the worn remains of a butted edge/flesh seam, stitch length 4mm, and a single, secondary cut edge, all other edges torn. Leather cattle hide. L.105mm, w. 88mm. *30/611; SF 326; Phase 5*

15 Leather welted shoe insole, made straight, worn through at tread, left side of seat broken away. Worn toe, medium tread, waist and seat. Tunnel-stitched sole seam in a raised rib around the edge changing to an edge/flesh seam around the seat, stitch length 5.5mm. Line of worn round peg holes across the waist from the attachment of a heel. Scatter of small holes across tread from attachment to last during manufacture. Worn grain upward to the foot, scored lines from de-fleshing present on flesh side. 17th to 19th-century construction. Leather worn, poor condition probably cattlehide. L. 212mm, w. tread 80mm, waist 48mm, seat 56mm. *30/1250 (topsoil); SF 327*

Part Five

The Environmental Evidence

edited by W.J. Carruthers

20 Introduction

During the excavations on Site 30, samples were taken from two main areas of interest (see Figs 63-4). The samples for each specialist, however, were taken and recorded during different seasons, resulting in up to four different identification conventions for samples taken from each context. Therefore, for ease of reference, a concordance table has been compiled (see below, Table 13).

In addition to these two main column areas, various other samples were taken. Although they can be

referenced to individual contexts, they remain unidentified in the drawn record. These samples relate to Section 1 and 2 of Bush's Palynological report and Column 1 of Girling and Robinson's Insect Assemblage report and are identified as 'Unlocated' in the concordance table.

Samples for Site 71 were only taken for the Plant Macrofossil remains. Therefore, there is no confusion over identification conventions and no concordance is necessary. As the samples were targeted as required, their precise locations are unrecorded in plan or section.

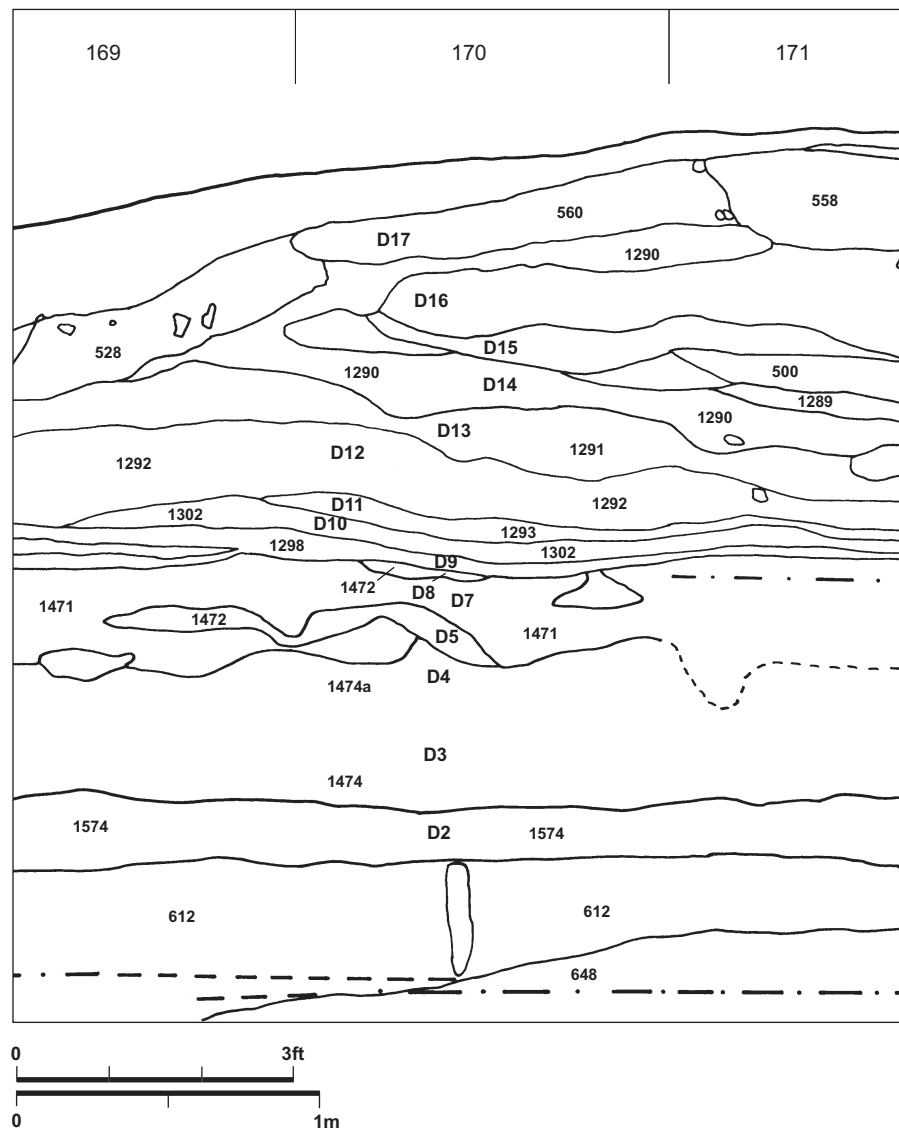


Fig. 63. Approximate position of samples taken through PP/QQ 170: Section 21 (Fig. 15). (E. Marlow-Mann)

Table 13. Site 30 sample concordance.

| Context no. | Bush Section 1 *1 | Bush Section 2 *1 | Bush Section 2 *1 | Hillman Sample A *2 | Hillman Sample B *2 | Girling SW Sample *3 | Girling Column 1 *3 | Girling Column 2 *3 | Fig. No. |
|-------------|----------------------|----------------------|----------------------|------------------------|------------------------|-------------------------|------------------------|------------------------|-------------|
| 560 | | | | D17 | | | | | Fig. 63 |
| 1290 | | | | D14 | | | | | Fig. 63 |
| 1291 | | | | D13 | | SW79 | | | Fig. 63 |
| 1292 | | | | D12 | | SW78 | | | Fig. 63 |
| 1293 | | | | D11 | | SW77 | | | Fig. 63 |
| 1298 | | | | | D9 | SW74 | | | Fig. 63 |
| 1302 | | | | D10 | | SW76 | | | Fig. 63 |
| 1471 | | | | D7 | | | | 1471 S5 | Fig. 63 |
| 1472 | | 1472 | | D5 | | | | | Fig. 63 |
| 1472 | | 1472 | | D6 | | | | | Fig. 63 |
| 1472 | | 1472 | | D8 | | | | 1472 S6 | Fig. 63 |
| 1474 | | 1474 | | D3 | | SW72 | | 1474 S2 | Fig. 63 |
| 1474 | | 1474 | | D4 | | SW73 | | 1473 S4 | Fig. 63 |
| 1474 | | 1474 | | D4 | | SW73 | | 1473 S3 | Fig. 63 |
| 1574 | | | | D2 | | | | | Fig. 63 |
| | | | | D15 | | | | | Fig. 63 |
| | | | | D16 | | | | | Fig. 63 |
| 522 | | | | | D29 | | | | Fig. 63 |
| 644 | | | | | D24 | | | | Fig. 63 |
| 645 | | | | | D22 | | | | Fig. 63 |
| 645 | | | | | D23 | | | | Fig. 63 |
| 646 | | | | | D20 | | | | Fig. 63 |
| 647 | | | | | D21 | | | | Fig. 63 |
| 1278 | | | | | D25 | | | | Fig. 63 |
| 1278 | | | | | D26 | | | | Fig. 63 |
| 1278 | | | | | D27 | | | | Fig. 63 |
| 1278 | | | | | D28 | | | | Fig. 63 |
| | | | | | D18 | | | | Fig. 63 |
| 1278 | | | 1278 | | | | | | Fig. 63 |
| 1291 | 1291 | | | | | | | | Fig. 63 |
| 1335 | | | 1335 | | | | | | Unallocated |
| 1337 | | | 1337 | | | | | | Unallocated |
| 1338 | | | 1338 | | | | | | Unallocated |
| 1341 | | | 1341 | | | | | | Unallocated |
| 1343 | | | 1343 | | | | | | Unallocated |
| 1344 | | | 1344 | | | | | | Unallocated |
| 1345 | | | 1345 | | | | | | Unallocated |
| 1461 | 1461 | | | | | | 1461 | | Unallocated |
| 1463 | 1463 | | | | | | | | Unallocated |
| 1464 | 1464 | | | | | | 1464 | | Unallocated |
| 1465 | 1465 | | | | | | 1465 | | Unallocated |
| 1466 | 1466 | | | | | | | | Unallocated |
| 1467 | 1467 | | | | | | 1467 | | Unallocated |
| 1468 | 1468 | | | | | | | | Unallocated |
| 1469 | 1469 | | | | | | | | Unallocated |
| 1491 | | | 1491 | | | | | | Unallocated |
| 1294 | | | | | | SW75 | | | Unallocated |

Notes

*1 See Ch. 24

*2 See Ch. 25

*3 See Ch. 28

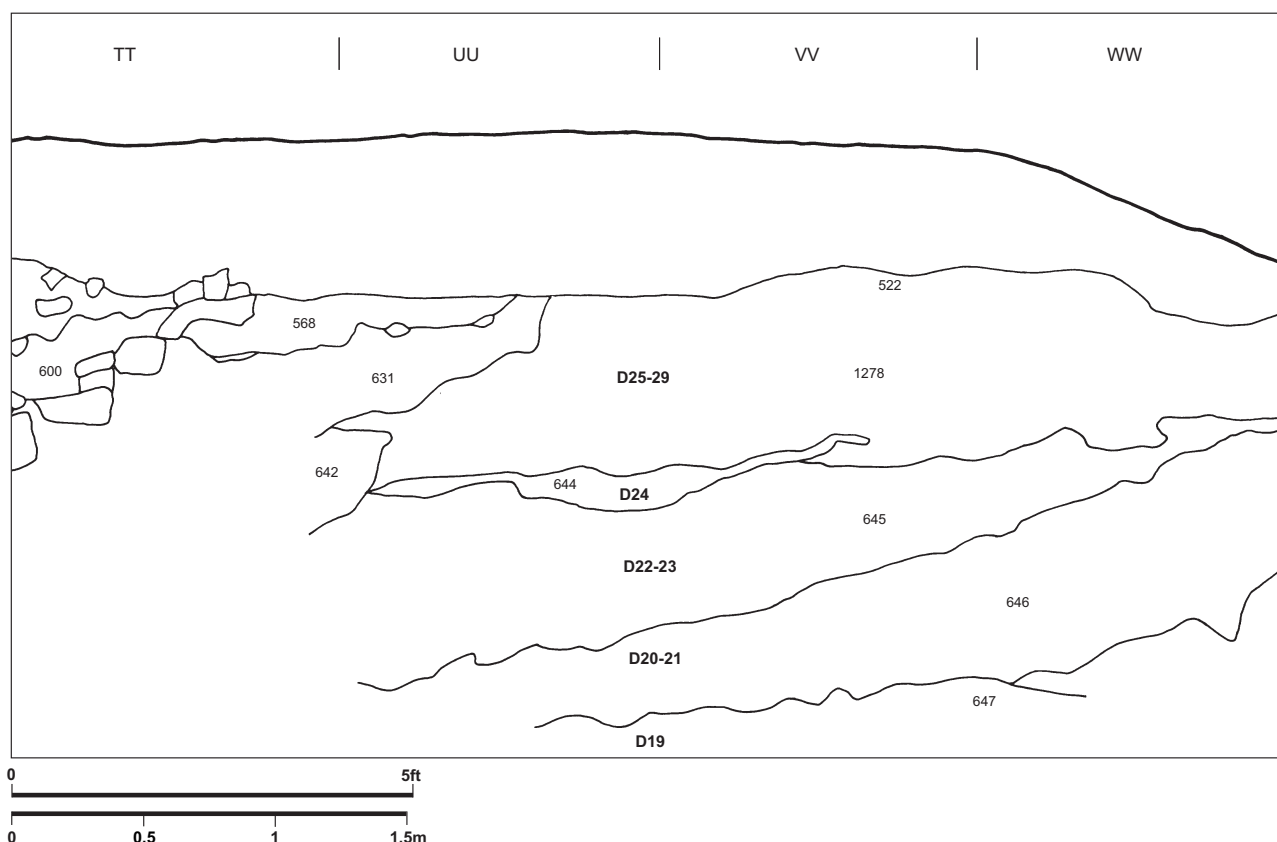


Fig. 64. Approximate position of samples taken through UU/VV 170/171: Section 24 (Fig. 16). (E. Marlow-Mann)

21 The Animal Remains

by J. Richardson

Introduction

The faunal assemblages from Sites 30, 67 and 71 date from the earlier medieval to post-medieval periods. These sites are compared to each other (in order to assess variations in bone disposal) and phase data are used whenever possible to consider changes in husbandry practices over time. Other animal bones of similar date have already been published from Wharram Percy including those from the South and North Manor Areas (Pinter-Bellows 2000; Richardson 2004). A note on the animal bone from Sites 9 and 12, the main peasant toft excavations, was published in *Wharram I*, based on Ryder 1974, and the dispersed pattern of this faunal material was discussed in *Wharram VI* (32, fig. 23). The opportunity has been taken in this volume, the last on major medieval remains in this series, to include these assemblages in full in Appendix 1, in order to contrast the material from the sites under discussion here with that from the peasant farmsteads. Similarly, the fish bones from the peasant tofts have been examined with those from the sites in this volume (Ch. 24). Collectively, these assemblages are used to analyse intra-site variation in the treatment and disposal of animal bones, to understand the ways in which the surrounding habitats were utilised and to consider changes in animal husbandry regimes over the medieval period.

Methodology

A total of 6636 bone fragments was recovered from deposits associated with Sites 30, 67 and 71, of which 40% were identified to species or a lower-order group. This compares to the identification of only 28% of bone fragments from the North Manor Area (Richardson 2004) and suggests that the bones from the Pond and Dam sites were less fragmented and better preserved. Extremely difficult excavation conditions (wet/sticky soil) in this southern area, however, probably resulted in the recovery of a greater proportion of larger and hence more readily identifiable fragments. Of the 40% identified, 16% were assigned to the earlier medieval period (11th to 13th centuries), 63% to the high and later medieval periods (late 13th to 16th centuries), 11% to the post-medieval period (up to the 20th century) and 10% from unstratified or topsoil deposits.

Bones were identified to species wherever possible, although lower-order categories were also used (e.g. sheep/goat, large-size mammal). The criteria of Boessneck (1969) and Payne (1969; 1985) were used to facilitate the separation of sheep and goat bones, but as only one goat bone was identified (compared to 145 sheep bones), sheep/goat bones are assumed to be of sheep. It is also difficult to separate the bones of the closely related domestic fowl (*Gallus gallus*) and pheasant (*Phasianus colchicus*) and they tended to be separated (subjectively) on size. This suggested that domestic fowl was exclusive and, reassuringly, this was

confirmed by the absence of any air-sac foramen on proximal femurs.

Recording was limited to diagnostic element zones, which by definition are easily identifiable and non-reproducible. This eliminated the possibility of recording an anatomical zone more than once. Only zones exceeding 50% were normally recorded, although exceptional cases (butchered, pathological and foetal/neonatal fragments) were included (as less than 50% complete). Definitions of the zones, as well as details of the Access bone databases used to facilitate analysis, are held with the Archive.

For age-at-death data, epiphyseal fusion (after Silver 1969) and the eruption and wear of deciduous and permanent cheek teeth were considered. Dental eruption and wear for cattle, sheep and pig were recorded using the letter codes of Grant (1982) and age stages were calculated using Halstead (1985) for cattle and Payne (1973) for sheep. A similar wear progression was assumed for pig, and approximate ages have been assigned to the wear stages exhibited by horse incisors. The sexing of the cattle and sheep populations was achieved with reference to the sexually dimorphic distinctions of the pelvis (after Prummel and Frisch 1986, 575), and the sexually dimorphic tusks of pigs were noted.

Bone condition, erosion, fragment size and fresh breaks were recorded in order to assess bone preservation, while gnawing, burning and butchery marks were noted to determine bone treatment. Butchery was routinely differentiated into chop and cut (knife) marks and the position and direction of these marks were recorded using Binford-type codes (Binford 1981).

Finally, pathological bones were described and biometrical data were recorded following the standards given by von den Driesch (1976) and Boessneck (1969). Only summaries of some of these data are produced here, but the complete data sets are stored with the Archive.

Taphonomic bias

In order to assess the usefulness of a bone assemblage for the reconstruction of animal husbandry practices, relevant taphonomic processes need to be considered. By assessing the effects of potential biases (e.g. methods of butchery and food preparation, disposal practices, the burial environment and excavation strategies), the appropriateness of the recovered assemblage as a reflection, not only of the death assemblage, but also of the living population, can be realised.

Bone recovery

Recovery of bone fragments is influenced most greatly by the methods of excavation. In particular, hand-excavated deposits will bias against the smaller bones of the smaller species most severely, while the sieving of deposits reduces this effect (Payne 1992, 1). Unfortunately, screening was not systematic during the excavations of these sites and it is likely that the assemblage is biased in

favour of the larger bones and hence the larger species. This bias may have been exacerbated further, as retrieval was probably prejudiced by a wet/sticky soil matrix in this area.

Formation processes

To determine how deposits were formed, bone preservation, weathering and gnawing were assessed and articulated bones were noted. Articulated parts tend to signify primary deposits, although well-preserved bones of a particular type (e.g. foot bones) may indicate the rapid disposal of bones from a specific activity such as primary carcass processing. Four groups of articulated bones were identified: a near complete cattle skeleton from Site 67 and two dogs and a cat from Site 30. In the absence of any butchery marks on the cattle skeleton, this animal may have died of disease, although none of the pathologies recorded - exostoses to a navicular cuboid, a pitted lesion within a glenoid cavity and a possible rib fracture - were life threatening.

In contrast to these primary deposits, bones that may have been middened prior to burial will tend to be less well preserved than those that have been buried more quickly. This is probably reflected in the lower size and erosion indices and the higher incidence of gnawed bones from Sites 30 and 71, when compared to Site 67 where the cattle skeleton makes up 92% of the total assemblage (Table 14). The percentage of loose teeth, another indication of the level of bone fragmentation, is also lowest from Site 67. The bones from 'secondary' deposits that dominate Sites 30 and 71 were presumably exposed to the effects of trampling, weathering and gnawing for longer than those of the articulated skeleton from Site 67. The percentage of gnawed bones from Sites 30 and 71 (8% and 3% respectively), however, is lower than that from the North Manor Area (Richardson 2004) and Site 39 (Pinter-Bellows 1992, 79). This suggests that the bones from the Pond and Dam sites (in particular those from Site 71) were buried quite rapidly.

Table 14. Bone preservation and treatment by site.

| | Site 30 | Site 67 | Site 71 |
|-----------------|---------|---------|---------|
| Size index | 0.26 | 0.39 | 0.25 |
| Condition index | 0.91 | 0.98 | 0.97 |
| Erosion index | 0.85 | 1 | 0.95 |
| % butchered | 1.50% | - | 5.10% |
| % gnawed | 8.10% | 1.60% | 2.70% |
| % burnt | 0.30% | - | 7.10% |
| % fresh break | 18.70% | 53.50% | 16.30% |
| % loose teeth | 28.60% | 8.70% | 11.80% |

For the size, condition and erosion index, values closer to 1.0 indicate more complete or better preserved bones

Table 15. The proportion of butchered bones by site for all species and knife and chop marks for cattle, sheep, pig and horse.

| | Site 30 | Site 71 |
|---------------------|---------|---------|
| Butchery marks % | | |
| Cattle | 3.4 | 11.9 |
| Sheep | 0.8 | 2.8 |
| Pig | 1.3 | 6.5 |
| Horse | 0.7 | |
| Fallow deer | | 100.0 |
| Domestic fowl | | 11.1 |
| Domestic goose | | 16.7 |
| Wild/domestic goose | | 5.6 |
| Large-size mammal | 5.4 | 32.0 |
| Medium-size mammal | | 24.0 |
| Small-size mammal | | 18.8 |
| Knife marks % | | |
| Cattle | 0.3 | 4.0 |
| Sheep | | 2.5 |
| Pig | | 2.4 |
| Horse | 0.2 | |
| Chop marks % | | |
| Cattle | 3.1 | 7.9 |
| Sheep | 0.8 | 0.3 |
| Pig | 1.3 | 4.1 |
| Horse | 0.5 | |

Bones with both cut and chop marks are counted twice

Pre-burial processes

The butchery and burning of bones prior to their discard can cause further bone loss. The higher proportion of butchered cattle bones and the relatively high incidence of chop marks when compared to sheep and pig bones (Table 15), reflects the more rigorous dismembering required of this larger species. This may have implications in terms of bone loss, particularly if cattle bones were targeted (and consequently broken up) for their marrow reserves. Comparing the proportion of butchered bones by site indicates that the bones deposited in Site 71 were more likely to be butchered than those from Site 30 (Tables 14 and 15). This may have implications for the preservation of bones at the former, although it may also reflect the greater visibility of butchery marks on the less eroded bones from Site 71 when compared to those from Site 30 (Table 14). Similarly, the proportion of burnt bones was much higher from Site 71 and this may also have affected bone survival (Table 14).

Conclusions

The levels of fragmentation and gnawing suggest that many bones from Site 30 (with the exception of three partial skeletons) and some of the bones from Site 71 were middened prior to final discard. Such exposure to

the effects of weathering and trampling will have biased against the most fragile bones (often those of the younger animals). In contrast, the assemblage from Site 67 consisted almost exclusively of a cattle skeleton that was buried fairly rapidly after death and avoided such damage. Probably the most significant bias, however, resulted from the methods of retrieval. Without systematic sieving and given the wet/sticky nature of the soil matrix, many of the smaller bones will have been missed and this will have affected the smaller species most severely. Finally, it should be realised that the bones recovered from the excavated areas may represent only a fraction of the food/industrial waste created by the medieval and post-medieval inhabitants. Many bones, along with other household rubbish, would have been used to manure the arable fields surrounding the settlement (*Wharram V*, 192).

Animal husbandry

Animal husbandry practices have been analysed using species proportions, age, sex, metrical and pathological data. Animal populations raised specifically for meat, milk or fleeces tend to produce distinctive slaughter patterns, while the absence of age groups may indicate the export of livestock for trade or taxation purposes. Pathological incidence has been used to assess animal welfare or identify working animals, while improvements in diet or the introduction of new breeding stock have been considered through the use of metrical data.

Species proportions

The proportions of species reveal a prevalence of domestic animals and a scarcity of wild mammals and birds regardless of site or phase (Table 16). This has already been noted from other bone assemblages from Wharram Percy (Richardson 2004; Appendix 1) and suggests that the domestic animals were sufficiently productive to meet the inhabitants' needs. Social restrictions on hunting also existed, however, and certainly the hunting of deer remained the preserve of the nobility during the medieval period (MacGregor 1989, 108). Nevertheless, unlike the deer remains from the North Manor Area which were exclusively antler fragments, the five deer bones from the Pond and Dam sites came from the lower legs of red, fallow and roe deer and suggest some limited availability of venison. A similar concentration of lower limb bones from fallow and roe deer was noted from Site 9 (Appendix 1).

Comparing the relative proportions of the main domestic animals by site and phase (Table 16, Fig. 65) indicates that the proportion of cattle was higher from earlier medieval deposits than from later medieval material. The proportion of sheep bones was also relatively high during the earlier period, although sheep bones were most commonly recovered from medieval Site 71. From this site, pig bones were almost as commonly identified as cattle bones. Most striking, however, was the number of horse bones associated with

Table 16. Fragment count by site and phase.

| | Earlier medieval (Phases 1-3) Sites 30 and 71 | Later medieval Site 30 | Later medieval Site 71 | Post-medieval Site 30 | Post-medieval Site 67 | Post-medieval Site 71 | Unstratified Site 30 | Unstratified Site 71 |
|--------------------------|--|------------------------|------------------------|-----------------------|-----------------------|-----------------------|----------------------|----------------------|
| Cattle | 101 | 156 | 130 | 54 | 118 | 2 | 28 | |
| Sheep | 29 | 27 | 69 | 6 | | 2 | 10 | 2 |
| Goat | | | 1 | | | | | |
| Sheep/goat | 118 | 124 | 222 | 23 | 1 | 5 | 67 | 7 |
| Pig | 50 | 21 | 112 | 6 | | 1 | 6 | 2 |
| Horse | 72 | 407 | 45 | 37 | 4 | 3 | 76 | |
| Dog | 23 | 52 | 4 | 6 | 1 | 1 | 8 | |
| Cat | 1 | 11 | 1 | | | | | |
| Red deer | | 1 | 1 | | | | | |
| Fallow deer | | | 2 | | | | | |
| Roe deer | | | 1 | | | | | |
| Hare | | 4 | 6 | | | | | |
| Rabbit | | 2 | 15 | 1 | | 5 | 11 | 6 |
| Badger | | | | | | | 2 | |
| Fox | 1 | | | 1 | | | | |
| Polecat | | 1 | | | | | | |
| Dog/fox | | 2 | | | | | | |
| Hedgehog | | | 1 | | | | | |
| Water vole | | 1 | | | | | | |
| Microfauna | | 1 | 1 | | | | | |
| Domestic fowl | 4 | 3 | 16 | | | | | |
| Domestic fowl/pheasant | 1 | 1 | 5 | | | 1 | | |
| Galliforme | | | 1 | | | | | |
| Domestic goose | 1 | 2 | 16 | | | | | 2 |
| Wild/domestic goose | 1 | 1 | 18 | | | | 1 | |
| Raven | | | 1 | | | | | |
| Crow/rook | | 2 | | | | | | |
| Woodcock | | | 1 | | | | | |
| Wood pigeon | | | 1 | | | | | |
| Columba sp. | 1 | | 8 | | | | | |
| cf. Song thrush/red wing | | | 1 | | | | | |
| Golden plover | | | 2 | | | | | |
| Bird spp. | | | 18 | | | | | 1 |
| Large-size mammal | 22 | 48 | 22 | 10 | 2 | | 14 | 1 |
| Medium-size mammal | 2 | 7 | 23 | | | | | 1 |
| Small-size mammal | 4 | 15 | 47 | 3 | | | 1 | 1 |
| Total | 431 | 889 | 791 | 147 | 126 | 20 | 224 | 23 |

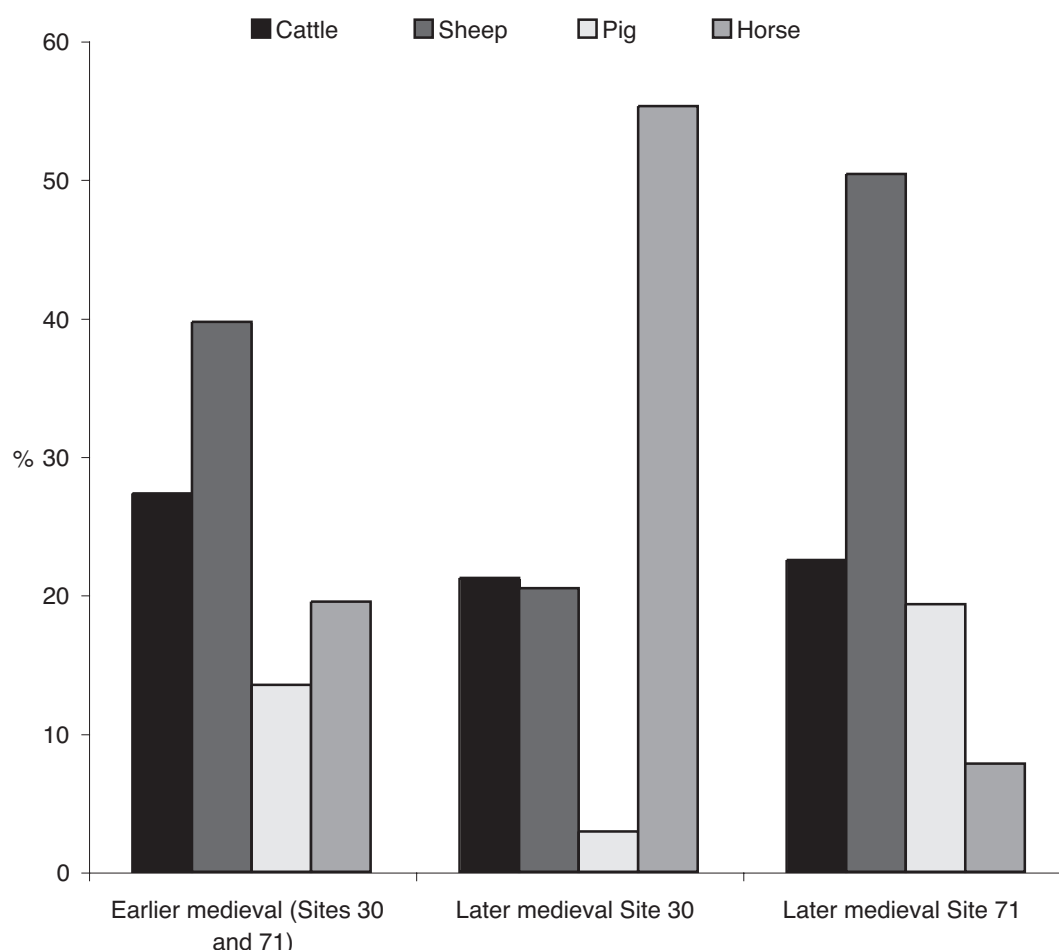


Fig. 65. The relative proportions of the main domestic animals by site and phase. (J. Richardson)

the medieval occupation of Site 30. These were scattered over many deposits, although a concentration was identified from cobbled surface 1164, from which a large deposit of horseshoes was also noted (p. 58). While the variations may be associated with differences in the activities/disposal practices in the two areas, the taphonomic biases noted above may also be significant. The lower incidence of sheep and pig bones from medieval Site 30 may be a reflection of the more extensive fragmentation, erosion and gnawing at this site and an associated bias against the smaller bones of the smaller species. Nevertheless, regardless of phase, a diet of beef, lamb/mutton and pork is indicated. Taphonomic processes alone, however, cannot explain the dominance of horse bones from Site 30. Their dominance suggests that horse carcasses may have been routinely disposed of in this area. As all body parts were present, entire horses were apparently deposited here, but as very few bones were butchered (Table 15), their carcasses were not regularly processed for meat and in the absence of the marks indicative of skinning, their hides were probably not used either.

A comparison of medieval faunal data from the North Manor Area (Richardson 2004), South Manor Area (Pinter-Bellows 2000) and Sites 9 and 12 (Appendix 1) to the proportions of the three main 'meat' animals from medieval Sites 30 and 71 has been made (Fig. 66). This

indicates that sheep bones were predominant at Site 12, cattle bones were commonly recorded from later medieval deposits at Site 30, while later medieval Site 71 revealed more than twice the proportion of pig bones compared to the North Manor Area. It is unlikely that these differences represent variations in animal husbandry practices between the areas, as pasture should have been readily available (on the stubble fields as well as the valley slopes) and herds may even have been managed on a village-wide basis. Instead, the diets of different households may have varied (either through choice or financial limitations) or activities involving slaughter, carcass processing and/or bone disposal may have been spatially distinct. Despite these fluctuations, however, sheep bones were predominant in all the assemblages (with the exception of later medieval Site 30) and this reflects the importance of sheep rearing on the free-draining soils of the Wolds. In addition, the relatively high proportion of cattle bones indicates that higher quality pasture and a plentiful supply of water must have been available also.

Age and sex data for cattle, sheep, pigs and horses

In order to assess husbandry practices and in particular the targeting of secondary products, age and sex data have been used to consider the slaughter patterns of cattle, sheep, pigs and horses. Unfortunately, these data were too

Table 17. Fusion data for cattle by site (zone > 0, F = fused, NF = not fused).

| | Earlier Medieval (Phase 1-3) | | | Later Medieval (Phase 4-5) | | | Medieval (Phase 1-5) | | |
|--------------|------------------------------|----|----|----------------------------|----|-----|----------------------|----|----|
| | F | NF | %F | F | NF | %F | F | NF | %F |
| 7-18 months | 10 | 1 | 91 | 25 | 0 | 100 | 35 | 1 | 97 |
| 24-36 months | 8 | 2 | 80 | 29 | 2 | 94 | 37 | 4 | 90 |
| 36-48 months | 5 | 1 | 83 | 6 | 1 | 86 | 11 | 2 | 85 |

7-18 months calculated from distal scapula, distal humerus, proximal radius, first phalanx, second phalanx

24-36 months calculated from distal metacarpal, distal tibia, distal metatarsal

26-48 months calculated from proximal humerus, proximal ulna, distal radius, proximal femur, distal femur, proximal tibia, calcaneus

Table 18. Fusion data for sheep by site (zone > 0, F = fused, NF = not fused).

| | Earlier Medieval (Phase 1-3) | | | Later Medieval (Phase 4-5) | | | Medieval (Phase 1-5) | | |
|--------------|------------------------------|----|-----|----------------------------|----|-----|----------------------|----|-----|
| | F | NF | %F | F | NF | %F | F | NF | %F |
| 6-16 months | 17 | 0 | 100 | 37 | 0 | 100 | 54 | 0 | 100 |
| 18-28 months | 15 | 7 | 68 | 48 | 4 | 92 | 63 | 11 | 85 |
| 30-42 months | 4 | 4 | 50 | 18 | 4 | 82 | 22 | 8 | 73 |

6-16 months calculated from distal scapula, distal humerus, proximal radius, first phalanx, second phalanx

18-28 months calculated from distal metacarpal, distal tibia, distal metatarsal

30-42 months calculated from proximal humerus, proximal ulna, distal radius, proximal femur, distal femur, proximal tibia, calcaneus

Table 19. Fusion data for pig by site (zone > 0, F = fused, NF = not fused).

| | Earlier Medieval (Phase 1-3) | | | Later Medieval (Phase 4-5) | | | Medieval (Phase 1-5) | | |
|--------------|------------------------------|----|----|----------------------------|----|----|----------------------|----|----|
| | F | NF | %F | F | NF | %F | F | NF | %F |
| 12 months | 0 | 0 | | 12 | 2 | 86 | 12 | 2 | 86 |
| 24-30 months | 1 | 5 | 17 | 5 | 21 | 19 | 6 | 26 | 19 |
| 36-42 months | 0 | 2 | 0 | 0 | 4 | 0 | 0 | 6 | 0 |

12 months calculated from distal scapula, distal humerus, proximal radius, second phalanx

24-30 months calculated from distal metacarpal, distal tibia, calcaneus, distal metatarsal, first phalanx

36-42 months calculated from proximal humerus, proximal ulna, distal radius, proximal femur, distal femur, proximal tibia

Table 20. Fusion data for horse by site (zone > 0, F = fused, NF = not fused).

| | Earlier Medieval (Phase 1-3) | | | Later Medieval (Phase 4-5) | | | Medieval (Phase 1-5) | | |
|--------------|------------------------------|----|-----|----------------------------|----|-----|----------------------|----|-----|
| | F | NF | %F | F | NF | %F | F | NF | %F |
| 9-20 months | 15 | 0 | 100 | 65 | 0 | 100 | 80 | 0 | 100 |
| 20-24 months | 6 | 0 | 100 | 20 | 0 | 100 | 26 | 0 | 100 |
| 36-42 months | 12 | 2 | 86 | 29 | 0 | 100 | 41 | 2 | 95 |

9-20 months calculated from distal humerus, proximal radius, distal metacarpal, distal metatarsal, first phalanx, second phalanx

20-24 months calculated from distal scapula, distal tibia

36-42 months calculated from proximal humerus, proximal ulna, distal radius, proximal femur, distal femur, proximal tibia, calcaneus

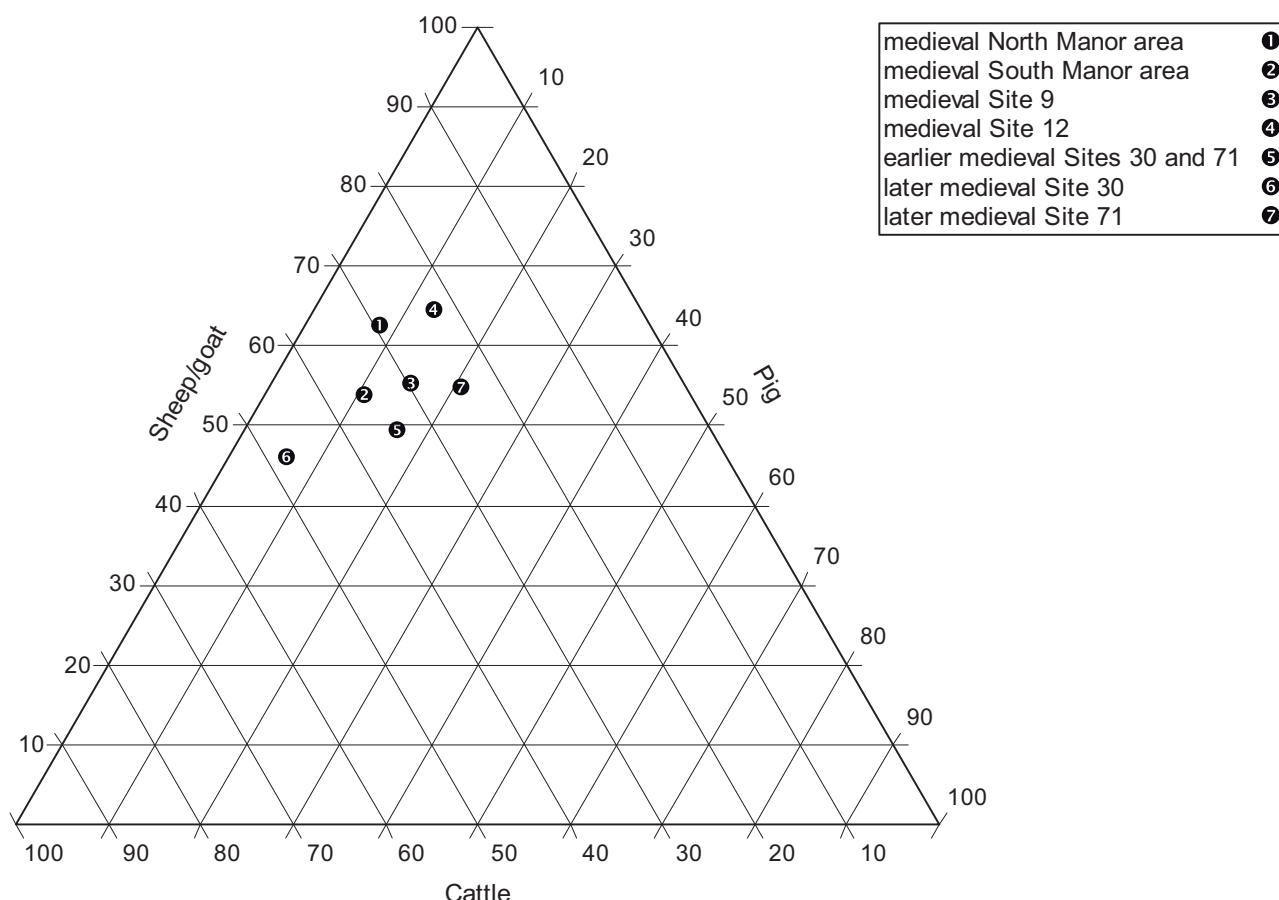


Fig. 66. Relative proportions of the three main 'meat' animals by site. (J. Richardson)

scarce to be considered from post-medieval deposits and any conclusions regarding the medieval material should be treated with caution. Fusion data are presented in Tables 17 to 20 for cattle, sheep, pig and horse, and in Tables 21 to 24 for dental eruption and wear data.

Given that the fusion data for cattle were limited (Table 17), the material from Sites 30 and 71 has been treated as a single medieval assemblage and compared to the fusion data from other areas of the village (Fig. 67). The Pond and Dam cattle were apparently maintained to maturity in high numbers, with 85% of the population surviving to 36 to 48 months or older. This suggests that milk was not targeted (in the absence of significant neonatal/juvenile slaughter) and while some prime meat was available, most animals were kept for breeding and as traction cattle (as indicated by possible work-related traumas to two pelves and four phalanges). Slaughter patterns associated with the North Manor and South Manor indicate that higher proportions of sub-adult cattle were killed from these areas (Fig. 67), but again few sub-adult cattle were associated with Sites 9 and 12 (Appendix 1, Fig. 88). Perhaps meat from younger animals was eaten more frequently by those living in the North and South Manor Areas when compared to the inhabitants of the peasant houses of Sites 9 and 12 and those disposing of their waste in the area of the Pond and Dam.

The dental eruption and wear data for medieval cattle confirmed the dearth of neonates and juveniles identified by the fusion data and again negated intensive milk production (Table 21). Indeed, an estimated ratio of four males to one female would not have been conducive to milk production or even the maintenance of a viable breeding herd (although two neonatal bones were recovered). Some sub-adult animals were slaughtered for their meat, particularly between 18 to 30 months, while the adult and mature cattle would have been killed when productivity (either breeding potential or traction power) declined. Comparing the medieval assemblage from the Pond and Dam sites to the North Manor (Fig. 68) reveals some variation in the slaughter patterns. The suggestion from the fusion data that a greater proportion of the animals from the North Manor Area were killed when sub-adult, is borne out in part by the dental data, although a higher proportion of cattle between 18 and 30 months were slaughtered and their bones disposed of in the Pond and Dam sites. The dearth in cattle of this age from the North Manor Area was used to suggest the transport of these 'market-age' animals off-site (Richardson 2004). This argument is weakened, however, by the high proportion of this age group recovered from the sites discussed here and also from Sites 9 and 12 (Appendix 1, Fig. 89).

Table 21. Number of cattle jaws at various wear stages by site and phase (after Halstead 1985).

| | Earlier Medieval (Phase 1-3) | Later Medieval (Phase 4-5) | Medieval (Phase 1-5) |
|----------------|------------------------------|----------------------------|----------------------|
| A: 0-1 mth | | | |
| B: 1-8 mths | | 2 | 2 |
| C: 8-18 mths | 1 | 1 | 2 |
| D: 18-30 mths | 2 | 6 | 8 |
| E: 30-36 mths | 1 | 3 | 4 |
| F: young adult | | 2 | 2 |
| G: adult | 1 | 5 | 6 |
| H: old adult | 1 | 5 | 6 |
| I: senile | 1 | 5 | 6 |
| Total | 7 | 29 | 36 |

Table 22. Number of sheep jaws at various wear stages by site and phase (after Payne 1973).

| | Earlier Medieval (Phase 1-3) | Later Medieval (Phase 4-5) | Medieval (Phase 1-5) |
|--------------|------------------------------|----------------------------|----------------------|
| A: 0-2 mths | | | |
| B: 2-6 mths | | | |
| C: 6-12 mths | 2 | 2 | 4 |
| D: 1-2 yrs | 1 | 3 | 4 |
| E: 2-3 yrs | 5 | 6 | 11 |
| F: 3-4 yrs | 6 | 12 | 18 |
| G: 4-6 yrs | 7 | 21 | 28 |
| H: 6-8 yrs | 1 | 9 | 10 |
| I: 8-10 yrs | 2 | 1 | 3 |
| Total | 24 | 54 | 78 |

Table 23. Number of pig jaws at various wear stages by site and phase.

| | Earlier Medieval (Phase 1-3) | Later Medieval (Phase 4-5) | Medieval (Phase 1-5) |
|---------------------------|------------------------------|----------------------------|----------------------|
| A: d4 unworn | | | |
| B: d4 in wear, M1 unworn | 1 | 2 | 3 |
| C: M1 in wear, M2 unworn | | | 0 |
| D: M2 in wear, M3 unworn | 2 | 4 | 6 |
| E: M3 in early wear | 1 | 2 | 3 |
| F: M3 beyond wear stage c | 1 | 1 | 2 |
| Total | 5 | 9 | 14 |

Table 24. Number of horse incisors (mandibular and maxillary) at various wear stages by site.

| | Earlier Medieval (Phase 1-3) | Later Medieval (Phase 4-5) | Medieval (Phase 1-5) |
|--|------------------------------|----------------------------|----------------------|
| A: deciduous incisors present (< 2 yrs) | | 1 | 1 |
| B: incisor erupted (2.5-4.5 years) | | 5 | 5 |
| C: incisor first in wear (3-6 yrs) | | 1 | 1 |
| D: incisor with square enamel pattern (5-7 yrs) | 1 | 3 | 4 |
| E: infundibulum lost (7-9 yrs) | 2 | 14 | 16 |
| F: incisor with circular enamel pattern (8-10 yrs) | | | 0 |
| G: incisor with no enamel (14 yrs +) | 1 | 10 | 11 |
| Total | 4 | 34 | 38 |

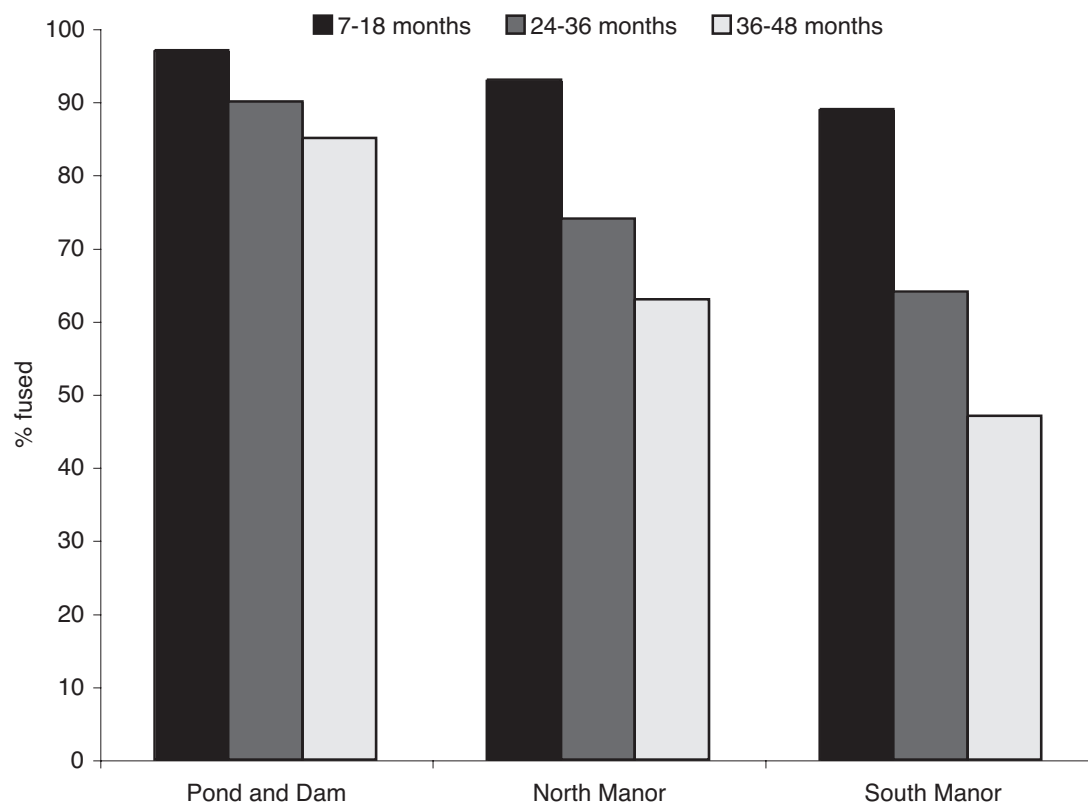


Fig. 67. Fusion data for medieval cattle by site. (J. Richardson)

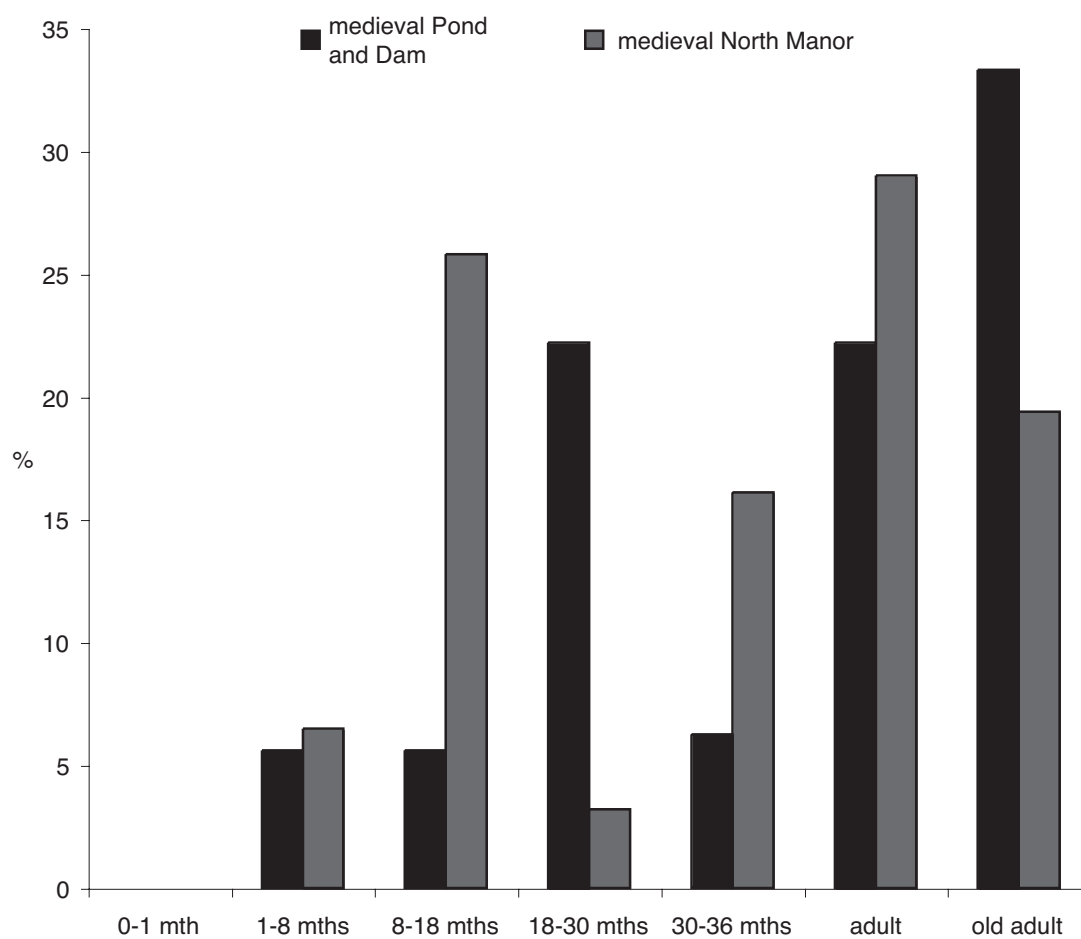


Fig. 68. Dental age data for cattle by site. (J. Richardson)

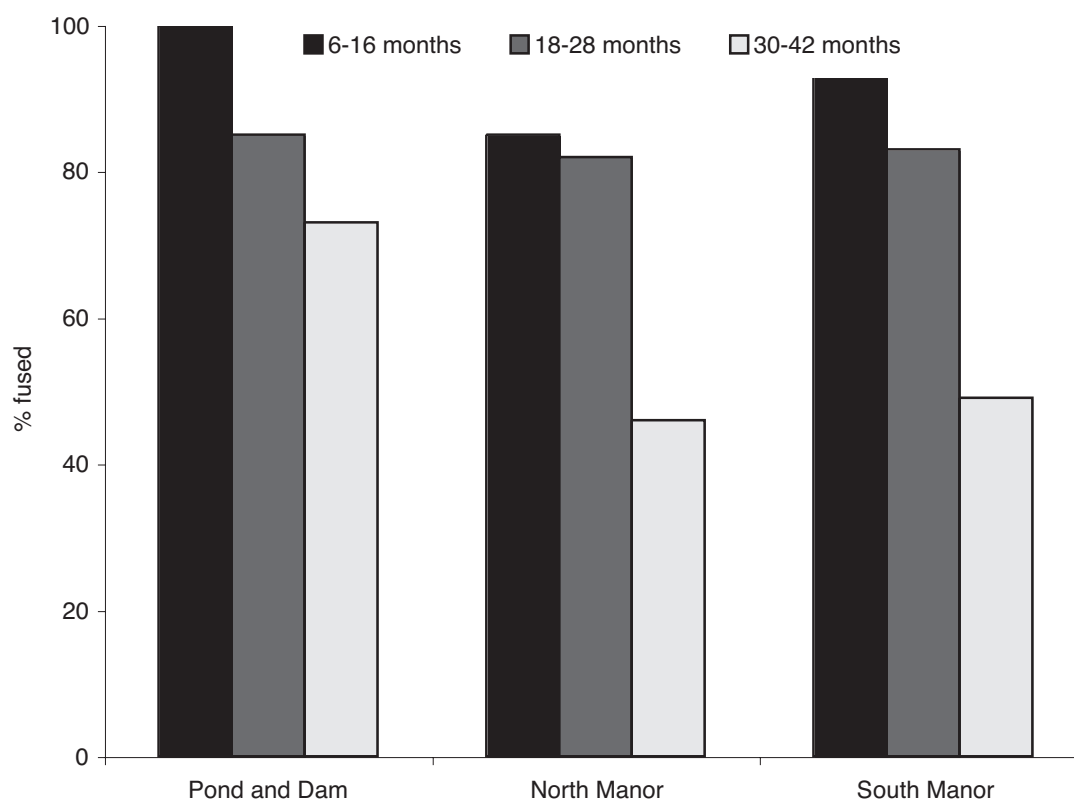


Fig. 69. Fusion data for medieval sheep by site. (J. Richardson)

The scarcity of the sheep fusion data recovered from Sites 30 and 71 again necessitated the analysis of a single medieval assemblage (Fig. 69), although the variation in the data from the two sites should be appreciated (Table 18). The combined data indicate a similar slaughter pattern to cattle with very few neonate/juvenile deaths, the limited availability of some prime meat, and the maintenance of 73% of the population into adulthood. Again in the absence of neonate deaths, intensive milk production can be discounted, although a ratio of one male to five females suggests the presence of a breeding population. The mature animals were presumably valued as breeding stock and for their fleeces and certainly England was renowned for its wool production at this time (Grant 1988, 151). A comparison with the North and South Manor Areas and Sites 9 and 12 indicates that a lower proportion of sheep from these sites was surviving to 30 to 42 months or older (Fig. 69; Appendix 1, Fig. 90). As with beef consumption (see above), perhaps prime lamb was eaten in greater quantities by the inhabitants of the North and South Manor Areas, and to a lesser extent by those occupying Sites 9 and 12, when compared to those disposing of their rubbish in the Pond and Dam sites.

Sheep dental data were more commonly recorded and it was possible to compare the material by phase (Table 22 and Fig. 70) as well as by site (Fig. 71). From both periods, the slaughter pattern indicated by the fusion data was confirmed: milk production was unlikely and prime lamb from animals under three years was limited. The slaughter of sheep peaked between three and six years

and these will have included a wide range of animals from meat producers to livestock whose breeding potential and fleece production had declined. The greater proportion of animals exceeding six years during the later medieval period may indicate a shift towards more intensive fleece production. A comparison of the medieval data from the Pond and Dam sites to those from the North Manor Area indicated once again that prime lamb (from animals up to two years old) was more readily available to the inhabitants in the north of the village.

Both fusion and dental data for pig were relatively scarce, but in the absence of any significant secondary products, their production for meat is assumed. The fusion data reveal that most pigs were killed between one and two years when they had gained sufficient weight (Table 19). The dental data (Table 23), however, indicate that a few animals did exceed three years, presumably maintained as valued breeding stock (after Silver 1969, table G: 18th-century data). A ratio of thirteen males to three females from medieval deposits suggests that the greater meat-bearing males were highly valued, although taphonomic factors may have led to the destruction of greater numbers of the smaller female tusks.

Finally, horse bones formed a significant proportion of the assemblage, in particular those from Site 30. Metrical data (see below) suggest that both horses and ponies (defined as animals of less than fourteen hands two inches) were utilised. While donkey/mule bones may have been misidentified as 'horse', no teeth indicative of such animals were noted (after Churcher and Richardson 1978; Armitage 1979).

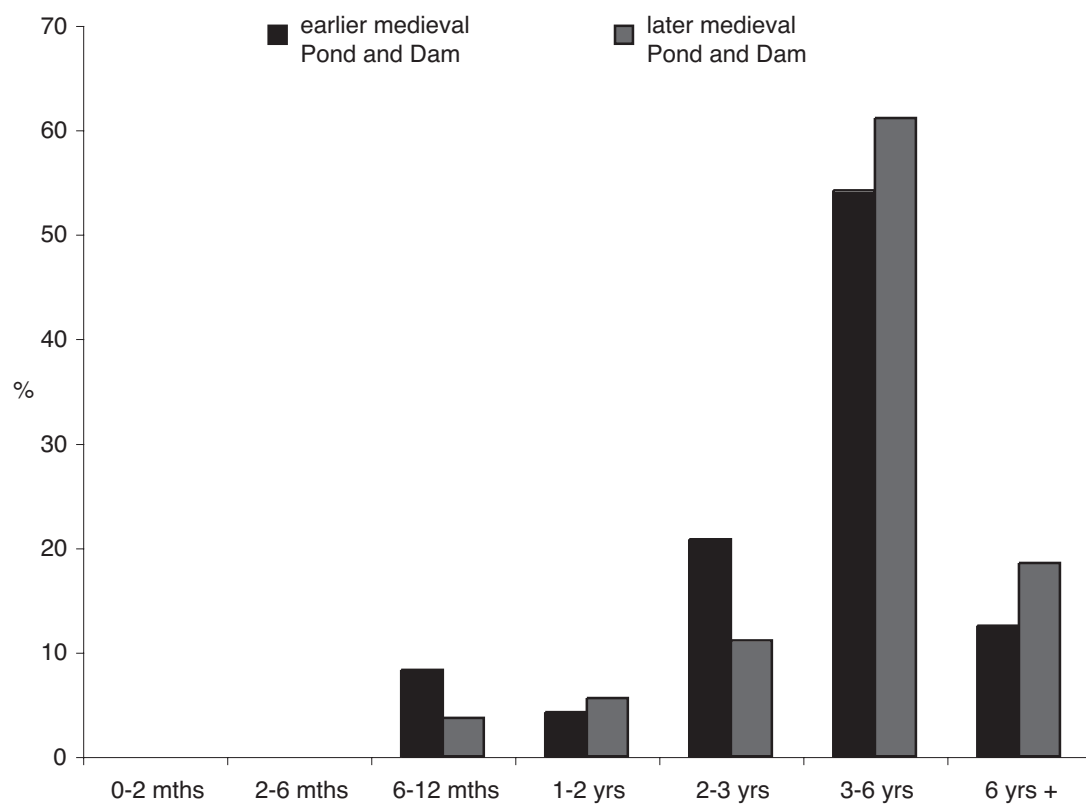


Fig. 70. Dental age data for sheep by phase. (J. Richardson)

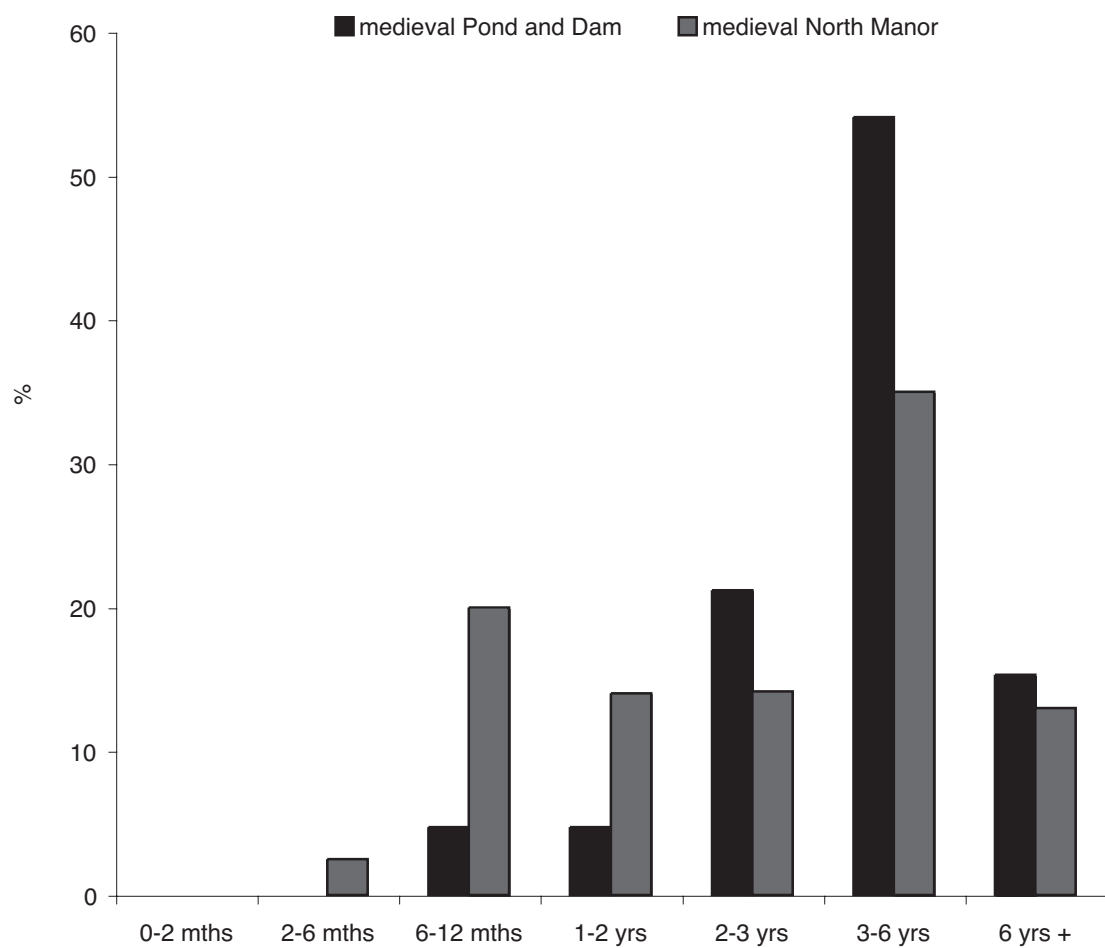


Fig. 71. Dental age data for sheep by site. (J. Richardson)

Table 25. Metrical data for sheep and horse by site and period (in millimetres).

| Site | Period | Species | Element | Measure. | No. | Min. | Max. | Mean | SD | Withers |
|------|----------------------|---------|------------|----------|-----|-------|-------|-------|------|-----------|
| SM | Middle Saxon | Sheep | Tibia | Bd | 99 | 23.0 | 29.0 | 26.2 | 1.4 | |
| SM | Late Saxon | Sheep | Tibia | Bd | 42 | 22.9 | 29.8 | 25.8 | 1.6 | |
| SM | Medieval | Sheep | Tibia | Bd | 100 | 21.6 | 29.1 | 25.5 | 1.5 | |
| NM | Medieval | Sheep | Tibia | Bd | 11 | 20.3 | 27.2 | 25.3 | 2.0 | |
| PD | Medieval | Sheep | Tibia | Bd | 11 | 25.0 | 30.1 | 26.6 | 1.5 | |
| NM | Iron Age/early Roman | Horse | Metacarpal | LI | 2 | 194.0 | 202.5 | 198.3 | 6.0 | 1244-1298 |
| NM | Medieval | Horse | Metacarpal | LI | 5 | 193.0 | 208.0 | 200.3 | 5.7 | 1237-1333 |
| PD | Medieval | Horse | Metacarpal | LI | 5 | 184.5 | 216.0 | 199.1 | 13.2 | 1183-1385 |
| NM | Medieval | Horse | Metatarsal | LI | 3 | 219.0 | 251.5 | 233.5 | 16.5 | 1167-1341 |
| PD | Medieval | Horse | Metatarsal | LI | 2 | 224.0 | 243.5 | 233.8 | 13.8 | 1194-1298 |
| PD | Medieval | Horse | Various | Withers | 15 | | | | | 1183-1513 |

Bd = greatest breadth of distal articulation (after von den Driesch 1976), LI = lateral length (after Kiesewalter 1888 in von den Driesch and Boessneck 1974)

SM = South Manor Area, NM = North Manor Area, PD = Pond and Dam

Unlike the concentration of butchered horse bones from a single levelling deposit at Site 82K (Richardson 2004), the bones from the Pond and Dam sites were scattered over numerous deposits and were rarely cut or chopped (Table 15). While the horse bones from Site 82K represent a single, atypical event, horse carcasses were more routinely deposited towards the southern limits of the village, perhaps representing the waste from a knacker's yard. Fusion data suggest that animals at the end of their working lives were usually slaughtered and discarded here, as only two bones from earlier medieval deposits came from sub-adult animals (Table 20). Conversely, dental data indicate that sub-adult animals were present in later medieval Wharram (Table 24). These albeit limited data suggest that horses were obtained by the local inhabitants before they were broken for the saddle or perhaps more likely were raised by the villagers. Certainly horses would have been valued for riding, as pack animals and increasingly for ploughing with the 12th-century introduction of the rigid breast harness (Langdon 1986, 9-10). Added to the fact that they were rarely eaten, it is unlikely that horses were slaughtered before their usefulness had been exhausted. A medieval example of trauma indicative of abnormal loading of the spine, the ankylosing of three lumbar vertebrae by the ossification of the dorsal longitudinal ligaments, highlights the use of these horses as work animals.

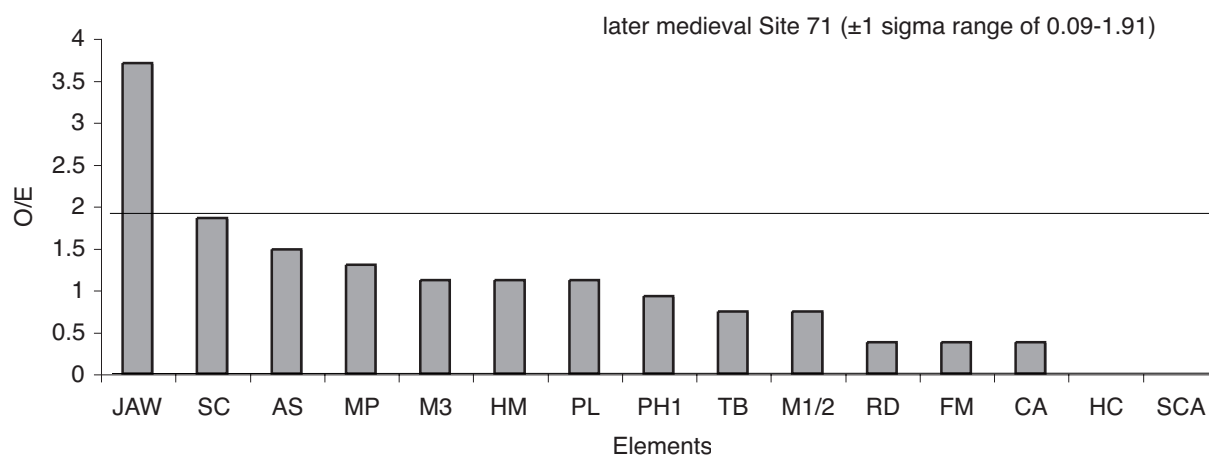
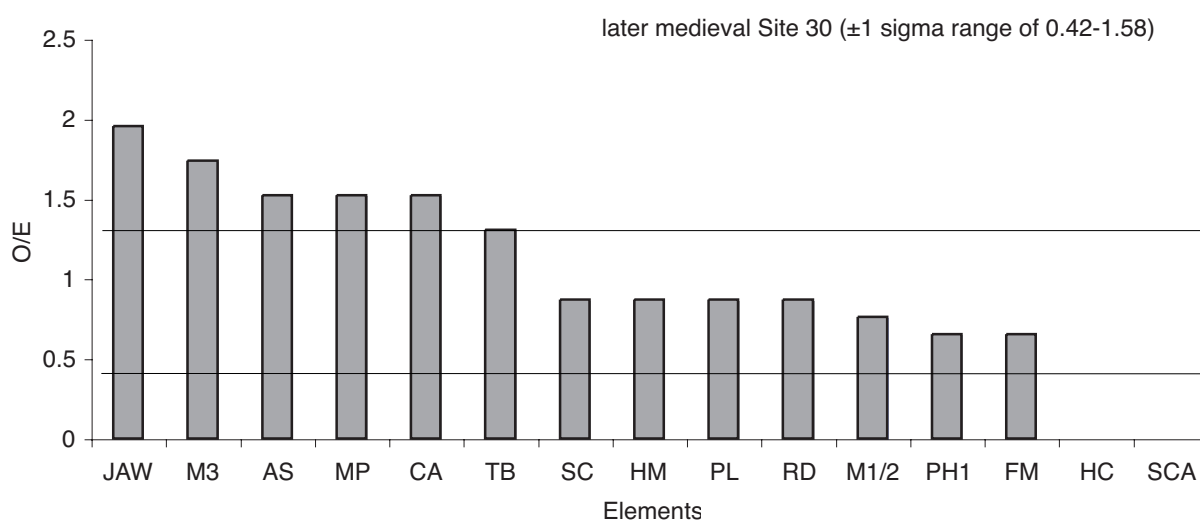
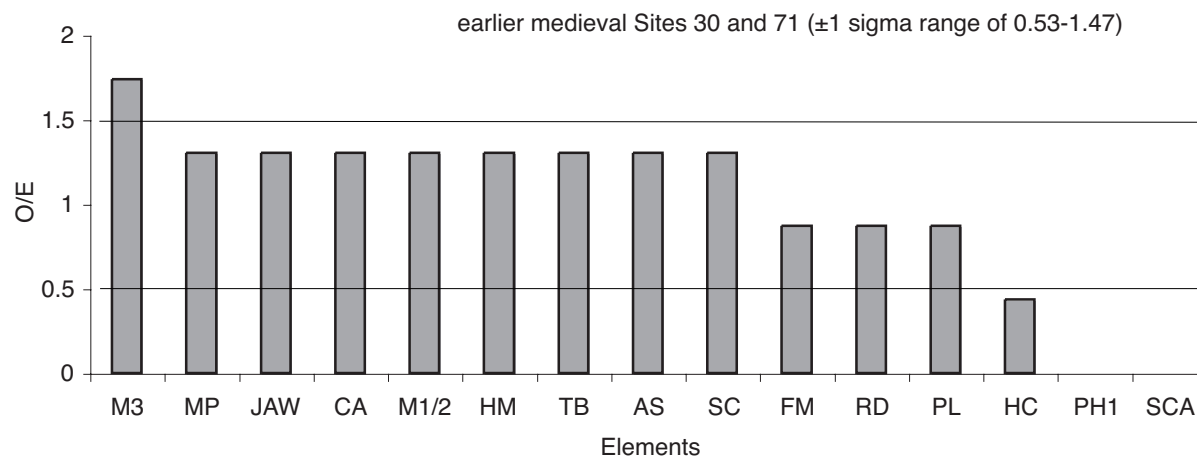
Metrical data

Metrical data from these sites were quite scarce due to the taphonomic damage noted above, in particular the level of fragmentation. As a result, a meaningful analysis of

changes in animal size and shape over time may only be possible once all faunal material from Wharram Percy has been recorded. Of the common domestic animals, only sheep and horse provided sufficient data for a preliminary analysis here (Table 25). The breadth of the distal tibia of sheep from the Pond and Dam sites shows evidence for a size increase when compared to Saxon examples from the South Manor Area and this may be related to a desire for larger fleeces to supply the wool trade (resulting in larger bodied animals). Unfortunately, this is not supported by the sheep bones recovered from the medieval deposits in the North and South Manor Areas or from Sites 9 and 12 (Table 50). Data to compare the wither heights of horses over time were scarce, although larger animals were noted from the Pond and Dam sites, where horses ranged in height from eleven hands two inches to just under fifteen hands.

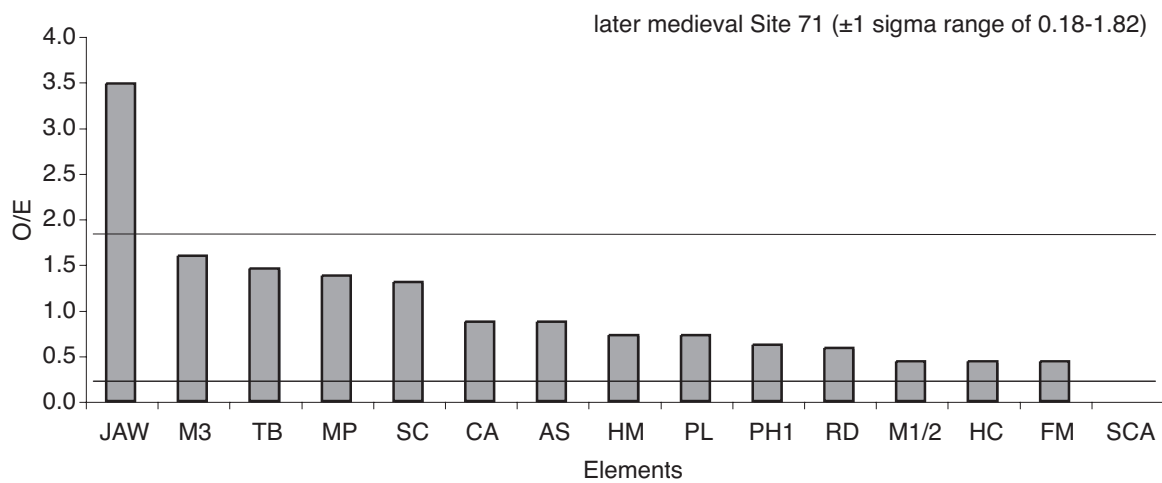
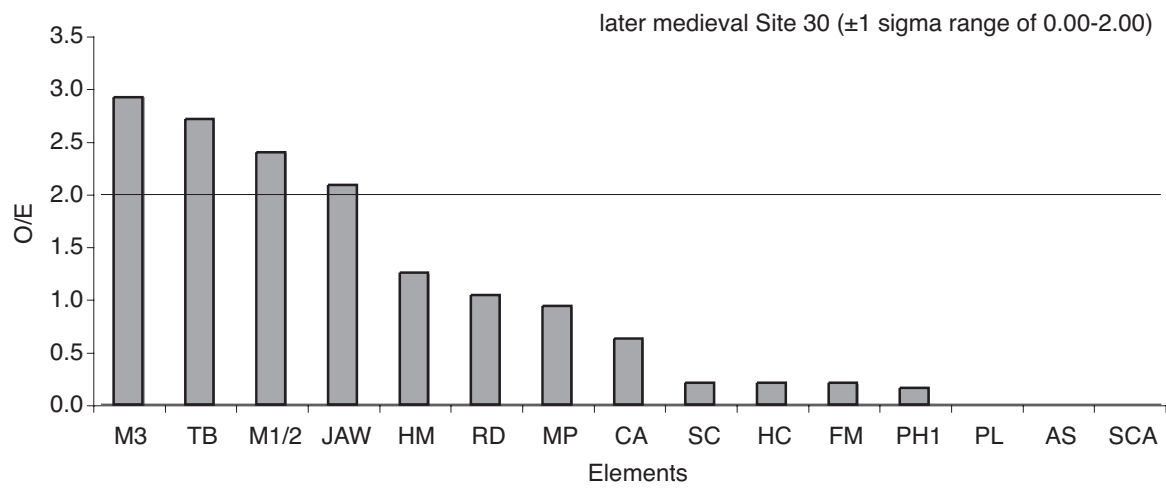
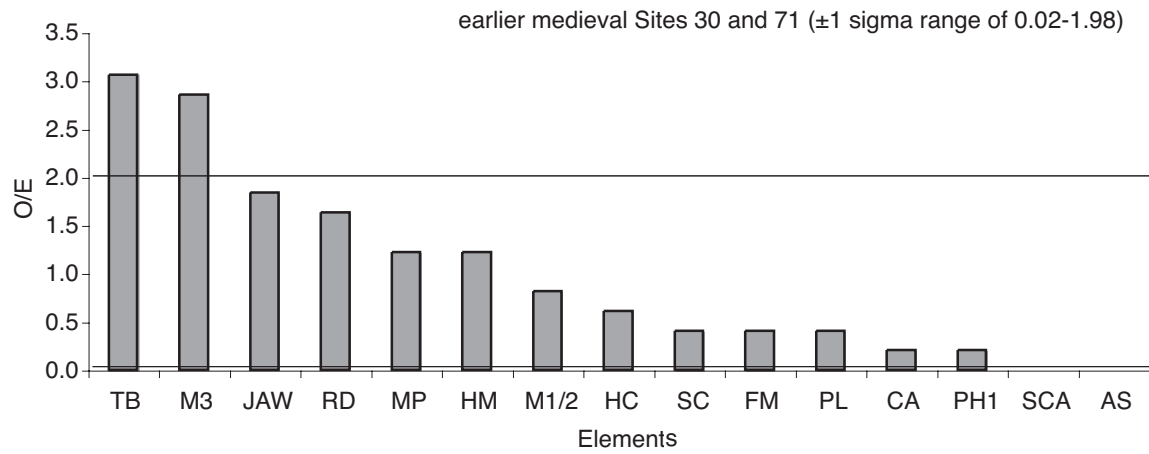
Carcass processing

Regardless of their primary function during life (breeding stock, traction animals or for fleece production), most livestock, with the probable exception of horses, would have been utilised for their meat on death. In the first instance, low-value body parts such as heads and feet would probably have been removed from the carcasses, although no deposits dominated by such primary butchery waste were noted. Nevertheless, medieval deposits at Site 71 included both an atlas and axis of pig and sheep with cut marks indicative of dismembering, and five mandibles, two of cattle and three of pig, indicated the removal of the tongue and the meat associated with the cheek. Secondly, carcasses may have been cleaved in two by suspending the decapitated animal



AS=astragalus, CA=calcaneus, FM=femur, HC=horncore, HM=humerus, M1/2=first/second molar, M3=third molar, MP=metapodials, PH1=first phalanx, PL=pelvis, RD=radius, SC=scapula, SCA=scaphoid, TB=tibia

Fig. 72. Distribution of skeletal elements: cattle. (J. Richardson)



AS=astragalus, CA=calcaneus, FM=femur, HC=horncore, HM=humerus, M1/2=first/second molar, M3=third molar, MP=metapodials, PH1=first phalanx, PL=pelvis, RD=radius, SC=scapula, SCA=scaphoid, TB=tibia

Fig. 73. Distribution of skeletal elements: sheep. (J. Richardson)

by its hocks. This practice (identified by the reduction of the vertebrae, sternum and sacrum on the sagittal plane) became increasingly common from the 11th century onwards (O'Connor 1982, 16), but so far has been absent from Wharram Percy (Richardson 2004). From later medieval deposits in the Pond and Dam sites, however, one large-sized mammal vertebrae and four small-sized mammal vertebrae had been chopped dorso-ventrally. Finally, dismembering marks indicate the reduction of the three main 'meat' species into joints, while filleting marks on ribs in particular highlight meat removal. Cut marks to a horse ulna, tibia and pelvis from later medieval Site 30 may indicate the sporadic consumption of this species, perhaps by humans, but more likely by dogs. (cf. Wilson and Edwards 1993; Thomas and Locock 2000). It is also possible, however, that horse carcasses were dismembered simply to facilitate their disposal (Rackham 2004, 19-20).

The relative proportions of body parts can also be used to assess carcass processing and once again these data have been analysed using a similar methodology as Pinter-Bellows (2000, 171) for the South Manor Area. To avoid over-emphasising minor deviations from the mean of 1, however, the standard deviation of the O/E ratio for each sample has been calculated and attention is given to elements for which the O/E ratio lies more than one standard deviation below or above the mean (after O'Connor 2000, 72). The presence of the majority of body parts from cattle and sheep carcasses from Sites 30 and 71 suggests that these animals were slaughtered and processed within the area (Figs 72 and 73). The absence of bones such as the scaphoid is unlikely to reflect specific processing or disposal practices and instead indicates the poor recovery of such small bones. Comparing the distribution of elements for cattle and sheep from the Pond and Dam sites to the North Manor Area (Richardson 2004, fig. 138) reveals a higher proportion of mandibles from the Pond and Dam sites during the later medieval period and in particular from Site 71. This suggests that primary butchery waste was routinely disposed of in this southern area.

Minor species

In addition to meat resources from cattle, sheep and pigs; chickens, geese and fish (Chapter 23) would have been utilised for their meat, with the domestic birds also valued for their eggs. Very occasionally, wild birds such as woodcock and the pigeon family may also have been utilised, as well as animals such as deer, hare and rabbit. Butchered bird bones were exclusive to later medieval deposits from Site 71 where meat was removed from the bones of chicken and geese. Although the number of domestic bird bones suggests that poultry was not systematically targeted, the taphonomic biases recognised earlier will have influenced the survival/recovery of these smaller species.

Dog bones were quite commonly recovered, accounting for 5% of the early medieval assemblage and 6% of the later medieval assemblage from Site 30 (Table 16). These



Plate 15. Fractured femur of dog bone (Site 30).

included two partial skeletons, one from earlier medieval pond silts (context 1474) and a second from a later medieval deposit (context 1169). The former had suffered from osteophytes to at least three vertebrae and joint damage to the elbow. Dogs may have been kept as pets, to reduce vermin or to guard property, but the severe fracture of a femur may hint at their occasional mistreatment (Plate 15). Similarly, cat bones were most commonly recorded from later medieval Site 30 and these included a partial skeleton from a chalk rubble deposit (context 45). No pathological cat bones were noted, however, and neither dog nor cat bones were visibly butchered.

Conclusions

A consideration of taphonomic processes recognised that the majority of material from Sites 30 and 71 was middened and/or formed surface deposits prior to final burial. Bones from Site 30 in particular were often eroded, in poor condition and accessible to the destructive capabilities of dogs. The percentage of loose teeth from this site also indicated that the assemblage was heavily fragmented. Site 71 in contrast, had three times as many butchered bones as Site 30, although cut marks may have

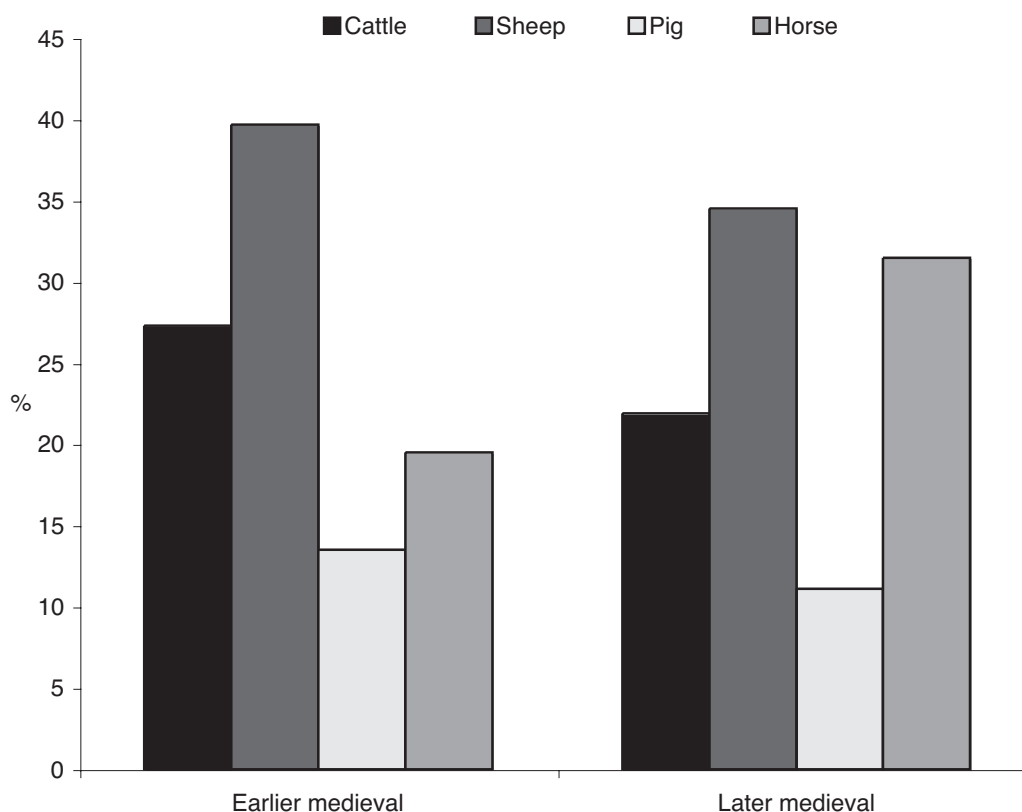


Fig. 74. The relative proportions of the main domestic 'species' by phase. (J. Richardson)

been more readily identified on the better preserved bones from this area. Regardless of site, however, the poor recovery of bones due to a lack of sieving, which was exacerbated by a wet and sticky soil matrix, will have influenced the assemblages most severely.

The earlier and later medieval assemblages from Sites 30 and 71 indicated that cattle were raised for their meat, for breeding and as traction animals, sheep were kept for meat and wool and the beef and mutton diet was supplemented by pork and very occasionally by poultry. Horses and ponies were kept for transport purposes, for harrowing and increasingly for ploughing and may have been bred locally. Although Walter of Henley unfavourably compared the costs of keeping horses to the costs of oxen (Oschinsky 1971, 319), Langdon (1986, 160) recognised that the working horse was better suited to lighter soils, more even terrain and a drier climate. As a result, the chalklands of the Yorkshire Wolds would have suited the horse-drawn plough admirably.

Variations in the assemblages from Sites 30 and 71 (a prevalence of horse bones from the former and a higher proportion of sheep and pig bones plus numerous fish bones from the latter) indicated that the disposal of bone waste was not uniform. Taphonomic factors may explain the higher proportions of sheep and pig bones from Site 71 where bone damage was less common, while the horse bones from Site 30 may have been used as levelling deposits to facilitate passage across an area that was sporadically wet and boggy, or represent waste from a knacker's yard. Despite these fluctuations, however,

multi-purpose husbandry strategies that produced a range of products from a number of animals were indicated. Combining the bone material from the earlier and later medieval deposits suggests that these strategies changed little over time (Fig. 74) and presumably were well suited to the habitats surrounding Wharram Percy. Sheep would have been raised in some number on the free-draining soils of the Wolds, while reliable water sources and lush pasture provided the means to support both cattle and horses. Pigs may have been raised on a household basis, although a village herd that was allowed to turn over the arable fields after harvest may have existed.

Comparisons of the Pond and Dam material to the faunal data from other excavations at Wharram Percy indicated some differences in the faunal assemblages. Primary butchery waste was more commonly recovered from the Pond and Dam sites and perhaps this indicates that slaughter and preliminary butchery tended to occur towards the limits of the settlement. Secondly, prime meat from cattle (up to eighteen months old) and sheep (up to two years old) appeared to be more widely available to the inhabitants of the North Manor Area when compared to the Pond and Dam material and it is tempting to relate this to variations in dietary status. Finally, the dearth of 'market-age' animals identified from the North Manor Area (here defined as 18 to 30 months old for cattle and one to two years old for sheep, see Figs 68 and 71) when compared to their prevalence from some urban deposits (e.g. O'Connor 1991, 248-9), was in part negated by the presence of some 'market-age'

animals from the Pond and Dam sites, as well as from Sites 9 and 12 (Appendix 1). A more reliable assessment as to whether such animals were exported to the urban markets must await the analysis of all the faunal material from Wharram Percy when a village-wide evaluation will be made.

Nevertheless, despite the variations in the assemblages analysed so far, the medieval community at Wharram Percy engaged in sheep and cattle husbandry. Breeding populations are attested by the presence of a few neonatal bones and the identification of all body parts (indicating at the very least the localised slaughtering of these animals). Slaughter patterns do not highlight the targeting of any one product and these suggest that specialist production was either not desired or not appropriate during the period in question. The prevalence of horse bones identified from Site 82K (Richardson 2004), Sites 9 and 12 (Appendix 1) and from the Pond and Dam sites, in conjunction with the presence of a few young animals, suggests that horse rearing may have been important to the village's inhabitants. Marked increases in the number of horse bones in the medieval period from another rural settlement has been linked to the adoption of the rigid breast harness (Davies 1992, 5) and the same may be true at Wharram Percy where the light chalk soils would have suited a horse-drawn plough. Although this animal was expensive to feed, would have required shoeing and was not widely considered to be edible on death (Le Patourel 1974, 52), the horse had the advantage over the ox of speed and stamina and was more versatile in the range of farming tasks it could undertake (Langdon 1986, 160). Horse bones are also a relatively common occurrence from medieval Sherburn on the northern edge of the Yorkshire Wolds (Rushe *et al.* 1994, table 2), although Cowlam, only ten miles from Wharram, revealed only 5% horse bones (Rushe *et al.* 1988, table 1). Perhaps the inhabitants of Wharram Percy were specialist horse breeders and, as well as raising animals to pull their own carts, harrows and ploughs, were also able to trade their livestock both within and beyond the Yorkshire Wolds.

22 The Mollusca

by J. Richardson

Only three complete oyster valves (*Ostrea edulis*) and two oyster shell fragments were recovered from Site 30. From Site 71, one oyster shell fragment, ten fragments of mussel shell (cf. *Mytilus edulis*) and one common whelk (*Buccinum undatum*) were noted. All of these may represent food gathered for human consumption.

Table 26. The mollusca from Sites 30 and 71.

| | Site 30 | Site 71 |
|--------|---------|---------|
| Oyster | 5 | 1 |
| Mussel | | 10 |
| Whelk | | 1 |

23 The Fish Bone

by J.H. Barrett

Introduction

This report presents an analysis of approximately 250 identified fish bones from sites 9, 12 and 71 of Wharram Percy. Sites 9 and 12 were peasant houses of broad medieval date. The material was virtually all hand collected. One small bag of material from context 206 of Site 71 was sieved to an unknown (but fine, perhaps 1mm) mesh size and another bag from context 213 of the same site may also have been sieved based on the material it included. Both of these groups, however, included mostly tiny unidentifiable fragments. As a whole, the assemblage must be viewed as hand collected and thus seriously biased against small fish (e.g. Jones 1982).

Despite the small sample size, loose dating and poor recovery the assemblage is informative. As noted previously (Ryder 1974), it is clear that almost all of the material is from marine fish. The diversity of marine species is also high, including herring, cod, haddock, ling, hake, whiting, plaice, conger eel, halibut, ray and shark. Butchery marks suggest that some of the cod was probably imported dry as stockfish or a similar product. Other marine species may also have arrived cured, but some were probably also consumed fresh based on element distributions that indicate whole fish in some instances. It is remarkable that fresh water catches are only represented by a single pike vertebra and seven eel bones, particularly given that Site 71 was adjacent to a pond.

Methods

The assemblage was recorded following the York protocol, which is described by Harland *et al.* (2003). It entails the detailed recording of *c.* 20 diagnostic elements. These bones are identified to the finest possible taxonomic group and recorded in detail – typically including, as appropriate, element, side, count, measurements, weight, modifications (including burning and butchery), fragmentation, texture and estimates of fish size. Although identified as diagnostic elements, fish vertebrae are recorded in slightly less detail (measurements are not taken and texture is not scored, for example). ‘Non-diagnostic’ elements (quantification category 0) are only identified beyond class for special reasons. Examples include butchered specimens and bones of species otherwise missing from the assemblage.

The assemblage has been quantified by number of identified specimens (NISP), including all bones or only the diagnostic elements as indicated. The complete archive will be kept on file at the University of York *Fishlab* and also forms part of the Archive. The small number of measurements follow Harland *et al.* (2003) and references therein. A list of Latin and common names for all taxa in the assemblage is included in Table 27.

Table 27. Common and Latin names of taxa identified at Kaupang.

| Common name | Latin name |
|----------------------|---|
| Shark Order | Pleurotremata |
| Ray Family | Rajidae |
| Eel | <i>Anguilla anguilla</i> |
| Conger Eel | <i>Conger conger</i> |
| Atlantic Herring | <i>Clupea harengus</i> |
| Pike | <i>Esox lucius</i> |
| Cod Family | Gadidae |
| Cod/ Saithe/ Pollack | <i>Gadus/Pollachius</i> |
| Cod | <i>Gadus morhua</i> |
| Haddock | <i>Melanogrammus aeglefinus</i> |
| Ling | <i>Molva molva</i> |
| Whiting | <i>Merlangius merlangus</i> |
| Hake | <i>Merluccius merluccius</i> |
| Halibut Family | Pleuronectidae |
| Halibut | <i>Hippoglossus hippoglossus</i> |
| Flounder/ Plaice | <i>Pleuronectes flesus/</i> <i>Pleuronectes platessa</i> |
| Plaice | <i>Pleuronectes platessa</i> |
| Unidentified Fish | Unidentified Fish |

Preservation

The fish bone from Wharram Percy was generally well preserved (Table 28). Including all specimens, c. 14% of the assemblage was burnt. Most of the heat altered bones were tiny unidentified fragments from the two bags recovered by sieving (see above). Otherwise virtually all of the assemblage was unburned. The most common surface texture was ‘good’ (lacking fresh appearance, but otherwise solid with very localised flaky or powdery areas) and the most common category of bone completeness was 80 to 100%. There was one specimen with evidence of carnivore tooth impressions and three additional bones were crushed, either by mastication or trampling (Wheeler and Jones 1989). The sample sizes are too small to draw meaningful intra-site comparisons, but overall the assemblage seems to have suffered relatively little taphonomic attrition. It must be noted, however, that hand collecting is likely to favour relatively intact and well-preserved specimens.

Results

A total of 1092 specimens were examined, 246 of which were identifiable diagnostic elements and a further two of which were ray teeth (which are not typically quantified using the York protocol). Thirteen taxa occur in the assemblage if one excludes broad groups such as cod family that are also represented by species level identifications (Table 29). Eleven of these are marine and two are freshwater or migratory between salt and

freshwater. In rank order, the marine species are: herring (99 specimens), cod (82 specimens), haddock (22 specimens), ling (12 specimens), plaice (4 specimens), conger eel (2 specimens), hake (2 specimens), whiting (1 specimen), halibut (1 specimen), shark order (1 specimen) and ray family (2 teeth, which are not formally quantified). The only truly freshwater species was pike (1 specimen). However, the eels (7 specimens) were probably also freshwater catches. The paucity of freshwater fish may be partly due to poor recovery – many of the marine species are very large – but this bias cannot explain why there is an abundance of tiny herring bones rather than more eel and pike specimens.

The collection is too small and biased by poor recovery to justify much analysis of element distributions (Table 30). Nevertheless, several patterns do merit comment. Firstly, the distribution of cod bones strongly suggests that some dried (or dried and salted) fish may have been transported to the site. There are few abdominal vertebrae and cranial elements (all of which are typically removed from dried cod), whereas caudal vertebrae, cleithra and supracleithra (which typically remain in dried cod) are the most abundant elements for this species (cf. Barrett 1997). This pattern cannot be a recovery bias as caudal vertebrae are smaller than abdominal vertebrae and the supracleithrum is one of the smallest bones of a fish skeleton. It is also inconsistent with preservation bias as cod cleithra are fragile (Jones 1991). The abundance of haddock cleithra should not, however, be interpreted in the same way. There is no other indication that dried haddock were brought to the site and the cleithrum of this species is anomalously robust (von den Driesch 1994). Other species may have been imported as cured fish, but the element distribution data cannot demonstrate this alone given the tiny sample sizes. Fish were also brought to Wharram Percy whole, and thus probably fresh, given the presence of some cranial elements even for species like cod that mostly arrived in a processed state.

Although modest in number, cut-marks observed on nine specimens augment these interpretations. Seven marks (four on cod, two on ling and one on a cod, saithe or pollack) are consistent with dried fish production (Table 31; cf. Barrett 1997). They include three transverse cuts on caudal vertebrae (made when the anterior vertebrae are cut away), three cuts on cleithra (made during decapitation) and one cut on a supracleithrum (also made during decapitation). These marks may imply that dried ling were also brought to the site, an observation that could not be supported based on the element distribution data alone. Conversely, the ling may simply have been transported whole and decapitated at Wharram Percy. The two remaining butchery marks, one on a cod ceratohyal and one on a cod posterior caudal vertebra, are less easily classified according to function.

Given that the assemblage was hand collected, it is not surprising that most of the specimens represent large fish (Table 32). The majority of the gadid bones were from fish of 0.5 to 1m total length and even the plaice

Table 28. Bone preservation characteristics by phase.

| | Site 9 | Site 12 | Site 71, Phase 3 | Site 71, Phase 4 | Site 71, Phase 5 | Site 71, Unstrat. | Total |
|--|--------|---------|---------------------|---------------------|---------------------|----------------------|-------|
| Burning (all specimens) | | | | | | | |
| Unburned | 32 | 22 | 3 | 887 | 3 | 8 | 955 |
| Burned White | | | | 100 | | | 100 |
| Burned Brown or Black | | | | 37 | | | 37 |
| Percent completeness (diagnostic elements only) | | | | | | | |
| 0-20% | 1 | 1 | | 22 | | | 24 |
| 21-40% | 7 | 2 | 2 | 12 | 1 | | 24 |
| 41-60% | 1 | | | 12 | | | 13 |
| 61-80% | 1 | 1 | | 15 | | 1 | 18 |
| 81-100% | 1 | 4 | | 22 | | 1 | 28 |
| Bone texture (diagnostic elements only) | | | | | | | |
| Excellent | 2 | 2 | | 9 | | 1 | 14 |
| Good | 4 | 3 | | 44 | | | 51 |
| Fair | 4 | 2 | | 26 | 1 | 1 | 34 |
| Poor | 1 | 1 | 2 | 3 | | | 7 |
| Other modifications (excluding butchery, all specimens) | | | | | | | |
| Carnivore Gnawing | 1 | | | | | | 1 |
| Crushed | | | | 3 | | | 3 |

Table 29. NISP by phase based on diagnostic elements (other records noted as present or unidentified).

| Common Name | Site 9 | Site 12 | Site 71, Phase 3 | Site 71, Phase 4 | Site 71, Phase 5 | Site 71, Unstrat. | Total |
|----------------------|--------|---------|---------------------|---------------------|---------------------|----------------------|---------|
| Shark Order | 1 | | | | | | 1 |
| Ray Family | | | | present | | | present |
| Eel | | | | 7 | | | 7 |
| Conger Eel | | | | 2 | | | 2 |
| Atlantic Herring | | | | 99 | | | 99 |
| Pike | | | | 1 | | | 1 |
| Cod Family | | | 1 | 8 | | | 9 |
| Cod/ Saithe/ Pollack | | | | 1 | | | 1 |
| Cod | 12 | 5 | | 63 | 1 | 1 | 82 |
| Haddock | 2 | 5 | 1 | 14 | | | 22 |
| Ling | 9 | | | 2 | 1 | | 12 |
| Whiting | | | | | | 1 | 1 |
| Hake | | | | 2 | | | 2 |
| Halibut Family | | | | 1 | | | 1 |
| Halibut | | | | 1 | | | 1 |
| Flounder/ Plaice | | | | 1 | | | 1 |
| Plaice | | | | 4 | | | 4 |
| Unidentified Fish | 8 | 12 | 1 | 816 | 1 | 6 | 844 |

Table 30. Fish element distribution (diagnostic elements only).

| Element | Site 9 | Site 12 | Site 71, Phase 3 | Site 71, Phase 4 | Site 71, Phase 5 | Site 71, Unstrat | Total |
|-------------------------------|--------|---------|---------------------|---------------------|---------------------|---------------------|-------|
| Shark Order | | | | | | | |
| Mineralized Vertebral Centrum | 1 | | | | | | 1 |
| Eel | | | | | | | |
| Abdominal Vertebra | | | | 4 | | | 4 |
| Caudal Vertebra | | | | 3 | | | 3 |
| Conger Eel | | | | | | | |
| Ceratohyal | | | | 1 | | | 1 |
| Maxilla | | | | 1 | | | 1 |
| Atlantic Herring | | | | | | | |
| Caudal Vertebra | | | | 48 | | | 48 |
| Abdominal Vertebra | | | | 28 | | | 28 |
| Maxilla | | | | 9 | | | 9 |
| Dentary | | | | 4 | | | 4 |
| Articular | | | | 2 | | | 2 |
| First Vertebra | | | | 2 | | | 2 |
| Ceratohyal | | | | 1 | | | 1 |
| Hyomandibular | | | | 1 | | | 1 |
| Palatine | | | | 1 | | | 1 |
| Post temporal | | | | 1 | | | 1 |
| Preopercular | | | | 1 | | | 1 |
| Ultimate Vertebra | | | | 1 | | | 1 |
| Pike | | | | | | | |
| Abdominal Vertebra | | | | 1 | | | 1 |
| Cod Family | | | | | | | |
| Cleithrum | | | | 4 | | | 4 |
| Preopercular | | | | 2 | | | 2 |
| Abdominal Vertebra | | | | 1 | | | 1 |
| Ceratohyal | | | 1 | | | | 1 |
| Opercular | | | | 1 | | | 1 |
| Cod/ Saithe/ Pollack | | | | | | | |
| Caudal Vertebra Group 1 | | | | 1 | | | 1 |
| Cod | | | | | | | |
| Caudal Vertebra Group 1 | 2 | 1 | | 15 | 1 | | 19 |
| Caudal Vertebra Group 2 | 3 | | | 8 | | | 11 |
| Cleithrum | 4 | | | 3 | | | 7 |
| Supracleithrum | | | | 6 | | | 6 |
| Ceratohyal | | 1 | | 3 | | | 4 |
| Hyomandibular | | | | 4 | | | 4 |
| Abdominal Vertebra Group 1 | | | | 3 | | | 3 |
| Infrapharyngeal | | 1 | | 2 | | | 3 |
| Preopercular | 1 | | | 2 | | | 3 |
| Basioccipital | | | | 2 | | | 2 |
| Dentary | | | | 2 | | | 2 |
| Maxilla | | | | 2 | | | 2 |
| Opercular | | | | 1 | | 1 | 2 |

Table 30 continued.

| Element | Site 9 | Site 12 | Site 71, Phase 3 | Site 71, Phase 4 | Site 71, Phase 5 | Site 71, Unstrat. | Total |
|----------------------------|--------|---------|---------------------|---------------------|---------------------|----------------------|-------|
| Cod continued | | | | | | | |
| Parasphenoid | | | | 2 | | | 2 |
| Posttemporal | | 2 | | | | | 2 |
| Quadrate | 1 | | | 1 | | | 2 |
| Abdominal Vertebra | | | | 1 | | | 1 |
| Abdominal Vertebra Group 2 | | | | 1 | | | 1 |
| Abdominal Vertebra Group 3 | 1 | | | | | | 1 |
| Articular | | | | 1 | | | 1 |
| First Vertebra | | | | 1 | | | 1 |
| Otolith | | | | 1 | | | 1 |
| Premaxilla | | | | 1 | | | 1 |
| Vomer | | | | 1 | | | 1 |
| Haddock | | | | | | | |
| Cleithrum | 2 | 3 | 1 | 5 | | | 11 |
| Abdominal Vertebra Group 3 | | 1 | | 3 | | | 4 |
| Post temporal | | | | 2 | | | 2 |
| Caudal Vertebra Group 1 | | | | 1 | | | 1 |
| Ceratohyal | | | | 1 | | | 1 |
| Maxilla | | 1 | | | | | 1 |
| Opercular | | | | 1 | | | 1 |
| Preopercular | | | | 1 | | | 1 |
| Ling | | | | | | | |
| Abdominal Vertebra Group 1 | 2 | | | | | | 2 |
| Abdominal Vertebra Group 2 | 2 | | | | | | 2 |
| Abdominal Vertebra Group 3 | 2 | | | | | | 2 |
| Cleithrum | | | | 2 | | | 2 |
| Supracleithrum | 2 | | | | | | 2 |
| Hyomandibular | 1 | | | | | | 1 |
| Parasphenoid | | | | | 1 | | 1 |
| Whiting | | | | | | | |
| Articular | | | | | | 1 | 1 |
| Hake | | | | | | | |
| Maxilla | | | | 1 | | | 1 |
| Quadrate | | | | 1 | | | 1 |
| Halibut Family | | | | | | | |
| Abdominal Vertebra | | | | 1 | | | 1 |
| Halibut | | | | | | | |
| Dentary | | | | 1 | | | 1 |
| Flounder/ Plaice | | | | | | | |
| Hyomandibular | | | | 1 | | | 1 |
| Plaice | | | | | | | |
| 1st Anal Pterygiophore | | | | 1 | | | 1 |
| Articular | | | | 1 | | | 1 |
| Cleithrum | | | | 1 | | | 1 |
| Infrapharyngeal | | | | 1 | | | 1 |

Table 31. Butchery marks (all specimens).

| Element | Common name | Interpretation | Site 9 | Site 71, Phase 4 |
|-------------------------|----------------------|-----------------------------|--------|---------------------|
| Caudal Vertebra Group 1 | Cod | removing anterior vertebrae | | 2 |
| Caudal Vertebra Group 1 | Cod/ Saithe/ Pollack | removing anterior vertebrae | | 1 |
| Caudal Vertebra Group 2 | Cod | | 1 | |
| Ceratohyal | Cod | | | 1 |
| Cleithrum | Cod | decapitation | | 1 |
| Cleithrum | Ling | decapitation | | 1 |
| Cleithrum | Ling | decapitation | | 1 |
| Supracleithrum | Cod | decapitation | | 1 |

Table 32. Estimated total length of fish based on comparison of diagnostic elements with reference specimens of known size.

| Total length | Site 9 | Site 12 | Site 71, | Site 71, Phase 3 | Site 71, Phase 4 | Site 71, Phase 5 | Total Unstrat. |
|-------------------------|--------|---------|----------|---------------------|---------------------|---------------------|-------------------|
| Conger Eel | | | | | | | |
| >1000mm | | | | 2 | | | 2 |
| Atlantic Herring | | | | | | | |
| 151-300mm | | | | 14 | | | 14 |
| 301-500mm | | | | 6 | | | 6 |
| Cod | | | | | | | |
| 301-500mm | | | | 3 | | | 3 |
| 501-800mm | 2 | | | 12 | | 1 | 15 |
| 801-1000mm | 1 | 1 | | 14 | | | 16 |
| >1000mm | 3 | 3 | | 4 | | | 10 |
| Haddock | | | | | | | |
| 301-500mm | | 2 | | 2 | | | 4 |
| 501-800mm | 1 | 2 | 1 | 6 | | | 10 |
| 801-1000mm | 1 | | | 2 | | | 3 |
| Ling | | | | | | | |
| 801-1000mm | | | | | 1 | | 1 |
| >1000mm | 3 | | | 2 | | | 5 |
| Whiting | | | | | | | |
| 301-500mm | | | | | | 1 | 1 |
| Hake | | | | | | | |
| 801-1000mm | | | | 2 | | | 2 |
| Halibut | | | | | | | |
| 501-800mm | | | | 1 | | | 1 |
| Flounder/ Plaice | | | | | | | |
| 301-500mm | | | | 1 | | | 1 |
| Plaice | | | | | | | |
| 501-800mm | | | | 3 | | | 3 |

specimens were from large individuals (0.5 to 0.8m total length). The principal exception is herring, for which most specimens derived from fish of less than 0.3m total length. These estimates are based on comparison with reference specimens of known size. Too few measurements could be taken to justify quantitative analysis.

Discussion

Despite its limitations, this assemblage does suggest the transport of a wide diversity of marine fish to Wharram Percy, in both whole (probably fresh) and cured states. It also implies that the use of freshwater fish was far less common. The vast majority of the material, including the butchered specimens, derived from Phase 4 of Site 71.

These patterns are consistent with broader trends in fish consumption in medieval England. The widespread use of freshwater fish declined in the 11th century (Barrett *et al.* in press), after which they were increasingly earmarked for elite consumption (Dyer 1988). The use of herring and cod first expanded to fill the gap, but they were joined in the 13th to 14th centuries by an increasing diversity of species – including haddock, ling and hake (Kowaleski 2000; Fox 2001; Barrett *et al.* in press). Christian doctrine created a high demand for fish during Lent and other periods of fasting (Woolgar 2000). Cured herring, cod and related species were thus the subjects of major medieval industries and were traded over long distances (Childs and Kowaleski 2000). It is conceivable, for example, that the dried cod at Wharram Percy were stockfish from Arctic Norway (Christensen and Nielssen 1996) and that the herring were from East Anglia or the Baltic (Holm 1996; Childs and Kowaleski 2000).

24 The Post-Saxon Vegetational History of Wharram Percy: a Palynological Account

by M.B. Bush (formerly of Department of Geography, University of Hull, England; Department of Zoology, The Ohio State University, Columbus, U.S.A.)

This paper was originally written in 1981 and revised, by the author, in 1988. All attempts at contacting him during 2003, both in England and America, have failed and the paper is therefore published as received in 1988.

Summary

Sedimentary deposits which had accreted behind the dams at Wharram Percy, believed to date from the 11th century, were analysed for their fossil pollen content.

A complementary study of modern pollen spectra in surficial sediments bordering the stream which currently flows through the valley bottom at Wharram Percy, allowed the comparison of modern pollen rain with fossil pollen of Phases 1 and 2 of Site 30. Although selective

preservation of some pollen samples was evident, there were nine levels which were apparently well preserved and conclusions are based on these samples. Pollen evidence suggests that the landscape of Phases 1 and 2 was probably similar to that of today: arable cultivation on the tops of the Wolds and chalk grassland on the valley slopes. *Cannabis sativa* pollen, absent from modern samples, was present in many of the fossil samples, but not in sufficient quantities to suggest that the pond was used for retting.

Introduction

During the 1980s the chalklands of Britain revealed several pollen histories. At Winchester on the South Downs, Waton (1982) reported neolithic forest disturbance leading to the formation of the chalk grasslands in southern England. More recently, it has been suggested that the chalk grasslands of the Yorkshire Wolds have been in existence throughout the post-glacial period (Bush and Flenley 1987; Bush 1988) and that human disturbance dating back to 9200 BP has maintained an evolving community of chalkland species which has its roots in the tundras of the glacial maxima.

There has also emerged a long history of cereal cultivation on the Yorkshire Wolds. Evans and Dimbleby (1976) recorded the presence of both chalk grassland and arable land prior to the construction of Kilham Long Barrow at c. 4400 BP. Thus, to put the palaeoecological data from Wharram Percy in perspective, we may start from the premise that the vegetation of the Great Wold Valley had been locally disturbed for some 8200 years, and that cereals had been cultivated for at least 3200 years before the deposits accumulated behind the dam at Wharram Percy. As Wharram Percy lies close to the Great Wold Valley, it is not unreasonable to suppose that mesolithic and neolithic peoples had been active in the area. It is unlikely, therefore, that Wharram Percy would have had an undisturbed vegetation cover lasting until c. 1200 BP. The questions which remain to be addressed in this study are: is there evidence of small-scale garden cultivation discernible in the pollen rain and to what extent were the Wolds around Wharram Percy wooded?

The site

The deposits sampled were taken from the faces of sedimentary accumulation behind the dams of the Wharram Percy millpond which were exposed during the 1980 site excavation (see Fig. 63). The Phase 1 pond was a small body of water with an inflow and an outflow, the inflow provided by a spring line at the base of the steep sided chalk valley in which the pond lay.

In the valley bottom the old outline of the pond is marked by a belt of hawthorn (*Crataegus monogyna*). More recently, the valley bottom has been flooded to recreate the pond, but at the time of the fieldwork the valley bottom consisted of a flushed grassland rich in sedges (*Carex* spp.), rushes (*Juncus* spp.), marsh

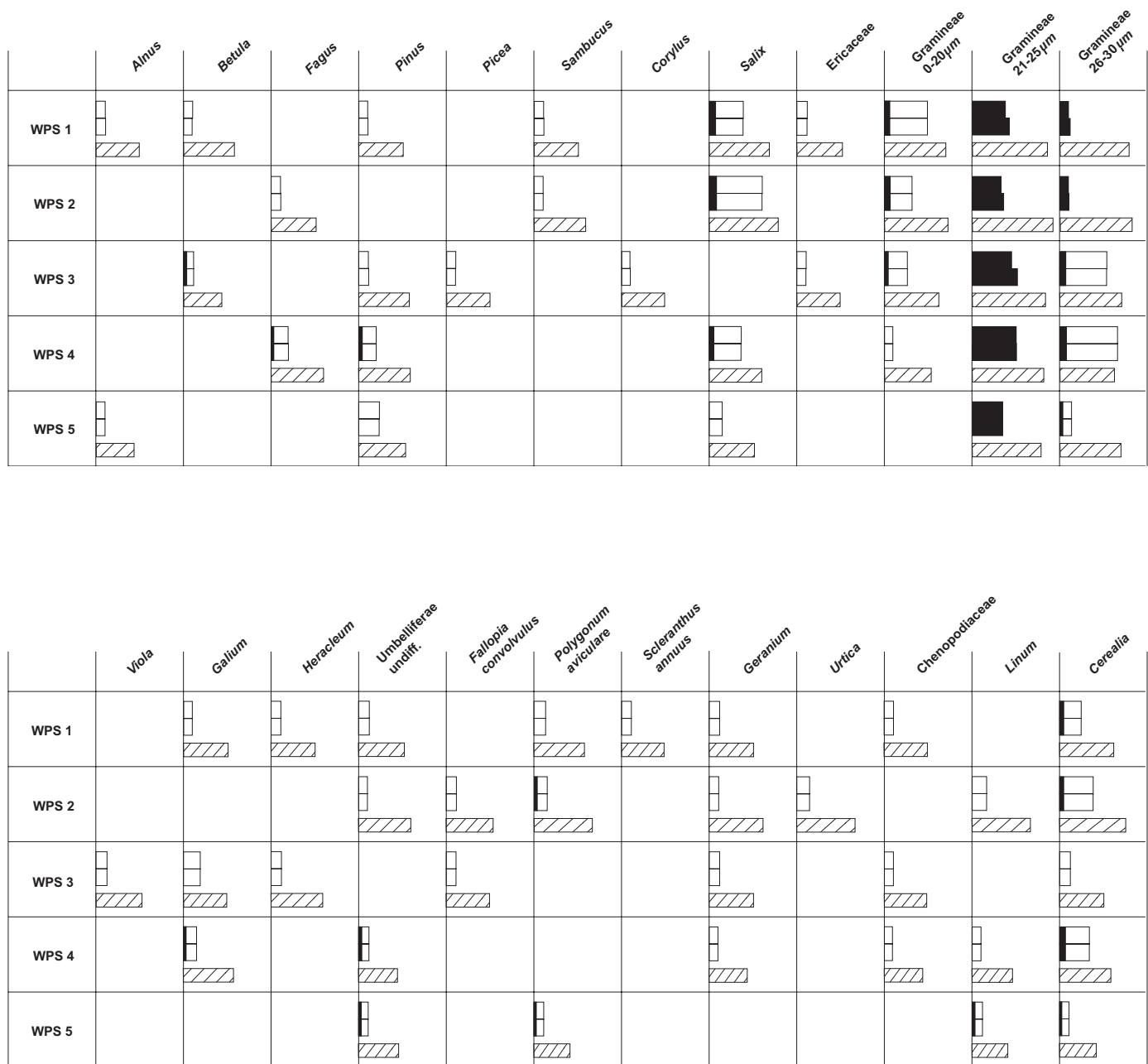


Fig. 75. Percentage diagram of the composition of modern pollen.

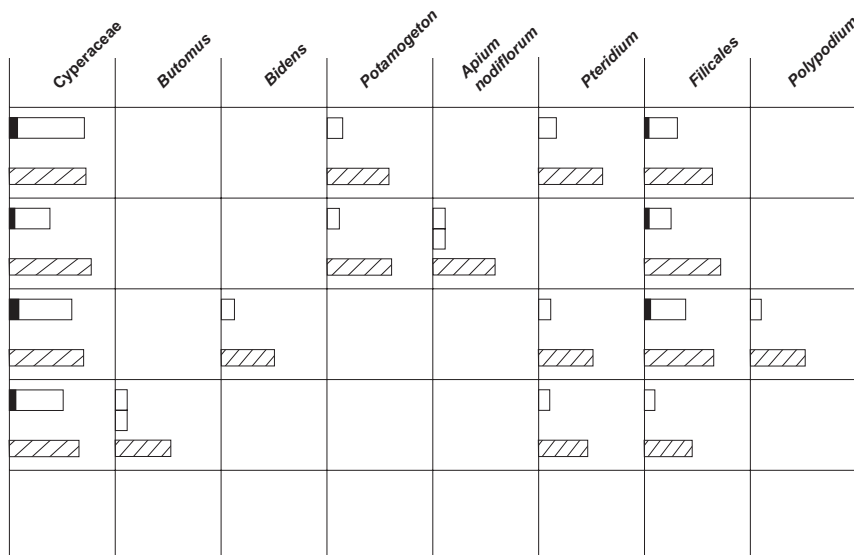
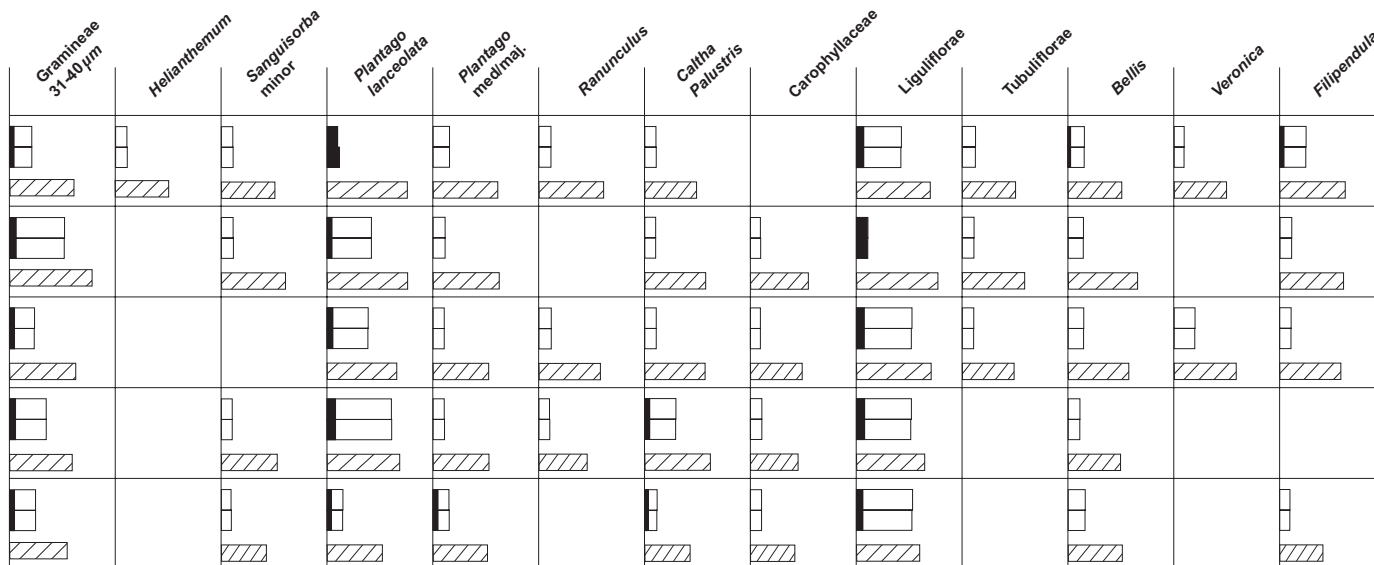
marigold (*Caltha palustris*) and willow herb (*Epilobium* sp.). In the shallow stream which flowed through this fen, fool's water-cress (*Apium nodiflorum*), brooklime (*Veronica beccabunga*), water mint (*Mentha aquatica*) and sweet-grass (*Glyceria* spp.) grew.

The present vegetation of the valley slopes is pasture with a mature chalk grassland characterised by calcicoles. The slopes of the valley sides are too steep to plough, and have been left as unimproved pasture for grazing by sheep on the eastern side, and as improved pasture for sheep and cattle on the western valley slopes. Particularly on the eastern side of the valley the unimproved grassland supports a diverse chalk grassland flora with salad burnet (*Sanguisorba minor*) and fairy flax (*Linum catharticum*). On the tops of the Wolds the principal agriculture is arable farming.

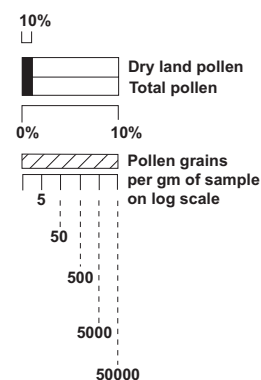
Nut Wood lying 500m to the north-east of the pond is a small commercial woodland of mixed species including silver fir (*Picea abies*), larch (*Larix decidua*) and sycamore (*Acer pseudoplatanus*). Other tree species in the area are largely limited to the churchyard where willows (*Salix* spp.) are present.

Methods

The fossil samples were collected by Dr J.R.Flenley in 1980 from an exposed face of sedimentary deposits. It is important to emphasise that this is not a continuous core but a series of samples taken from the various stratigraphic levels formed during three phases of sediment accumulation. The sediments are all from Phases 1 and 2 (see Table 42). The modern analogue



Key



surface samples were collected from areas which appeared to be permanently saturated. A 5mm deep scrape of sediment was removed for analysis.

Preparation of samples followed the techniques of Faegri and Iversen (1975); *Lycopodium* spores were added (Stockmarr 1971) to facilitate concentration calculations. Samples were additionally 'cleaned' by ultrasonic sieving (10 mm) (Caratini 1981; Tomlinson 1984) and were mounted in silicone oil. Counting was hindered in some samples by low pollen frequencies and poor preservation, but it was usually possible to attain counts of over 200 grains per sample.

Results

The total pollen percentages, dry land pollen percentages and pollen grains per gram of dried sample were calculated and plotted for both modern and fossil spectra (Figs 75-6). Samples are plotted in Fig. 76 in the order in which it is believed they were deposited. Due to the complex site stratigraphy, i.e. lenses of organic matter within bedded silts, the samples are identified by the stratigraphic number assigned by the archaeologists to each level. As temporal relationships between the samples are unclear no attempt was made to zone the fossil diagram.

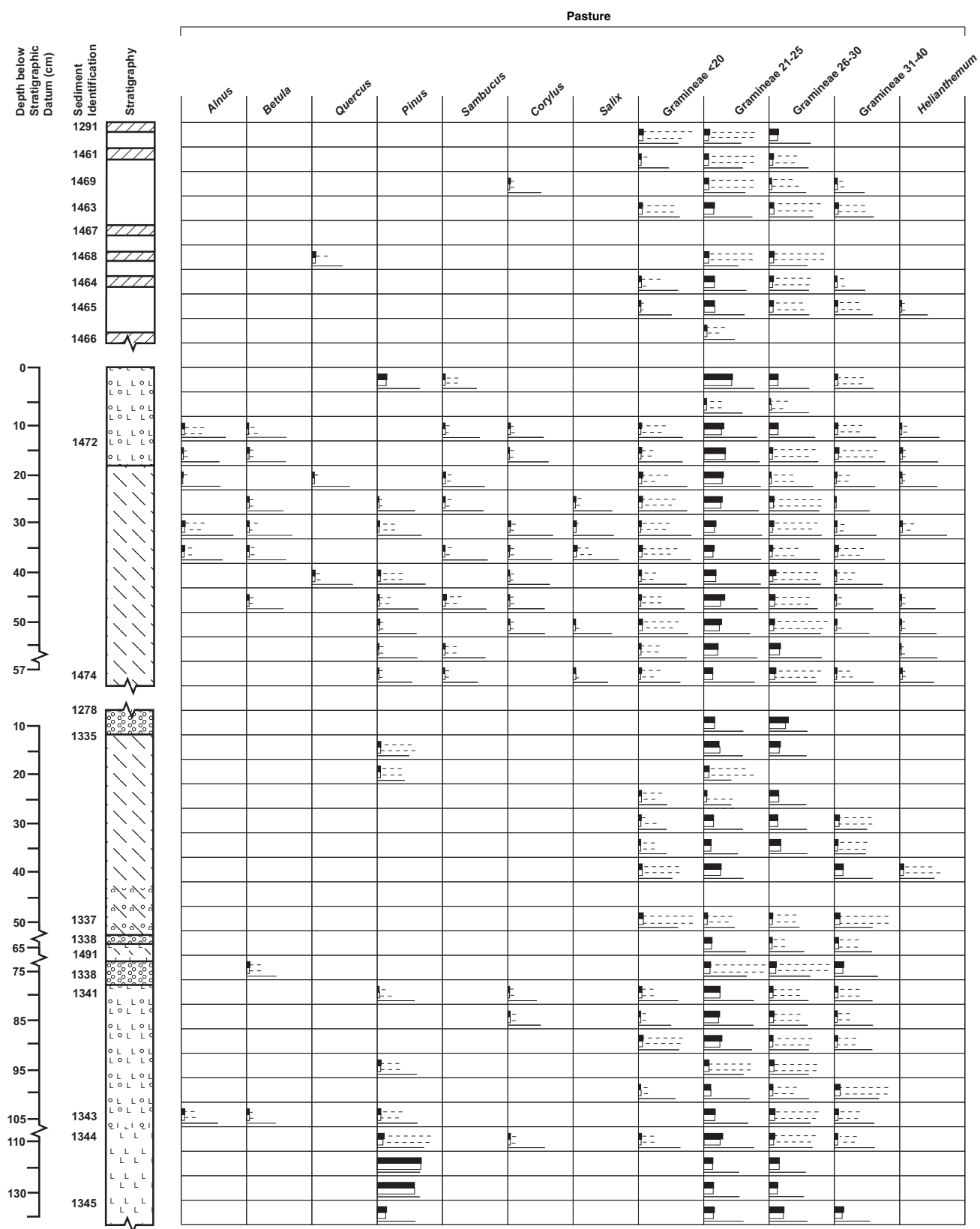


Fig. 76. Percent diagrams of the fossil pollen from Site 30. (See p. 181 for key)

[illegible]

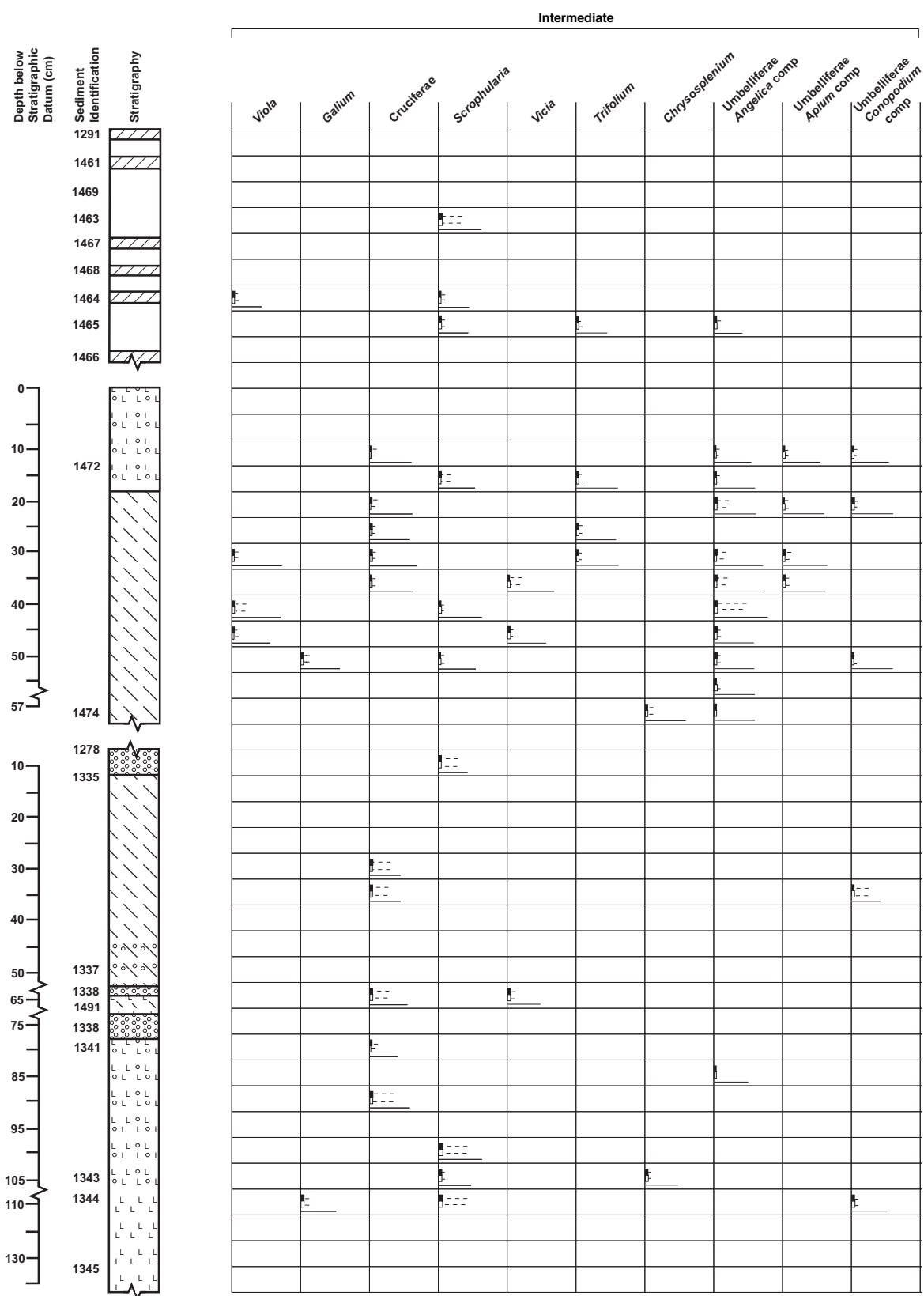


Fig. 76 continued.

[illegible]

| | |
|---|--------------------------------------|
|  | Organic |
|  | Clay |
|  | Silt |
|  | Chalk pebbles and gravels |
|  | Clays and silts |
|  | Silts and chalk fragments |

The graph is a log scale plot. The y-axis is labeled 'pollen grains per gm of sample on log scale' and has major tick marks at 5, 50, 500, 5000, and 50000. The x-axis has three categories: '% dry land pollen (x10)', '% total pollen (x10)', and '% total pollen (x10)'. The data points are represented by vertical bars. The first two categories show very low pollen grain counts (below 50). The third category shows a very high pollen grain count, peaking at approximately 50,000.

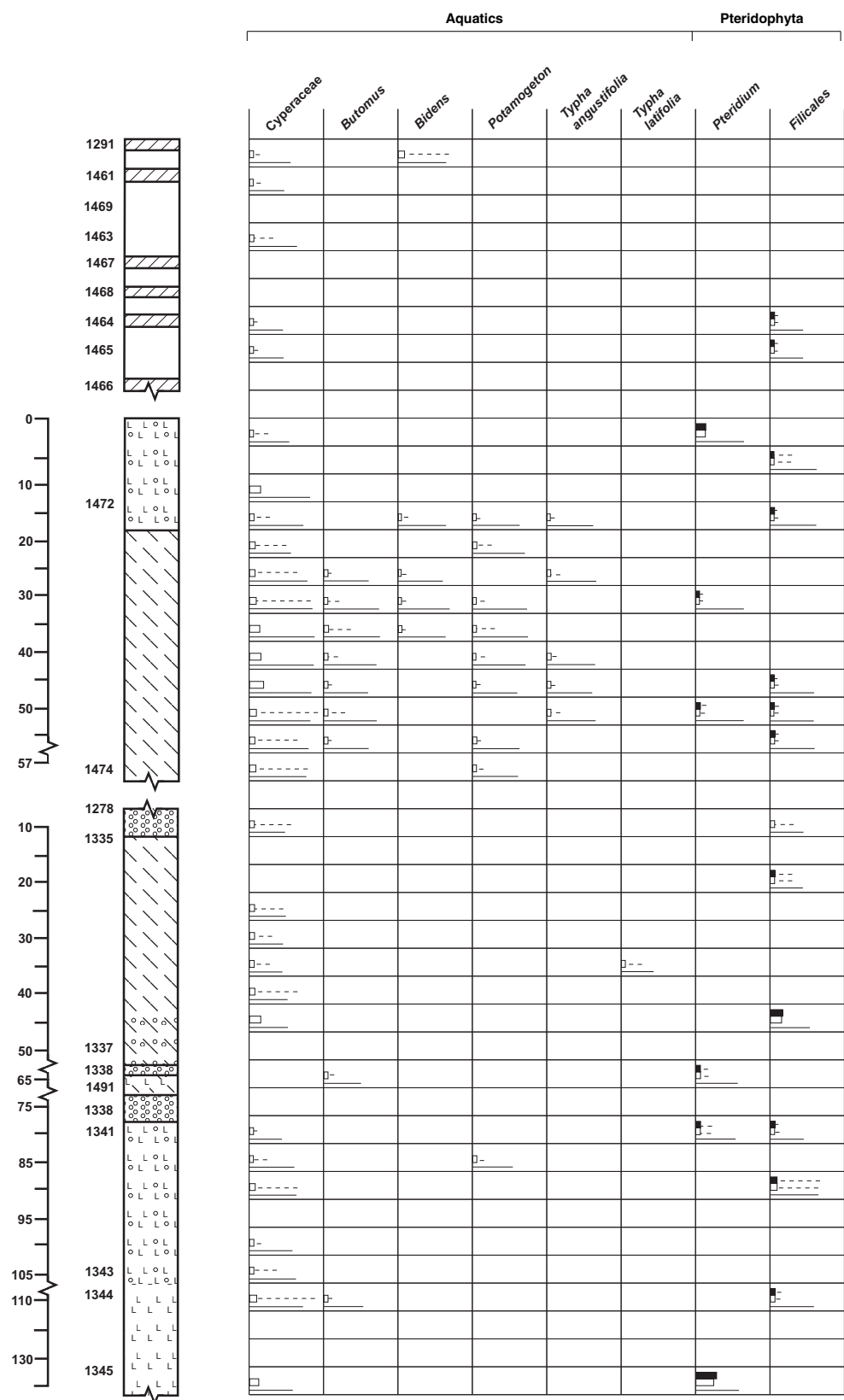


Fig. 76 continued. (See p. 181 for key)

Discussion

In Sections 1 and 3 (Fig. 76) Liguliflorae pollen reaches anomalously high levels. Sample 1466 has a value of 90% (7,308 grains g⁻¹) which may be compared with samples in 1474 of Section 2 with a value for Liguliflorae of 12% (23,814 grains g⁻¹). Thus it is evident that Section 2 is much richer in fossil pollen and that the apparent abundance of Liguliflorae in Sections 1 and 3 is due to the disproportionate loss of other pollen types. Such a loss may come about through selective preservation: some pollen types are more likely to survive chemical aggradation and oxidation than others (Havinga 1967; 1971). Havinga noted that Liguliflorae pollen was especially resistant and so the peaks of this pollen type are almost certainly artefactual. They do tell us something about the environment. It is most unlikely that an assemblage of pollen grains which have been kept permanently moist will show selective preservation. Notions that calcareous waters may lead to pollen destruction have been refuted by Waton (1982) and Bush (1986). The selective preservation would almost certainly have been due to the emptying of the pond and the exposure of the sedimentary material to atmospheric oxygen. Thus at least two, possibly three, phases of pond building are demonstrated.

An initial pond was formed using the Section 3 deposit of carbonised grain as a dam (Fig. 76). This dam was breached, or the pond dried up, in the interim between Sections 3 and 2. A new pond was formed, sediment accreted and may have filled the pond. As this deposit shows little evidence of selective preservation (with the exception of one sample near the top of the section) it is likely that these sediments remained buried with a water table at or near their upper surface. A layer of sediments showing selective preservation above Section 2, suggests either a heightened dam, i.e. a third phase of pond building, or that Sections 1 and 2 are part of the same depositional sequence, but subsequent dam destruction lowered the water table sufficiently to allow Section 1 to oxidise but to keep Section 2 moist. Although there is no direct evidence to determine which of these alternatives is correct, the stratigraphic change at the boundary of Sections 1 and 2 suggests entirely different depositional environments, and hence a third phase of dam building is seen as the most economical explanation.

The origin of the pollen input to the Wharram Percy deposits will be a function of the size of the Phase 1 pond, the length and size of the feeder stream, and the kind of vegetation cover alongside the stream and lake margin. Peck (1973) estimated the percentage of pollen washed into a small Yorkshire lake by feeder streams and surface runoff to be 91-97% of the pollen influx. A similar value of 90% was obtained at Blenheim Tarn (Bonney 1976). As Wharram Percy is on permeable chalk with extremely porous soils, it is possible that the runoff figure may not be as high as that found on the moor grit by Peck. Furthermore the feeder stream is relatively small (< 0.5km

long) and drains only the valley in which Wharram Percy is located. Therefore, it probably contributed a relatively minor pollen component, and what it did contribute would reflect the extra-local environment, probably a very similar catchment to that represented by the aerial pollen rain to a 0.25 hectare pool such as this one. It is evident that we cannot be too explicit about the fossil pollen source area, but the modern surface samples have been exposed to similar processes, i.e. they are located within the site of the old pond and are flushed by the same feeder stream, and therefore should be useful analogues.

The fossil samples subject to selective preservation are of little value beyond providing bare species lists. On the basis of the presence of salad burnet (*Sanguisorba minor*), plantains (*Plantago media/major*) and daisy (*Bellis*) it is likely that chalk grasslands were present throughout Sections 1 and 2. Cerealia pollen was recorded in both sections indicating nearby arable farming. Section 2 appears to be well preserved and the character of the samples essentially similar to those of Sections 1 and 3. As there is no clear evidence to suggest Section 2 to be atypical, more detailed conclusions regarding the vegetation around Wharram Percy will be based on this section.

The arboreal pollen content is relatively low (c. 10%) with a mixture of trees which were probably growing locally in small numbers, e.g. elder (*Sambucus*) and willow (*Salix*) and some which were, as now, a longer distance component, e.g. birch (*Betula*), hazel (*Corylus*), alder (*Alnus*). This correlates with the modern pollen spectra (Fig. 75) in which a similar assortment of trees totals 10%. Noticeably oak (*Quercus*) is absent from the modern spectra and its presence in only three of the fossil spectra would suggest a very low local, or purely long-distance, pollen source for this genus. Hawthorn, though a common chalkland shrub, is absent from both modern and fossil spectra. This should not be construed as indicative of the absence of the plant as this species has such delicate pollen that it seldom fossilises and may be considered a 'silent' member of the chalkland community.

Gramineae (Grass family) pollen accounts for 30-70% of the fossil dry land pollen spectrum, with a modal size of 21-25µm which accords almost exactly with modern Gramineae representation (30-60%) with a modal size of 21-25µm. The larger Gramineae pollen of 31-40µm which are present in the modern spectrum could represent *Glyceria plicata* (Beug 1961). Similar quantities of these large Gramineae grains were recovered from the fossil deposits.

There is a strong representation of the dry chalk grassland flora in the fossil deposits with flax (*Linum*), rock-rose (*Helianthemum*), salad burnet (*Sanguisorba minor*), plantains *Plantago Media/major* and *Geranium*, all of which are represented in the modern spectrum in similar abundances. It is likely that this was a grazed grassland, hence the numbers of broad-leaved herbs which would be lost to dominant grasses in an ungrazed

system. A light grazing of a grassland sward will promote species diversity, but overgrazing or enrichment with dung, or by nitrogen-fixing plants (e.g. *Trifolium*), may lead to vigorous grass growth and a loss of the more sensitive chalkland species. The *Helianthemum* pollen probably represents *H. chamaecistus*. *Helianthemum* is the only one of these grassland species which went unrecorded in an extensive floral survey carried out within the valley. The presence of *Helianthemum* in only one sample of the modern analogues suggests that this single pollen grain may have been derived from outside the valley, for it is a common grassland plant on other mature chalk grasslands of the Yorkshire Wolds, e.g. Fordon Chalk Bank.

Lanceolate plantain (*Plantago lanceolata*) is well represented throughout Section 2. *P. lanceolata* is a weed of disturbed ground and these higher values may represent a local abundance of the plant on the drier sides of the pond and the dam, or it may represent a widespread occurrence of neglected land. Certainly most of the values are higher than the peak of 10% recorded from the modern analogues, which suggests greater-than-present areas of recolonising vegetation.

The occurrence of buck's-horn plantain (*Plantago coronopus*) appears somewhat anomalous as this is a species frequently associated with coastal locations. It has been documented, however, in inland pollen diagrams (Clark and Godwin 1956), and is reported to grow on light freely draining soils in North Humberside.

The presence of fossil Cerealia pollen (c. 2-3%) allies closely with abundances in the modern spectra (2-4%). This similarity suggests that the source for the pollen may be largely unchanged. Current cereal production around Wharram Percy is restricted to the flat land on the tops of the Wolds. The absence of plough marks on the steep valley sides would support the hypothesis that cereal cultivation did not extend downslope into the valley. The size of the cerealia pollen (44-50 µm) would be consistent with crops of meadow barley (*Hordeum vulgare*), wheat (*Triticum aestivum*) and oats (*Avena* sp.) which have been identified as carbonised seeds from other sedimentary deposits at Wharram Percy (Arthur, pers. comm.).

In Sections 2 and 3 (Fig. 76) Cruciferae pollen is present at 1-2%. Although there are many grassland and wetland Cruciferae, none of their pollen was recorded in the modern analogue samples. It is possible that the Cruciferae in the fossil samples represent cultivated plants, e.g. cabbage or wild turnip (*Brassica* spp.), which may have been grown in the cottage gardens. There are a number of pollen types which are agricultural weeds, e.g. black bindweed (*Fallopia convulvulus*), knotgrass (*Polygonum aviculare*) and mugwort (*Artemisia*). There were also species strongly indicative of disturbed or 'improved' grassland, e.g. stinging nettle (*Urtica dioica*), thistle (*Cirsium*), clover (*Trifolium*) and daisy (*Bellis*). These could be associated with cottage gardens, or in the case of *U. dioica* and *Cirsium*, they could have been associated with refuse.

The pollen of *Linum* was found in ten of the fossil samples and three of the modern analogue samples. The only *Linum* sp. growing around Wharram Percy at present is fairy flax (*L. catharticum*) but it is possible (though less likely) that the fossil pollen is that of pale flax (*L. bienne*) or flax (*L. usitatissimum*). The quantities of fossil *Linum* pollen are not sufficient to suggest cultivation for either linseed or cloth manufacture.

The pollen of Cannabaceae could represent one of two species, either the hop (*Humulus lupulus*) or hemp (*Cannabis sativa*). These grains are theoretically separable by the pore structure (Andrew 1984), however, the grains found in these samples were too poorly preserved to be certain of identification to species level. *H. lupulus* though a native British plant of damp woodlands was not widely grown until it was introduced for the making of hopped beers in the 16th century (Dimbleby 1967).

Cannabis sativa was a common medieval crop (Godwin 1967), but as these samples date from before the widespread use of *Humulus lupulus*, and as Wharram Percy does not appear to have provided a suitable habitat for the natural occurrence of *H. lupulus*, the Cannabaceae pollen are probably attributable to *C. sativa*. Neither *H. lupulus* nor *C. sativa* are now grown locally and their pollen was absent from the modern spectra.

Godwin (1967) states that part of the hemp-making process was to tie the cut *Cannabis sativa* into bundles and to soak them in a 'retting-pond'. Characteristically retting-ponds have large spikes of *C. sativa* pollen, of which there is no evidence at Wharram Percy. Furthermore, it is unlikely that hemp would be retted in the principal village pond in an area where surface water is at a premium, because hemp-retting fouled the water (Hall *et al.* 1979). It would seem that hemp was being grown locally, but was being soaked elsewhere if its use was for making rope.

Conclusions

Sedimentary deposits laid down behind the dam at Wharram Percy appear to have been subjected to periods of dessication related to the failure to maintain the dam. The early dam failure, between Sections 3 and 2 suggests a considerable period when the millpond was allowed to drain.

The Phase 1 and 2 landscape around Wharram Percy was probably a mixed agricultural landscape of grasslands on the valley sides and cultivation on the Wold tops. There was little woodland left, if indeed there ever had been a woodland cover, and the only hardwoods, oak and alder, are poorly represented, indicative of a long-range source for these pollen types.

Weeds of disturbed ground, cannabaceae and cruciferae are represented in the fossil pollen record and may relate to small-scale cultivation, e.g. cottage gardens.

25 Charred Plant Remains from Site 30

from archive reports by G. Hillman (n.d.) and J.R.B. Arthur (AML report no. 1751), combined and revised by W. J. Carruthers

Introduction

Two sequences of samples were taken during the excavations:

'Soil Samples A' - from a north-south section (PP/QQ 170) through Phase 2 pre-construction silts, silts associated with the clay dams, through to Phase 3 silts associated with the chalk and earth dam (samples D1 to D17 - See Figs 15 and 63).

'Soil Samples B' - from a west-east section (UU/VV 171/172) through a deposit of charred grain (samples D18 to D29 - See Figs 16 and 64).

Sample sizes are not available, but some of the samples may be the same as those listed in the insect report (see Ch. 28), since the context numbers match (1290 and 1474), and the charred remains were said to have been extracted 'in the course of paraffin floatation for insect remains' (Hillman n.d.).

The samples also appear to have been split at some point, so that J.R.B. Arthur produced a brief report (species lists and notes on identification) on some of the grain and weed seeds from samples D2 to D29 (AML report 1751), and later Gordon Hillman was sent material from seven samples in section D20 to D29 (Hillman n.d.). Samples D21 to D23 were not included in this sequence, although J.R.B. Arthur lists a few remains from D21 and D22. Sample D23 appears to have been unproductive.

Thus, details concerning the sample sizes and treatment of the remains discussed in this report are uncertain at best. Useful information can still be recovered, since several of the samples were productive, and some contained well-preserved chaff and weed seeds. Hillman notes that:

'cereal identification is far more reliable if based on spikelet remains (e.g. lemma or rachis fragments) rather than on grain remains alone, and as spikelet remains abound in the material examined for this report the identification may be of some value. In addition, many of the smaller seeds of weeds and ruderals appear to have been left behind in this spikelet-rich 'residue' when the grain was removed.'
(Hillman n.d.)

The samples also add to information recovered from other environmental remains from the Pond and Dam sites, and to that from Wharram Percy as a whole.

Results

Table 33 combines the results from both Hillman's and Arthur's reports for each sample. Nomenclature and habitat information follow Stace (1997).

It should be remembered that these two reports were written in the 1970s, and that identification criteria and our understanding of the environment and economy of the Late Saxon and medieval periods have moved on in the last 30 years. Nonetheless, the following notes on identification help to confirm that the results from these samples are still valid, and make a significant contribution to the archaeobotanical record.

Some notes on identification

by J.R.B. Arthur and P.J. Paradine

The identification of *T. turgidum* was assisted by the well-preserved grains clearly showing a hump on the dorsal side, accompanied by small characteristic thick stems of the straw.

It was interesting to secure a number of short internodes of the barley *Hordeum vulgare* of the strain *H. hexastichum*.

The *Carex* species are of the *C. flacca* group in shape - obovoid and trigonous. These species are often found in calcareous grassland, heavier soils and marshes throughout the British Isles.

Identification of cereals

by G. Hillman

Using charred grain alone, it is rarely possible to separate the bread wheats (including the compact-eared forms) from free-threshing tetraploids such as rivet wheat or glass wheat. Well preserved rachis remains, however, generally allow clear separation of the free-threshing tetraploid wheats from their hexaploid cousins. It is unfortunate that, in this case, the six rachis fragments were all a little too battered to allow identification either way.

All the charred remains of oats present in the Wharram Percy samples (in the form that they reached the author) appear to represent the small sand oat, *Avena strigosa*. The various species of oat that occur (or used to occur) in Britain can only be separated from each other when remains of lemma-bases are present. Even then, more than one identification is often possible in samples where only a few of these structures are present. This group of samples from Wharram Percy fortunately includes 38 well-preserved lemma-bases, together with innumerable fragments of awn, several hundreds of lemma-less grains and even a few spikelet-bases (represented by the swollen portion of the distal end of the inflorescence branches where the glumes were attached).

Using only criteria such as the gross morphology of the point of attachment at the base of the lemmas and the overall size of the few near-intact lemmas, the remains could be taken to represent not only *A. strigosa* but also the isolated upper florets of either *A. ludoviciana* and *A. sativa* (the common domestic oat). *A. ludoviciana* and *A. sativa* may safely be excluded on the basis of some of the finer details of lemma-base morphology, the tight twisting of the many awn fragments (this eliminates *A. sativa*) and finally the consistently small size of the several hundreds of lemma-less grains which include not

Table 33. Charred plant remains from Site 30.

KEY: all remains are charred apart from () = non-charred; + = present but not quantified; o = occasional; f = frequent; a = abundant; v.a = very abundant; cf. = uncertain identification; NFI = not further identified
Habitat preferences A = arable; C = cultivated; D = disturbed/waste; E = heath; G = grassland; H = hedgerow; M = marsh/bog; R = rivers/ditches/ponds; S = scrub; W = woods; Y = waysides/hedgerows; a = acidic soils; c = calcareous soils; n = nutrient-rich soils; o = open ground; d = damp soils;

| Sample | D2 | D3 | D4 | D5 | D6 | D7 | D8 | D10 | D11 | D12 | D14 | D18 | D19 | D20 | D21 | D24 | D25 | D26 | D27 | D28 | D29 |
|---|------|------|-------|------|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|------|------|------|------|-----|
| Context | 1574 | 1474 | 1474a | 1472 | 1472 | 1471 | 1472 | 1302 | 1293 | 1292 | 1290 | | 647 | 646 | 646 | 644 | 1278 | 1278 | 1278 | 1278 | 522 |
| Phase | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Taxa | | | | | | | | | | | | | | | | | | | | | |
| Cereals : | | | | | | | | | | | | | | | | | | | | | |
| <i>Triticum turgidum</i> | | | | | | | | | | | | 6 | | | | | | 4 | 3 | | |
| <i>Triticum</i> sp. (NFI wheat grain) | | | | | | | | | | | | | | 23 | 3 | 40 | 6 | 4 | 6 | 8 | 9 |
| <i>Hordeum</i> sp. (asymmetrical 6-row hulled barley grains) | | | | | | | | | | | | | | 22 | | 34 | 38 | 34 | 43 | 27 | 22 |
| <i>Hordeum</i> sp. (symmetrical hulled barley grains) | | | | | | | | | | | | | | 10 | | 15 | 18 | 18 | 16 | 8 | 7 |
| <i>Hordeum</i> sp. (unreferable barley grains) | | | | | | | | | | | | 36 | | 290 | | 774 | 574 | 1225 | 1330 | 706 | 634 |
| <i>A. strigosa</i> (sand oat grains) | | | | | | | | | | | | | | 89 | | 160 | 144 | 180 | 210 | 202 | 46 |
| <i>A. fatua</i> L. (wild oat floret) | | | | | | | | | | | | | | 1 | | | | | | | |
| <i>Avena</i> sp. (NFI oat grains) | | | | | | | | | | | | 8 | | 4 | 7 | 7 | 12 | 6 | 3 | 8 | 4 |
| Secale cereale L. (rye grain) | | | | | | | | | | | | | | 1 | | | | 6 | | 2 | 2 |
| Secale or Triticum | | | | | | | | | | | | | | | | | 2 | | | 9 | |
| Sprouted grains (all types) | | | | | | | | | | | | | | 1 | | | | 4 | 4 | 2 | |
| Insect infested grain (precise measure of frequency not possible) | | | | | | | | | | | | | | + | | + | + | + | + | + | + |
| Chaff : | | | | | | | | | | | | | | | | | | | | | |
| <i>Triticum</i> sp. (free-threshing wheat rachis nodes) | | | | | | | | | | | | | | 2 | | 1 | | | 1 | 1 | 1 |
| <i>Hordeum</i> sp. (lax eared, six-row, hulled barley rachis nodes) | | | | | | | | | | | | | | 78 | | 52 | 4 | 13 | 130 | 7 | 29 |
| <i>Hordeum</i> sp. (lax eared, six-row, hulled barley detached lemma bases) | | | | | | | | | | | | | | 3 | | 1 | 1 | 6 | 6 | 5 | 3 |
| <i>Avena strigosa</i> lemma bases | | | | | | | | | | | | | | 1 | | 3 | 1 | 5 | 26 | | 2 |
| <i>Avena</i> sp. (oat awn frag.) | | | | | | | | | | | | | | f | | a | a | a | v.a | a | a |
| Weeds and ruderals: | | | | | | | | | | | | | | | | | | | | | |
| <i>Ranunculus repens/acris/bulbosus</i> (buttercup achene) DG | | | | | | | | | | | | | | 1 | | | | | | | |
| <i>Ranunculus flammula</i> (esser spearwort achene) MR | | | | | | | | | | | | | | | | | | | | 1 | |

Table 33 continued.

| Sample | D2 | D3 | D4 | D5 | D6 | D7 | D8 | D10 | D11 | D12 | D14 | D18 | D19 | D20 | D21 | D24 | D25 | D26 | D27 | D28 | D29 |
|---|------|------|-------|------|------|------|------|------|------|------|------|-----|-------|-----|-----|-----|------|------|------|------|-----|
| Context | 1574 | 1474 | 1474a | 1472 | 1472 | 1471 | 1472 | 1302 | 1293 | 1292 | 1290 | | 647 | 646 | 646 | 644 | 1278 | 1278 | 1278 | 1278 | 522 |
| Phase | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Taxa | | | | | | | | | | | | | | | | | | | | | |
| <i>Papaver dubium/ rhoeas</i> L. (poppy seed) AD | | | | | | | | | | | | | | 1 | | | | | | | |
| <i>Fumaria</i> sp. (fumitory seed) CD | | | | | | | | | | | | | 2 | | | | | | | | |
| <i>Urtica dioica</i> L. (stinging nettle) | | | | | | | | | | | | | (365) | | (4) | | | | | | |
| <i>Urtica urens</i> L. (small nettle achene) CDn | | | | 3 | | | | | | | | | 2 | 5 | 3 | | | | | | |
| SCorylus avellana L. (hazelnut shell frag.) HSW | | | | | | | | | | | | | | | | | | | | | |
| <i>Atriplex patula/prostrata</i> (orache seed) CDn | | | | | | | | | | | | | | | 1 | | 1 | | 2 | 2 | |
| <i>Chenopodium album</i> L. (fat hen seed) CDn | | | | | | | | | | | | | | | 2 | | | | | | |
| <i>Agrostemma githago</i> L. (corn cockle seed) AD | | | | | | | | | | | | | | 1 | | | | | | | |
| <i>Stellaria media</i> (L.) Villars (common chickweed seed) CD | | | | | | | | | | | | | 14 | 5 | | | | | | | |
| <i>S. graminea</i> | 1 | | 1 | | | | | | | | | | | | | | | | | | |
| <i>Polygonum aviculare</i> L. (knotgrass achene) CD | | 1 | | | | | | | | | | | | 1 | | | | | | | |
| <i>Fallopia convolvulus</i> (L.) A.Love (<i>black-bindweed achene</i>) AD | | | | | | | | | | | | | | | | | | | | | |
| <i>Rumex acetosella</i> L. (<i>sheep's sorrel achene</i>) CEGas | 1 | | | | | | | | | | | | 2 | 1 | | | | | | | |
| <i>Rumex obtusifolius</i> | | | | | | | | | | | | | | 1 | | | | | | | |
| <i>R. crispus</i> L. (curled dock achene) CD | | | 1 | | | | | | | | | | | | | | | | | | |
| <i>Rumex</i> sp. (dock achene) CDG | | | | | | | | | | | | | (5) | | | | 2 | 3 | 2 | 2 | |
| <i>Malva</i> sp. (mallow nutlet) DG | | | | | | | | | | | | | | | | | | | | 1 | |
| <i>Viola</i> sp. (violet seed) | | | | | | | | | | | | | | | | 1 | | 1 | | | |
| <i>Sinapis arvensis</i> L. (charlock seeds) Ad | | | | | | | | | | | | | 32 | | | 28 | 8 | 15 | 38 | 2 | 9 |
| <i>Sinapis arvensis</i> L. (charlock capsule fragments) | | | | | | | | | | | | | | | | a | | o | f | f | |
| <i>Sinapis arvensis</i> L. (charlock capsule pedicels) | | | | | | | | | | | | | | | | 3 | 1 | 2 | 10 | 1 | |
| <i>Calluna vulgaris</i> (L.) Hull (heather leafy shoot tip) | | | | | | | | | | | | | 2 | | | | | | | 1 | |
| <i>Sanguisorba minor</i> Scop. (salad burnet achene) Gc | | | | | | | | | | | | | | | | | | | | | |
| <i>Trifolium</i> sp. (clover seed) DG | | | | | | | 2 | | | | | | | | | | | 1 | | | |
| <i>Vicia tetrasperma</i> (L.) | 1 | | | | | | | | | | | | 5 | | | | 4 | 4 | 5 | 2 | 1 |
| <i>Vicia/Lathyrus/Pisum</i> sp. (large-seeded legume cotyledons) | | | | | | | | | | | | | | | | | | 1 | | | + |
| <i>Linum catharticum</i> L. (fairy flax seed) Cds | | | | | | | | | | | | | | | | | | | 1 | | |

Table 33 continued.

| Sample | D2 | D3 | D4 | D5 | D6 | D7 | D8 | D10 | D11 | D12 | D14 | D18 | D19 | D20 | D21 | D24 | D25 | D26 | D27 | D28 | D29 |
|---|----------|----------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|------------|-----------|-------------|------------|-------------|-------------|------------|-----|
| Context | 1574 | 1474 | 1474a | 1472 | 1472 | 1471 | 1472 | 1302 | 1293 | 1292 | 1290 | | 647 | 646 | 646 | 644 | 1278 | 1278 | 1278 | 1278 | 522 |
| Phase | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Taxa | | | | | | | | | | | | | | | | | | | | | |
| <i>Torilis</i> sp. (immature hedge parsley mericarp) | | | | | | | | | | | | | | | 2 | | | | | | |
| <i>Bupleurum rotundifolium</i> (thorow-wax mericarp) | | | | | | | | | | | | | | | | | Cf.1 | | | | |
| <i>Aethusa cynapium</i> L. (fool's parsley mericarp) | | | | | | | | | | | | | 3(42) | | | | 5 | 2 | | | |
| Apiaceae NFI | | | | | | | | | | | | | (1) | | | | (1) | | | | |
| <i>Hyoscyamus niger</i> L. (henbane seed) CDn | | | | | | | | | | | | | (64) | | | | | | | | |
| <i>Prunella vulgaris</i> L. (self-heal nutlet) GHW | | | | | | | | | | | | | 1 | | 1 | | | | | 1 | |
| <i>Stachys</i> sp. (woundwort nutlet) GH | | | | | | | | | | | | | | | | | | | | 2 | |
| <i>Galeopsis</i> sp. (hemp-nettle nutlet) GHW | | | | | | | | | | | | | | | | | | | | 3 | |
| <i>Plantago lanceolata</i> (ribwort plantain seed) CDGo | | | | | | | | | | | | | | | 1 | 2 | | | 1 | | 1 |
| <i>Odontites verrus/Euphrasia</i> sp. (red bartsia/eyebright seed) CD | | | | | | | | | | | | | | 1 | | | | 1 | | | |
| <i>Gallium aparine</i> L. (cleavers) CDG | | | | | | | | | | | | | | | | | | | | | |
| <i>Sambucus nigra</i> L. (elder seed) HSW | | | | | | | | | | | | | | 4 | | 3 | | (2) | | | |
| <i>Arctium</i> sp. (burdock achene) | | | | | | | | | | | | | 1 | | | | | | | | |
| <i>Cirsium/Carduus</i> sp. (thistle achene) | | | | 1 | | | 2 | | 1 | | | | | | 2 | | | | 2 | 1 | |
| <i>Carduus</i> cf. <i>acanthoides</i> (cf. weltd thistle) | | | | | | | | | | | | | | | | | | | | 1 | |
| <i>Centaurea</i> sp. (knapweed) | | | | | | | | | | | | | | | | | | | | | |
| <i>Lapsana communis</i> L. (nipplewort achene) DHWo | | | | | | | | | | | | | | 3 | | 3 | 1 | 5 | 6 | 1 | 2 |
| <i>Leontodon autumnalis</i> (autumnal hawkbit) | | | | | | | | | | | | | | | | 1 | Cf.1 | 2 | 1 | | |
| Asteraceae indeterminate | | | | | | | | | | | | | | | 2 | | | 4 | | | |
| <i>Juncus</i> sp. (rush seed) | | | | | | | | | | | | | | | 5 | | | | | | |
| <i>Carex</i> sp. (sedge nutlet) GdMP | | | | 10 | | 8 | 3 | 3 | 3 | 5 | 4 | | 2(22) | 3 | | | | 1 | | | |
| Poaceae <i>Poa</i> -type (poa-type grass caryopsis) CDG | 2 | 3 | | | | | | | | | | | | | | 2 | | | | | 3 |
| Poaceae (indeterminate grass caryopsis) CDG | | | | | | | | | | | | | 7 | | 4 | | 6 | 2 | 3 | 1 | |
| Total charred (non-charred) plant remains: | 5 | 8 | 2 | 11 | 3 | 8 | 7 | 3 | 4 | 5 | 4 | 50 | 10 | 607 | 21 | 1146 | 820 | 1556 | 1002 | 782 | |
| | | | | | | | | | | | | | (499) | | (4) | | | (1) | (2) | | |

a single grain large enough to match the size of basal grains from either of the excluded species.

Lastly *A. brevis* (a species closely related to *A. strigosa*) can be excluded on the basis of the slender, elongated, form of the charred grains.

Sprouted grain

A few of the barley and oat grains had sprouted. This may indicate a wet summer that gave rise to lodging and sprouting in the ear or else poor conditions of storage and/or inadequate drying in the kilns prior to storage. The proportion of sprouted grains is too insignificant for any firm conclusions. Their numbers are certainly too small to represent an accident during the roasting of grain that had been deliberately germinated for malting.

Infested grain

Grains with holes bored by insects were present in all samples, however, the blistered and puffed state of most of the grains prevented any meaningful assessment of the proportion originally infested in this way. It is not impossible that the grain was deliberately burned to destroy the insect pest and prevent it spreading to other grain, though certain components of the sample indicate that the remains do not represent stored grain in any case.

Identification in general

Certain seeds such as those of the buttercup could be identified to species level if more time were allocated to the task. Very little (if any) additional information on past environment would result from the extra time invested.

Discussion

Phase 1: the grain deposits

Samples D20 to D29 were taken through dumps of charred grain pre-dating the first clay dam (contexts 646, 645, 644, 1278 and 522). The following passages are taken from Hillman's report on these samples, incorporating some cereals and weeds seeds from Arthur's report. Minor alterations to the text have not been marked, but major additions by Carruthers to Hillman's original interpretations in the light of new information by are marked [].

Food economy at Wharram Percy

Small numbers of samples of plant remains cannot be expected to tell us much about the relative contribution of different food plants to the economy of the settlement as a whole. Their composition may reflect no more than the effects of isolated, unrepresentative events or represent just one component of the pattern of variation associated with the different classes of activity area which are likely to have been operating during any one year within one settlement. The only available method of eliminating these relatively small-scale background fluctuations and deriving a more reliable clue to the overall pattern of food economy is by 'presence analysis' of very large numbers of samples recovered from independent deposits

associated with a wide range of different context types (see Hubbard 1975; 1976).

The ten [including three of Arthur's] samples examined from these closely associated deposits appear to be far from independent in terms of the plant materials that ended up in them. Indeed, the close similarity of the composition of the seven samples suggests that they had a common origin. All the material must, therefore, be considered collectively as a single sample and no reliable measure of relative importance of the different species can be given.

Sample composition

The composition of a sample of plant remains can occasionally provide detailed information on crop processing activities and even husbandry practices in the field. Interpretation at this level is not possible in the case of these samples from Wharram Percy for two reasons. Firstly, the precise treatment and size of the samples is uncertain [although the amalgamation of the two reports hopefully restores the samples more-or-less to their original composition]. Secondly, for interpretation at this low level, it is necessary to be certain that the material is derived from a single step in the crop-processing sequence without admixture of material from any other source. In fact, both the nature of the find-context and the composition of the samples suggest that the plant material is of mixed origin.

[Concentrations of remains cannot be compared through the profile, since sample size information is absent. Assuming that samples have not been misplaced, there appears to have been a hiatus in the middle of the section (samples D21 to D23) during which time charred cereal remains were not being deposited in any quantity.]

While detailed discussion of the composition of these incomplete samples would be potentially misleading, it is perhaps worth commenting on some of their more striking features. First, each sample contains a mixture of crop types that could be assumed to have resulted from mixed cropping. The possibility of mixed cropping cannot be tested because of the likelihood that the plant remains are of mixed origin.

Next, barley rachis fragments and oat awns are strikingly abundant. The numbers of rachis nodes and awn fragments suggest that this material was not from a typical grain store that had been through the usual sequence of threshing, winnowing and cleaning. Instead, it is possible that we are dealing with the sort of charred remains that accumulate in the ash of hearths or ovens fired with chaff and straw. The straw burns away, and so does most of the chaff. But the denser items such as stray grains, occasional detached rachis fragments and small segments of awn will drop into the ashes fast enough to be buried before they can be oxidised to ash. Buried in the ash they will merely be carbonised. Even though grains may be relatively rare in the original straw and chaff, they will be differentially preserved in this way and concentrations of them soon build up after a few fires. In

the absence of speltoid wheats, more grain will generally accumulate than rachis remains [the overall ratio of barley grains to chaff fragments in these samples is 17 to 1. Oat chaff is more difficult to quantify.] (The converse is true with burned chaff derived from spelt or emmer wheat). That straw and chaff from different crops should find its way onto the same hearth is not surprising, particularly towards the end of winter or into early spring when the different chaff stores tend to get amalgamated. This must be treated as just one of the interpretations possible for samples with an uncertain provenance.

The crops

The crops cultivated include free-threshing wheat [perhaps both bread and rivet wheat], six-row hulled barley [both lax-eared and dense-eared] and sand oat. Sand oat is a small-grained form of oat that, in present day Britain, is grown only at the limits of cereal cultivation in mountainous parts of Wales and in the Outer Hebrides. Rye was present either as a crop in its own right or, just as likely, as a 'weed' in the wheat fields. As a weed it would probably have been tolerated and gathered along with the main crop, just as in some primitive areas today. [The overall ratio of different cereal types is roughly 1 : 50 : 10 : 0.1 wheat : barley : oats : rye]. From the isolated cotyledon of a large-seeded legume, it would appear that either peas or large-seeded vetches were growing somewhere in the area either as crops or as weeds.

Cultivation of any of the crops identified here would have posed no real difficulty on the well-drained soils of the Wolds, given the sort of fallow systems cited for this period by Harris (1959). Arthur noted that:

'Plant remains at Wharram Percy are in many ways very similar to Therfield, Herts. (Biddle 1964).

1 Evidence of *Triticum turgidum* L.

2 Ample evidence of vetches as a weed in grain crops.

3 The prevalence of *Rumex* species.'

Seeds of weeds and ruderals

In aerobic or seasonally aerobic levels such as the grain dump, most of the non-charred seeds would probably be regarded as recent intrusives; the small seeds of ruderals growing in the vicinity all too readily get washed down into archaeological deposits. The non-charred seeds of fool's-parsley, elder, dock and sedge are matched (in adjacent deposits) by occasional charred seeds of the same species. This raises the possibility that some, at least, of the non-charred seeds are ancient after all. [In addition, 499 of the 506 non-charred seeds came from the lowest sample (D20) examined by Hillman, located just above the natural clay. Intrusive non-charred seeds are likely to have been more concentrated at the top of the section. It is, therefore, considered that the frequent non-charred stinging nettle, henbane, fool's parsley and sedge seeds have been preserved anaerobically, and are contemporary with the charred plant remains. The information provided by these taxa is that the nutrient status of the soils had been enriched, as indicated by the

henbane and nettle seeds. This could indicate the deposition of dung by grazing animals, or run-off from recently ploughed fields on the upper slopes of the Wolds.]

The bulk of the species listed in Table 33 are best regarded as weeds of crops. Examples of notable cornfield weeds appearing in the list include poppy, charlock, corncockle and thorn-wax. This interpretation is reinforced by the fact that most of them are charred like the crop remains themselves. An anomaly exists here in the form of charred seeds of the elder, a shrub that was clearly not a weed of cereals. The same goes for the two charred shoot-tips of heather. It is easy to conceive of a number of every-day situations that would lead to a few elder seeds finding their way onto a hearth together with cereal chaff and heather cut for fuel. Several of the herbaceous perennials and biennials, too, would generally be classified as plants of hedgerows or as weeds of permanent pasture rather than weeds of arable. If, however, they were really segetals as implied by their association with remains of crops and a number of typical annual segetals, then their presence may suggest that some form of ard (scratch plough) or primitive 'swing-wing' plough was still in use in the contemporary settlement. These primitive ploughs do not eliminate perennial weeds as effectively as the more developed mouldboard ploughs; indeed, in those parts of the world where ards are still used, the weed flora includes a well developed perennial and biennial component that commonly includes several of the plants listed in Table 33.

While it is obvious from Table 33 that the Wharram Percy crops had a good share of the usual weeds of agriculture, the original level of infestation in the field or in the stored grain can clearly not be estimated from remains of what are probably mixed agricultural by-products (chaff/straw) in which weed seeds are likely to have been concentrated artificially in the course of crop processing.

The well-drained nature of some, at least, of the land is apparent from the presence of plants like purging flax (*Linum catharticum*), though permanently wet areas were not far away judging from the remains of seeds of marsh plants such as lesser spearwort, rushes and sedges.

The following passages are written by Wendy Carruthers using data from Arthur's Table 'Locality A. D1-D17'.

Phase 2: pre-dam silts and silts associated with the clay dams

Samples D2 to D13 cover the period of silting of the pond associated with the clay dams. No cereals were recovered from either Phase 2 or Phase 3 pond silts from this section. The charred plant remains recorded by Arthur comprise mainly sedge nutlets (or seeds; *Carex* sp.). A few other weeds of grasslands and cultivated or other disturbed soils were recovered, but the total number of fruits/seeds only amounted to 56. The species represented had too wide habitat ranges to provide much information

about soil types, although some nutrient-enrichment was indicated by the members of the dock family and small nettle. Since the seeds were recovered as charred remains, one possible explanation is that burnt waste had been spread on the surrounding fields as fertiliser. The material may have gradually been washed into the pond, or perhaps been trampled in by livestock. The remains were too sparse to represent the dumping of burnt waste, although they could have been present amongst unburnt waste that had rotted away.

Phase 3 – silts associated with the chalk and earth dam

Only four sedge nutlets were recovered from the lowest of these samples (D14 to D17). Without more detailed information about sample sizes and processing it is not wise to place much significance on negative evidence.

26 Plant Macrofossil Remains from Site 71

by J. Jones (27 March 2003)

Introduction

The earliest deposits at Site 71 (Phases 1 and 2) represent the silting of a depression (273) to the north of the Site 30 dam. This depression is thought to be associated with the use of the dam during and after milling activities and appears as natural silting with the presence of few anthropogenic inclusions. An interim period (Phase 2.2) occurred during which the Site 30 pond was created and infilling in Site 71 began with a view to the expansion of the land available for building. This continued in Phase 4 when rubbish was dumped into the former depression to level off the land. This dump consisted of layers of black deposits, containing carbonised grain, animal bone and pottery sherds, alternating with loose dumps of rubble. This has been interpreted as domestic debris, associated with a nearby house. Although no mill is known at this time in the immediate vicinity, it is possible that one may have existed further north, downstream.

Methodology

Initially 250 gram sub-samples were sieved to examine the composition of the deposits and subsequently further samples were processed as required. Sample weights are shown in Tables 34 and 35. The samples were soaked in warm water and washing soda before washing through a 250 micron sieve for both the float and the residue. The floats were fully sorted using a low-powered microscope and identifications made with the author's reference collection. The results are shown in Table 34 for Phases 1 and 2 and Table 35 for Phase 4. Nomenclature and habitat information is based on Stace (1991).

Seven samples were recovered from Phases 1 and 2 associated with the silting of the depression (273). The sediments were composed of amorphous peats and silty clays with organic inclusions and preservation of plant macrofossil remains was largely by anoxic waterlogging, with some charred preservation of cereal remains. The condition of the preserved fruits and seeds was very good. Two samples (173 and 40) also contained a small assemblage of land and water snails including single valves of bivalves, possibly freshwater mussels or cockles. The samples from Phase 4, associated with the rubbish dump, were also composed of amorphous peats and silty clays and contained animal bone, charcoal, charred hazelnuts and carbonised grain. Ten samples were processed from this phase, although two of these (208 and 224) produced only limited amounts of charcoal. Preservation of the charred cereal remains was variable. Some of the grain was well-preserved, although the majority of grains had some degree of pitting or blistering and had lost their surface, whereas other grains were badly damaged by the charring process, with much of the grain lost, accounting for the high percentage of grains classified as Cereal Indet (indeterminate). There was little evidence for erosion or breakages of grain caused by post-depositional damage. Much of the chaff was also fragmentary, but better preservation of certain items, such as the wheat rachis internodes, allowed further interpretation of the wheat species present. In addition to the charred cereal remains some items of chaff were preserved by silicification which will be discussed more fully later. Limited anoxic waterlogging also preserved a small assemblage of weeds.

Phases 1 and 2

From the Saxon period onwards the stream at Wharram Percy was dammed for a series of water-mills, but during these phases at Site 71 the deposits are associated with the silting of the depression (273). Not surprisingly therefore, there are no macrofossils which suggest the presence of a standing body of water, although there are a few marginal species which would have thrived in the shallow margins or muds of the depression. Brooklime (*Veronica beccabunga*), particularly abundant in 85 and 173, occurs in shallow margins of ponds and streams and can be found growing with celery-leaved crowfoot (*Ranunculus sceleratus*), also recovered, a characteristic plant of nutrient rich (including rather polluted) muds at the margins of ponds, especially where there is some disturbance (Hall *et al.* 1983). Both rushes (*Juncus*) and sedges (*Carex*), common in most samples are typical of damp situations and could have occurred at the margins of the depression together with water-cress (*Rorippa*), willowherb (*Epilobium*), wood dock (*Rumex sanguineus*), clustered dock (*Rumex conglomerates*) and lesser spearwort (*Ranunculus flammula*).

As part of the pollen study of the mill pond dam at Site 30, only some 15m to the south-west of Site 71 a survey of the modern vegetation was made in an area where the valley bottom had been flooded to recreate the former

Table 34. Waterlogged and charred plant remains from Site 71. Phases 1 and 2.

| Sample | | 172 | 173 | 174 | 161 | 85 | 157 | 40 | |
|---|-------------------------|------|-----|-----|-----|------|-----|------|-----------------|
| Sample size (kg) | | 0.25 | 2.5 | 0.3 | 0.5 | 0.45 | 0.5 | 2.15 | |
| WATERLOGGED PLANT REMAINS | | | | | | | | | |
| RANUNCULACEAE | | | | | | | | | Habitat |
| Ranunculus | Meadow/Creeping/ | | 14 | 2 | 4 | 2 | 5 | 5 | DG |
| acris/repens/bulbosus | Bulbous Buttercup | | | | | | | | |
| Ranunculus flammula L. | Lesser Spearwort | | | | 1 | | | | MPRw |
| Ranunculus sceleratus L. | Celery-leaved Buttercup | 30 | 4 | 2 | | 1 | | | MPR |
| PAPAVERACEAE | | | | | | | | | |
| Papaver dubium/ hybridum/rhoeas | Poppy | | 2 | | 1 | | | | CD |
| URTICACEAE | | | | | | | | | |
| Urtica dioica L. | Common nettle | 2 | 152 | 4 | 61 | 39 | 5 | 15 | DGHWp |
| Urtica urens L. | Small nettle | | 7 | | 22 | 1 | 4 | 12 | CDI |
| CHENOPODIACEAE | | | | | | | | | |
| Atriplex spp | Orache | | 6 | | | 2 | 2 | 1 | CDn |
| CARYOPHYLLACEAE | | | | | | | | | |
| Agrostemma githago L. | Corncockle | | | | | | | 1f | C |
| Arenaria spp | Sandwort | | 9 | | 2 | 1 | | 4 | o |
| Cerastium sp | Chickweed | | | 13 | | 1 | | | |
| CDG | | | | | | | | | |
| Stellaria graminea L. | Lesser Stitchwort | | | | | | | 1 | EGSI |
| Stellaria media (L.)Villars | Common Chickweed | | 7 | | 1 | 1 | | 1 | CD |
| POLYGONACEAE | | | | | | | | | |
| Fallopia convolvulus (L.)A.Love | Black-bindweed | | | | | | | 7 | CD |
| Polygonum aviculare L. | Knotgrass | | 46 | 2 | 5 | | | | CD |
| Rumex acetosella L. | Sheep's Sorrel | 1 | 1 | | | | | | Ho, CG, a,sandy |
| Rumex conglomeratus Murray | Clustered Dock | | 1 | | | | | | BGw |
| Rumex crispus L. | Curled Dock | | | | 3 | 13 | | | CDM |
| Rumex obtusifolius L. | Broad-leaved Dock | | 1 | | | 92 | | | BCDG |
| Rumex c.f. sanguineus L. | Wood Dock | | 4 | | | | | | BHWw |
| Rumex sp | Dock | 2 | 54 | 2 | 69 | 62 | 4 | 4 | DG |
| Rumex sp (inflorescences) | Dock | | | | | 5f | | | P, wet mud |
| BRASSICACEAE | | | | | | | | | |
| Brassica/Sinapis sp | Mustard/Rape/ Cole etc | | | | | 1 | 2 | 1 | CD# |
| Capsella bursa-pastoris (L.)Medikus | Shepherd's Purse | | 2 | | | | | 14 | Co |
| Coronopus squamatus (Forsskaol)Asch | Swine Cress | | 1 | | 1 | | 1 | 2 | Do |
| Raphanus raphanistrum ssp raphanistrum (pods) | Wild Radish | | 12f | | | | | | CD |
| Rorippa spp | Water-cress | | | 10f | | | | | MPR |
| Sinapis arvensis (fruits - single valves) | | | | | | | 6f | | CD |
| ERICACEAE | | | | | | | | | |
| Calluna vulgaris (L.)Hull (leaf) | Heather | | | few | | | few | | EWo |
| Calluna vulgaris (L.)Hull (flowers) | Heather | | | 76 | | | | | EWo |
| PRIMULACEAE | | | | | | | | | |
| Primula veris/elatior | Cowslip/Oxlip | | | | | | 1 | | Gl base rich |

Table 34 continued.

| Sample | | 172 | 173 | 174 | 161 | 85 | 157 | 40 | |
|--|-----------------------|------|-----|-----|-----|------|-----|------|-------------------|
| Sample size (kg) | | 0.25 | 2.5 | 0.3 | 0.5 | 0.45 | 0.5 | 2.15 | |
| ROSACEAE | | | | | | | | | |
| <i>Aphanes arvensis</i> L. | Parsley-piert | | 1 | | | | | | CGd |
| <i>Filipendula ulmaria</i> (L.) Maxim | Meadowsweet | | | | | | 1 | | w |
| <i>Potentilla anserina</i> L. | Silverweed | | 1 | | | | | | DG, sand-dunes |
| <i>Potentilla</i> sp | Cinquefoil | 1 | | | | | | | |
| <i>Sanguisorba minor</i> ssp <i>minor</i> | Salad Burnet | 1 | | | | | | | Gc |
| FABACEAE | | | | | | | | | |
| Fabaceae indet (corolla) | Pea family | | | 2f | | | | | |
| <i>Medicago lupulina</i> L. | Black Medick | 1 | | 1 | | | | | GR |
| <i>Trifolium</i> c.f. <i>dubium</i> Sibth | Lesser Trefoil | | 1 | | | | | | G-o |
| <i>Trifolium</i> c.f. <i>pratense</i> L. (calyx) | Red Clover | 21 | | 6 | | | | | DG# |
| <i>Trifolium</i> sp. (calyx) | Clover | 72 | | 36 | | | | | DG |
| <i>Trifolium</i> sp (pod caps) | Clover | 1 | | 5 | | | | | |
| ONAGRACEAE | | | | | | | | | |
| <i>Epilobium hirsutum/roseum</i> | Great/Pale Willowherb | | | | | 13 | | 20 | CDw |
| LINACEAE | | | | | | | | | |
| <i>Linum catharticum</i> L. | Fairy Flax | 6 | 5 | 5 | 7 | 1 | 49 | | Gc |
| <i>Linum usitatissimum</i> L. | Flax | | | | | | 1 | | # |
| APIACEAE | | | | | | | | | |
| <i>Aethusa cynapium</i> L. | Fool's Parsley | | | | | 1 | | | C |
| <i>Daucus carota</i> ssp <i>carota</i> | Wild Carrot | | 1 | | | | 10 | | G,s, chalky soils |
| <i>Heracleum sphondylium</i> L. | Hogweed | | | 1 | | | | | DG |
| <i>Torilis</i> sp | Hedge-parsley | 1 | 1 | | | 1 | | | CGHwO |
| SOLANACEAE | | | | | | | | | |
| <i>Hyoscyamus niger</i> L. | Henbane | | 4 | | 1 | 1 | | | Ds sand/shingle |
| LAMIACEAE | | | | | | | | | |
| <i>Galeopsis tetrahit</i> L. | Common Hemp-nettle | | 1 | | | | | | CW |
| <i>Mentha</i> sp | Mint | | | | 1 | | | | CDPW |
| <i>Prunella vulgaris</i> L. | Selfheal | 6 | 9 | 3 | | | 24 | 1 | DG |
| PLANTAGINACEAE | | | | | | | | | |
| <i>Plantago major</i> L. | Greater Plantain | 21 | 30 | 9 | | 5 | 3 | 2 | CDG-o |
| SCROPHULARIACEAE | | | | | | | | | |
| <i>Odontites/Euphrasia</i> sp | Bartsia/Eyebright | | 2 | | | | | | CD |
| <i>Rhinanthus minor</i> L. | Yellow Rattle | 1 | | 3 | | | | | G |
| <i>Veronica beccabunga</i> L. | Brooklime | 1 | 51 | 2 | | 382 | | 10 | BMPR |
| CAPRIFOLIACEAE | | | | | | | | | |
| <i>Sambucus nigra</i> L. | Elder | | 1 | | | | | 1 | DHSWn |
| ASTERACEAE | | | | | | | | | |
| <i>Anthemis cotula</i> L. | Stinking Chamomile | | 1 | | | | 6 | | CDh |
| <i>Bellis perennis</i> L. | Daisy | | 29 | | | 45 | 1 | 6 | G |
| <i>Centaurea</i> sp. | Knapweed | | 1 | | | | | | |
| <i>Cirsium/Carduus</i> spp | Thistle | | 8 | | 4 | 1 | | | DGMW |
| <i>Hypochaeris</i> sp | Cat's-ear | | 2 | | | | | | GW |
| <i>Lapsana communis</i> L. | Nipplewort | | | | | | 3 | | DH |
| <i>Leontodon</i> sp | Hawkbit | 2 | 1 | | | | 18 | | G |
| <i>Picris hieracioides</i> L. | Hawkweed Oxtongue | | 1 | | | | 2 | | DGoc |
| <i>Senecio</i> sp | Ragwort | 1 | | | | | | | |
| <i>Sonchus asper</i> (L.) Hill | Prickly Sow-thistle | 1 | 6 | | | 1 | 4 | | CD |
| <i>Sonchus oleraceus</i> L. | Smooth Sow-thistle | | 1 | | | | 5 | | CDW |

Table 34 continued.

| Sample | | 172 | 173 | 174 | 161 | 85 | 157 | 40 | |
|-------------------------------------|-----------------------------|------|-----|-----|-----|------|-----|------|-------|
| Sample size (kg) | | 0.25 | 2.5 | 0.3 | 0.5 | 0.45 | 0.5 | 2.15 | |
| JUNCACEAE | | | | | | | | | |
| <i>Juncus</i> sp | Rush | 22 | 252 | 23 | 9 | 4 | 90 | 7 | GMRw |
| CYPERACEAE | | | | | | | | | |
| <i>Carex</i> spp | Sedge | 3 | 31 | 5 | 1 | | 25 | 27 | GMPRW |
| POACEAE | | | | | | | | | |
| <i>Lolium temulentum</i> L. | Darnel | 14 | | | | | | | CD |
| <i>Poa/Phleum</i> spp | Meadow-grass/ Cat's-tail | 8 | 109 | 22 | 77 | 16 | 32 | 14 | G |
| Poaceae indet | Grass | 20 | 4 | 5 | | | 1 | | G |
| CHARRED PLANT REMAINS | | | | | | | | | |
| Grain | | | | | | | | | |
| <i>Triticum</i> sp | Free-threshing wheat | | | | 2 | | | | # |
| c.f. <i>Triticum</i> sp | Wheat | | 4 | | | | | | # |
| <i>Hordeum</i> sp | Barley | | 15 | 4 | 39 | 1 | | 1 | # |
| <i>Hordeum</i> sp (straight) | Barley | | 7 | 2 | 5 | | | | # |
| <i>Hordeum</i> sp (hulled/straight) | Hulled Barley | | | | 1 | | | | # |
| <i>Avena</i> sp | Oat | | 6 | 2 | 13 | 1 | 1 | | # |
| Indet grain | | | 9 | 7 | 23 | | 3 | | # |
| Cereal embryo | | | 3 | | 1 | | | | # |
| Chaff | | | | | | | | | |
| <i>Triticum</i> sp | Wheat | | | | 1 | | | | # |
| (rachis internode base) | | | | | | | | | |
| <i>Hordeum</i> sp | | | | | | | | | |
| (single internodes) | Barley | | 7 | | 7 | | | | # |
| <i>Avena</i> sp (floret base) | Oat | | 1 | | | | | | # |
| <i>Avena sativa</i> (pedicel) | Cultivated Oat | | | | 1 | | | | # |
| <i>Avena</i> sp (pedicels) | Oat | | | | | | | | # |
| <i>Avena</i> sp (awns) | Oat | | 25 | | | | | | # |
| Legumes | | | | | | | | | |
| <i>Vicia tetrasperma</i> | | | 1 | | | | | | |
| Weeds | | | | | | | | | |
| Poaceae indet | | | | 1 | 2 | | | | |
| OTHER REMAINS | | | | | | | | | |
| Land and water snails | | | 29 | | | | | 86 | |
| Bivalves (single shells) | | | 43 | | | | | 1 | |

Habitats

B: Bankside
C: Cultivated/Arable
D: Disturbed
E: Heath/Moor
G: Grassland
H: Hedgerow
M: Marsh
P: Ponds, ditches - stagnant/slow flowing water
R: Rivers, streams
S: Scrub
W: Woodland

c: calcareous
d: dry soils
h: heavy soils
l: light soils
n: nitrogen rich soils
o: open habitats
p: phosphate rich soils
s: coastal
w: wet/damp soils
cultivated plant/of economic importance

f = fragments

millpond there. The vegetation was described as consisting of:

‘a flushed grassland rich in sedges (*Carex* spp.), rushes (*Juncus* spp.), marsh marigold (*Caltha palustris*) and willowherb (*Epilobium* sp.). In the shallow stream which flowed through this fen fool’s water-cress (*Apium nodiflorum*), brooklime (*Veronica beccabunga*), water-mint (*Mentha aquatica*) and sweet-grass (*Glyceria* spp.) grew’
(pp 175-6)

There are therefore many similarities with the flora today, to that suggested by the Phases 1 and 2 deposits. The plant macrofossil species recovered suggest that by Phase 2, after the mill ceased to function, the depression still did not contain standing water. It is likely that the depression would have become quickly choked with vegetation, once the mill went out of use, unless it was constantly cleaned out. Silting of the depression was probably fairly rapid, with only those species of the muddy margins or areas of shallow water persisting.

The second group of plant species recovered is also likely to reflect the immediate vicinity of the Site 30 pond. These are species characteristic of disturbed and waste ground. They could have grown in the immediate vicinity of the pond where some trampling or abrasion occurred. Knotgrass (*Polygonum aviculare*), curled dock (*Rumex crispus*) and greater plantain (*Plantago major*) frequently occur where the soil is compacted, perhaps by trampling such as near trackways. The high frequency of broad-leaved dock (*Rumex obtusifolius*) in sample 85 is also likely to have occurred in areas of disturbed ground. Common nettle (*Urtica dioica*), also frequent throughout, is a useful indicator species for localised areas rich in nitrogen.

The third major group of plant species recovered is more typical of the wider environment and is characteristic of the chalk grassland of the Yorkshire Wolds. Chalk grassland communities form on the basic soils of this area and are maintained by light grazing, occurring on the relatively steep slopes of escarpments and valley sides and summits of the narrow ridges. Typical species recovered here include fairy flax (*Linum catharticum*), a shallow rooting chalk-land species, with self-heal (*Prunella vulgaris*), daisy (*Bellis perennis*), hawkbit (*Leontodon*) and bulbous buttercup (*Ranunculus bulbosus*). A ‘chalk heath’ may form, where leaching of the upper layers of the profile occurs, giving rise to a slightly acid soil (Tansley 1939, 551). This is marked by a mixture of calcicolous plants rooting in the calcareous soil, such as salad burnet (*Sanguisorba minor*) with calcifuge heath plants such as heather (*Calluna vulgaris*) rooting in the acid surface soil. Both flowers and leaves of heather were present in sample 174.

There is little evidence for woodland or scrub, apart from single occurrences of elder (*Sambucus nigra*) in two samples (173 and 40), although the steep sided valleys today carry patches of scrub (Hurst 1984).

There is also limited evidence for cereal cultivation at this period from the charred remains which occur in some of the samples. This is mostly barley (*Hordeum*) grain with some oat (*Avena*), but little evidence for wheat (*Triticum*). Preservation of cereal chaff is limited, although a single pedicel of *Avena sativa* (cultivated oat) suggests the oat was a cultivated crop.

Phase 4

The eight samples examined from Phase 4 are associated with the dumping of domestic debris into the depression (273). The bulk of the plant macrofossils recovered from this phase were preserved by charring with good assemblages of cereal remains present, although there were also silicified remains of chaff and limited waterlogging. Cereal grain forms the largest single component, with over 7,000 grains recorded although cereal chaff is abundant. Preservation of grain was variable, with the poor state of preservation accounting for the relatively high number of indeterminate cereals, in some samples accounting for 20-30% of total cereals.

Wheat

The most commonly found cereal was wheat with 3373 grains counted. It is difficult from grain morphology to distinguish between free-threshing tetraploid and hexaploid wheats but much of the better preserved grains are of the short-rounded form showing the steep angle of the embryo, characteristic of the hexaploid type (*Triticum aestivocompactum* s.l.) Tail grain was defined as grain less than 4.5m in length. The occurrence of a few examples of both hexaploid (bread/club wheat – *Triticum aestivum/compactum*) and tetraploid (rivet/macaroni wheat – *Triticum turgidum/durum*) rachis internodes, suggest that both types were being cultivated. The hexaploid rachis internodes showed the typical curved sides with no thickenings under the glumes, whereas the tetraploid internodes were straight sided with swelling under the glume bases, criteria as described by Moffett (1991) and Jacomet (1989). Bread wheat has a high gluten content which makes it more suitable for bread making than the soft mealy grain of rivet wheat and it may be that both were cultivated for their different qualities. A large proportion of wheat internodes however were very fragmentary and have been recorded as of the tough rachis type from a free-threshing wheat.

Barley

Barley grains also frequently occurred (1942 grains) and in several samples (206 and 213) were more common than wheat. Preservation was variable, but some have been recorded as hulled barley where traces of the lemma and palaea remained. A record was also made, where possible, of whether the grain was straight (symmetrical) or twisted (asymmetrical). In theory a crop of six-row barley should have two twisted grains to one straight grain, but in this case numbers were too low to calculate the ratio, with straight grains predominating in all the

Table 35. Charred plant remains from Site 71, Phase 4.

| | Context | 196 | 200 | 206 | 208 | 211 | 213 | 224 | 215 | |
|---|------------------|-------------|------------|-------------|-------------|------------|------------|------------|-------------|---|
| | Sample size (kg) | 3.15 | 4.5 | 2.4 | 4.5 | 3.45 | 2.75 | 1.25 | 2.4 | |
| Grain | | | | | | | | | | |
| <i>Triticum</i> sp | Free-threshing | 676 | 120 | 119 | 563 | 148 | 88 | 170 | 647 | # |
| | Wheat | | | | | | | | | |
| c.f. <i>Triticum</i> sp | Wheat | 115 | 38 | 59 | 91 | 63 | 34 | 27 | 56 | # |
| <i>Triticum</i> sp (tail grain) | Wheat | 59 | 25 | 38 | 55 | 17 | 14 | 54 | 97 | # |
| <i>Triticum/Hordeum</i> sp | Wheat/ Barley | 12 | 3 | | | | 31 | 71 | | # |
| <i>Triticum/Hordeum</i> sp (tail grain) | Wheat/ Barley | 9 | | | | 35 | | | | # |
| <i>Hordeum</i> sp | Barley | 252 | 99 | 555 | 72 | 143 | 176 | 151 | 38 | # |
| <i>Hordeum</i> sp (hulled) | Barley | | | 3 | | | | 3 | | # |
| c.f. <i>Hordeum</i> sp | Barley | | 6 | 28 | | 19 | 9 | | | # |
| <i>Hordeum</i> sp (straight) | Barley | 34 | 8 | 84 | 7 | 44 | 36 | 48 | 8 | # |
| <i>Hordeum</i> sp (hulled/straight) | Barley | 3 | 1 | 9 | | | | | | # |
| <i>Hordeum</i> sp (hulled/straight with lax-eared lemma base) | Barley | 1 | | | | | | | | # |
| <i>Hordeum</i> sp (twisted) | Barley | 1 | 3 | 5 | | 1 | 5 | 4 | 3 | # |
| <i>Hordeum</i> sp (tail grain) | Barley | 21 | 10 | 38 | 9 | 43 | 25 | 8 | | # |
| c.f. <i>Hordeum</i> sp (tail grain) | Barley | | | 103 | 12 | | | | | # |
| <i>Avena</i> sp | Oat | 142 | 12 | 101 | 242 | 84 | 86 | 79 | 56 | # |
| c.f. <i>Avena</i> sp | Oat | | 13 | 12 | 18 | 2 | | | | # |
| c.f. <i>Secale cereale</i> | Rye | 2 | | | | | | | | # |
| Indet grain | | 150 | 107 | 285 | 313 | 288 | 125 | 85 | 119 | # |
| Total: | | 1477 | 445 | 1439 | 1382 | 887 | 629 | 700 | 1024 | |
| Cereal indet (embryo) | | 50 | 9 | 40 | 15 | 25 | 4 | 52 | 16 | # |
| Cereal indet (embryo – sprouted) | | 1 | | | | | | | | # |
| Chaff | | | | | | | | | | |
| <i>Triticum</i> sp (free-threshing Bread Wheat hexaploid rachis internode) | | 2 | | | | | | | | # |
| <i>Triticum</i> sp (free-threshing tetraploid rachis internode) | | 3 | | | | | | 4 | | # |
| <i>Triticum</i> sp (rachis internode) | Wheat | 6 | | 2 | | | | 6 | | # |
| <i>Triticum</i> sp (tough rachis internode) | Wheat | 306 | 11 | 47 | 33 | 61 | 17 | 123 | 25 | # |
| <i>Triticum</i> sp (rachis internode base) | Wheat | 122 | 3 | 13 | 10 | 40 | 9 | 50 | 8 | # |
| <i>Triticum</i> sp (basal rachis internode) | Wheat | 4 | | | 1 | | | | 1 | # |
| <i>Triticum/Hordeum</i> sp (awns) | Wheat/Barley | | | | | | | | | # |
| <i>Hordeum</i> sp (single rachis internode) | Barley | 206 | 25 | 166 | 10 | 50 | 40 | 246 | 5 | # |
| <i>Hordeum</i> sp (rachis with several internodes) | Barley | 13 | | 3 | | 4 | | 20 | | # |
| <i>Avena</i> sp (floret base) | Oat | 13 | | 1 | 4 | 4 | 1 | 4 | 1 | # |
| <i>Avena fatua/ludoviciana</i> (floret base) | Wild Oat | 1 | | | 1 | | 1 | | | # |
| <i>Avena sativa</i> (pedicel) | Cultivated Oat | 49 | | 5 | 2 | 13 | 2 | 26 | | # |
| <i>Avena fatua/ludoviciana</i> (pedicel) | Wild Oat | 5 | | 1 | | | | 1 | | # |
| <i>Avena</i> sp (pedicel) | Oat | | | | | | | | | # |
| <i>Avena</i> sp (awns) | Oat | 51 | 18 | 42 | 21 | 55 | 46 | 98 | 19 | # |
| Cereal/Poaceae indet (culm nodes) | Cereal/Grass | 38 | 4 | 13 | | 12 | 1 | 40 | 2 | # |
| Cereal/Poaceae indet (culm bases) | Cereal/Grass | 9 | | 3 | | | | 2 | 1 | # |
| Total: | | 828 | 61 | 296 | 82 | 239 | 117 | 620 | 62 | |

Table 35 continued.

| | Context | 196 | 200 | 206 | 208 | 211 | 213 | 224 | 215 | |
|---|---------------------------|------|-----|------------|------|------|------|------|-----|--------------------------------------|
| | Sample size (kg) | 3.15 | 4.5 | 2.4 | 4.5 | 3.45 | 2.75 | 1.25 | 2.4 | |
| Weeds | | | | | | | | | | |
| BETULACEAE | | | | | | | | | | |
| <i>Corylus avellana</i> L. (nut frags) | Hazel | 1f | 4f | 1f1 + 274f | | | 4f | 2f | | HSW |
| CHENOPODIACEAE | | | | | | | | | | |
| <i>Atriplex</i> spp | Orache | 18 | 1 | 1 | 2 | | | 26 | 4 | CDn |
| <i>Chenopodium album</i> L. | Fat-hen | | | | | | 1 | | | CDn |
| CARYOPHYLLACEAE | | | | | | | | | | |
| <i>Stellaria media</i> (L.) Villars | Common Chickweed | | | | | | | 1 | | CD |
| POLYGONACEAE | | | | | | | | | | |
| <i>Fallopia convolvulus</i> (L.) A. Love | Black-bindweed | 3 | | 1 | | 1 | 1f | 1f | | CD |
| <i>Rumex acetosella</i> L. | Sheep's Sorrel | | | | | | 1 | | | Ho, CG, a, sandy |
| <i>Rumex</i> sp | Dock | 17 | 2 | 4 | 4 | 4 | 3 | 1 | 3 | DG |
| BRASSICACEAE | | | | | | | | | | |
| <i>Brassica/Sinapis</i> sp | Mustard/Rape/ Cole etc | 3 | | 1 | | | | 8f | | CD# |
| ERICACEAE | | | | | | | | | | |
| <i>Calluna vulgaris</i> (L.) Hull (flower) | Heather | 1 | | | | | | | | EWo |
| FABACEAE | | | | | | | | | | |
| <i>Lathyrus/Vicia/Pisum</i> groups | | | | | | | | | | |
| 1. <i>Vicia tetrasperma</i> (L.) Schreber | | | | | | | | | | |
| (c.1.5 x 1.5mm + hilum) | Smooth Tare | | | 18 | | 5 | 4 | 9 | | G |
| <i>Lathyrus/Vicia</i> spp | Vetch/Pea | | | | | | | | | |
| (c.1.5 x 1.5mm no hilum) | (?Smooth Tare) | | 1 | 90 | 6 | | | 15 | 5 | |
| (+ halves) | | | (9) | (85) | | | | (12) | | |
| 2. <i>Vicia c.f. irsute</i> (L.) Gray | | | | | | | | | | |
| (2 x 2 mm + long hilum) | Hairy Tare | | 1 | | | | | | | DG |
| <i>Vicia hirsute</i> (L.) Gray | | | | | | | | | | |
| (pod with 2 seeds) | Hairy Tare | | | | | | | 1 | | |
| 3. <i>Lathyrus/Vicia</i> spp | | | | | | | | | | |
| (c.2 x 2mm no hilum) | Vetch/Pea | 16 | 4 | 10 | 1 | 13 | 5 | 4 | | |
| (+ halves) | | | | (2) | (1) | (43) | (5) | | | |
| 4. <i>Pisum sativum</i> L. | | | | | | | | | | |
| (c.4 x 4 mm + ovate hilum) | Garden Pea | | | | 1 | | 2 | | 2 | #CD |
| 5. <i>Lathyrus/Vicia/Pisum</i> spp | | | | | | | | | | |
| (c.4 x 4 mm no hilum) | Vetch/Garden Pea | 3 | 6 | 21 | 6 | 7 | 7 | 3 | 3 | |
| (+halves) | (?Garden Pea) | (11) | (9) | (26) | (15) | (26) | (11) | (36) | (5) | |
| <i>Trifolium c.f. dubium</i> Sibth | Lesser Trefoil | 1 | | | | | | | | G-o |
| <i>Trifolium/Medicago</i> spp | Clover/Medick | | | 6 | | 1 | | 1 | | Short, often brackish turf by sea |
| BORAGINACEAE | | | | | | | | | | |
| <i>Lithospermum arvense</i> L. (mineralised) | Field Gromwell | 9 | | 5 | 4 | 2 | 3f | | 2 | CDGo |
| PLANTAGINACEAE | | | | | | | | | | |
| <i>Plantago lanceolata</i> L. | Ribwort Plantain | | | | | | | 1 | | G |
| SCROPHULARIACEAE | | | | | | | | | | |
| <i>Odontites/Euphrasia</i> sp | Bartsia/Eyebright | 11 | | 1 | 1 | 1 | | | 7 | CD |
| RUBIACEAE | | | | | | | | | | |
| <i>Galium aparine</i> L. | Cleavers | 1 | 1 | | 1 | 1f | 1 | 1 | 1 | CHSo |
| ASTERACEAE | | | | | | | | | | |
| <i>Anthemis cotula</i> L. | Stinking Chamomile | 2 | | 1 | | | 1 | 1f | 2 | CDh |
| <i>Anthemis arvensis</i> L. | Corn Chamomile | | | | | | 1 | 1 | | CDc |

Table 35 continued.

| | Context | 196 | 200 | 206 | 208 | 211 | 213 | 224 | 215 |
|---|---------------------|-----------|-----------|------------|---|-----------|-----------|-----------|--------------|
| | Sample size (kg) | 3.15 | 4.5 | 2.4 | 4.5 | 3.45 | 2.75 | 1.25 | 2.4 |
| CYPERACEAE | | | | | | | | | |
| <i>Carex</i> spp | Sedge | | 1 | 9 | | 6 | 1 | | GMPRW |
| POACEAE | | | | | | | | | |
| Poaceae indet | | 2 | | 2 | 7 | 2 | | | |
| Total: | | 88 | 17 | 149 | 33 | 43 | 30 | 64 | 29 |
| Silicified plant remains | | | | | | | | | |
| Triticum sp (awns) | | c750 | | 500 | c500 | c500 | c250 | c200 | c700 |
| Triticum sp (glume beaks) | | 20 | | 6 | 20 | 20 | 11 | 25 | 17 |
| Poaceae indet (culm nodes) | | 118 | | 54 | | 80 | 59 | | 168 |
| Indet silicified chaff frags | | few | | | few | few | | few | few |
| Waterlogged plant remains | | | | | | | | | |
| CHARACEAE | | | | | | | | | |
| <i>Chara</i> spp | Stonewort | | 73 | 50 | | 25 | | | A |
| URTICACEAE | | | | | | | | | |
| <i>Urtica dioica</i> L. | Common nettle | | 4 | 2 | | 2 | 1 | 3 | |
| FUMARIACEAE | | | | | | | | | |
| <i>Fumaria</i> sp | Fumitory | | | | | | 1 | | CDH |
| CHENOPODIACEAE | | | | | | | | | |
| <i>Atriplex</i> spp | Orache | | | | | 1 | | | |
| <i>Chenopodium album</i> L. | Fat-hen | | | | | 1 | | | CDn |
| CARYOPHYLLACEAE | | | | | | | | | |
| <i>Stellaria media</i> (L.)Villars | Common Chickweed | | | | | 1 | | | CD |
| BRASSICACEAE | | | | | | | | | |
| <i>Capsella bursa-pastoris</i> (L.)Medikus | Shepherd's Purse | | | | | 1 | 1 | | Co |
| LAMIACEAE | | | | | | | | | |
| <i>Stachys sylvatica</i> L. | Hedge Woundwort | | | | | 1 | | | HSW |
| SCROPHULARIACEAE | | | | | | | | | |
| <i>Veronica beccabunga</i> L. | Brooklime | | 1 | | | | 1 | | BMPR |
| CAPRIFOLIACEAE | | | | | | | | | |
| <i>Sambucus nigra</i> L. | Elder | | 12 | 3 | | 6 | 4 | 1 | DHSWn |
| COMPOSITAE | | | | | | | | | |
| <i>Leucanthemum vulgare</i> Lam. | Oxeye Daisy | | | | | | 1 | | G-rich soils |
| <i>Sonchus asper</i> (L.)Hill | Prickly Sow-thistle | | 1 | | | | | | CD |
| POACEAE | | | | | | | | | |
| Poaceae indet | Grass | | | | | 1 | 2 | | |
| Total: | | 0 | 91 | 55 | 0 | 39 | 11 | 4 | 0 |
| Habitats | | | | | | | | | |
| A: Aquatic | | | | | a: acidic | | | | |
| B: Bankside | | | | | c: calcareous | | | | |
| C: Cultivated/Arable | | | | | h: heavy soils | | | | |
| D: Disturbed | | | | | n: nitrogen rich soils | | | | |
| E: Heath/Moor | | | | | o: open habitats | | | | |
| G: Grassland | | | | | # cultivated plant/of economic importance | | | | |
| H: Hedgerow | | | | | | | | | |
| M: Marsh | | | | | f = fragments | | | | |
| P: Ponds, ditches - stagnant/slow flowing water | | | | | | | | | |
| R: Rivers, streams | | | | | | | | | |
| S: Scrub | | | | | | | | | |
| W: Woodland | | | | | | | | | |

samples. Therefore, while it is possible to suggest that six row hulled barley is present it is also likely that two row, which consists entirely of straight grains, was also present. One of the hulled grains retained a horseshoe-shaped basal scar on the floret which is typical of the lax-eared type i.e. with a nodding spike. Barley rachis internodes were numerous and varied in length and width, with some internodes very closely spaced, suggesting that the dense-eared type, i.e. with an erect spike, was also present. There was no evidence for sprouted grains, a characteristic which would suggest the grain had germinated possibly as part of the malting process for ale production. In addition to malting, barley was also valued as a food grain as a supplement to wheat, with the hardy six-row barley usually grown for fodder, although grain used for fodder is less likely to be exposed to fire than grain prepared for human consumption.

Oats

Oat grain was also present in all samples and although they formed a lesser component than wheat and barley, accounted for 9-18% of total cereals, a reasonably high percentage to suggest that they are also likely to have been a crop plant. Further confirmation was obtained by the identification of oat pedicels (stalks) in some samples (Moffett 1988). The lemma bases of hexaploid oats appear to detach directly from the pedicel, with the wild hexaploid oats showing the characteristic reverse scar of the sucker mouth, borne on the lemma base. Both cultivated (*Avena sativa* type) and wild forms were recorded with several floret bases also showing the sucker mouth scar and were therefore identified as wild oat (*Avena fatua/ludoviciana*). Oat awns were also common. These different elements of chaff present suggest that the oat grain had originally been in its husks which had then become brittle and fragmented on charring, the oats therefore likely to represent an unprocessed crop. Oat crops are best harvested before they are fully ripe so that the grain is not lost when the ripe panicle shatters. Oven drying prior to storage and processing for human consumption is therefore often needed, which may result in some of the crop becoming accidentally charred. Oats were traditionally cultivated as a spring grown crop often planted with barley for use as human food or animal fodder, particularly for draught animals due to their high energy value. They will grow on poor acid soils and most varieties are spring sown, as oats are less frost hardy than other cereals.

Rye

Two grains from 196 were identified as possible rye (c.f. *Secale cereale*) and it seems likely that these occurred as crop weeds. The records of rye from other sites at Wharram are sparse and have been suggested as occasional crops or crop weeds.

Silicified chaff

Some items of cereal chaff, such as wheat/barley awns, wheat glume beaks and grass culm nodes were preserved

in a silicified form. Silicification has been shown to occur in high temperature oxidising conditions, which burns out all the carbon leaving the silica skeleton of remains such as cereal chaff, conditions typical of a bonfire that had burnt down to a heap of glowing charcoal. Silicified remains have been recovered from other sites from contexts such as corn drier flues and oven or kiln floors (Robinson and Straker 1991) and it seems likely that the Wharram material originated from similar situations. Silicified nutlets of field gromwell (*Lithospermum arvense*) were also recovered from six samples. They also have a high mineral content, which enables them to withstand charring at high temperatures.

Fabaceae

Seeds of the pea family (Fabaceae) were present in all samples. Although preservation was variable, with many of the seeds in a fragmentary state, having lost their hilum, a characteristic necessary for identification to species, it was decided to place them into a number of groups based on size. Of particular interest are the few definite identifications of garden pea (*Pisum sativum*) with more frequent occurrences of similar sized seeds, (many half seeds) also suggested to be garden pea. Preservation of the Fabaceae in a charred form seems to be less common than cereals, as they are less likely to come into contact with fire during cooking preparations. It is suggested, however, that garden peas were also cultivated at Wharram as garden or field crops and would have formed an important addition to the diet. Other vetches identified include smooth tare (*Vicia tetrasperma*) and hairy tare (*Vicia hirsuta*) including a whole pod containing two seeds. All legumes would have been valued for improving the soil by their nitrogen fixing abilities in helping to improve the soil and may have been grown as part of a crop rotation system.

Weeds

The remaining charred species are mostly weeds of cultivated ground which may have been accidentally gathered as impurities growing with the crop. Both cleavers (*Galium aparine*) and black-bindweed (*Fallopia convolvulus*) are twining species which could easily have been cut with the grain. Other species may have invaded from adjacent, unploughed fields or have persisted as residual species from before the fields were cultivated and also have been gathered at harvest. Species include bartsia/eyebright (*Odontites/Euphrasia*), stinking chamomile (*Anthemis cotula*), corn marigold (*Chrysanthemum segetum*), orache (*Atriplex*) and common chickweed (*Stellaria media*). Common chickweed and corn marigold are more typical of spring sown crops such as barley, oats and pulses, whereas stinking chamomile has a preference for heavy damp soils, conditions more suited to bread wheat. This would suggest that different areas of the valley at Wharram were exploited for seasonal crop cultivation.

Other species recovered are unlikely to have occurred in arable fields. Quantities of hazelnut (*Corylus avellana*)

fragments, particularly from sample 208, may have been gathered with hazel wood for use as fuel, although the nuts would have provided a seasonal variation to the diet. Similarly the single charred heather (*Calluna vulgaris*) flower in sample 196 is likely to have come from the collection of woody species for fuel.

As well as the charred weed assemblage there is a small group of seeds preserved by anoxic waterlogging from five of the dumped deposits. Most abundant are the oospores of the aquatic algae stonewort (*Chara*). Characeae are found in diverse aquatic habitats and are often the first plants to colonise newly dug or cleared ponds and ditches and some species are characteristic of ephemeral water bodies which dry up completely in summer (Moore 1986). The presence of stonewort and brooklime here are likely to be remnants from the former millpond or from areas which continued to remain wet to this period. The other weeds such as orache, fat-hen (*Chenopodium album*) and chickweed are typical of areas of disturbed ground and could have grown locally, while common nettle (*Urtica dioica*) and elder (*Sambucus nigra*) would have thrived in areas of rubbish deposition where the soil may have been enriched.

Discussion of the charred cereal remains

The charred remains recovered from the depression (273) have shown a range of cultivated crops, suggesting a mixed crop economy at Wharram during Phase 4. Out of a total of 7634 grains, it has been calculated that 44% are wheat, 25% barley, 11% oat (with 20% unidentifiable), with the possible addition of a garden or field crop of peas.

Much emphasis has been placed on the interpretation of crop processing activities from the composition of charred cereal remains recovered from excavations of all periods (Hillman 1981). These interpretations need to be based on samples recovered from primary deposits associated with contexts such as corn driers, storage pits or granaries. The samples from Wharram come from secondary contexts, associated with general disposal of domestic debris, including animal bone and pottery, during this period. Therefore although the charred remains were plentiful and it is possible to make some general statements on which crops were grown, it is difficult to infer crop processing activities from these assemblages.

It has already been suggested from the components of oat grain and chaff recovered that we are dealing with an unprocessed crop which may have been accidentally charred prior to storage. With the wheat also, whole components of the cereal ear are present – this includes primary grain, tail grain, rachis internodes, glume and awn fragments. There are also some culm nodes and culm bases, which although not identified to species, suggest that the straw was still present at the time of charring. The presence of weed seeds also suggests an uncleaned crop. It may be that whole ears were being burnt, prior to any cleaning. This may imply either an accidental fire or deliberate burning of the cereals because of pest damage

or disease. No sign of damage from grain beetles was observed and it seems unlikely that a valuable crop would have been used as fuel unless it was damaged in some way.

As the cereal remains were not from primary contexts, it may be that the different elements of processing had become remixed following cleaning of hearths or ovens which were then deposited periodically along with other domestic rubbish into the area of the disused millpond. Certainly the presence of silicified chaff suggests that much of this material originated from the cleaning of ashes from hearths or ovens. This is likely to be the result of drying the range of crops utilised at Wharram - wheat, barley, oats, with the possibility of rye, for whatever purpose, animal feed or human consumption. Charred debris could also have accumulated as a result of food preparation from the hearths of individual households.

27 Tree-ring Analysis of Wattling from the Millpond and Graveyard by R. Morgan

Introduction

The excavation of Site 30 at Wharram Percy in 1981 revealed a series of dams, the first of which retained a shallow pond serving the village mill. A double line of wattling some 9.5m long (see Fig. 14) had been constructed upon this earliest dam; it ran south-south-east to north-north-west, not precisely on the alignment of the Phase 2 and 3 dams. The wattling may represent reinforcement of the earliest dam, or it may have had a previous unrelated use. The wattling has been radiocarbon-dated to 1090 ± 70 ad (HAR 4651; 30/1641) and 1200 ± 90 ad (HAR 4652; 30/1642) sealing a deposit of burnt grain. A further line of wattling and posts was located just to the north in Site 71, on the southern boundary of the graveyard.

A visit to the site in July 1982 suggested the value of a detailed analysis of the wood used for the wattling and posts; experience of such material from other early medieval sites and from prehistoric trackways in the Somerset Levels (Morgan 1988b) had already shown how informative it could be. Species identification indicates the trees available in the area and those selected for use; their relative proportions may suggest their frequency in the woodland and thus its composition. Records of age and diameter of each stem in a large assemblage can be gathered to search for any patterns indicative of natural or managed woodland. Regular cutting, or coppicing, leads to the production of long straight rods (when young) or poles (as stems mature), which are invaluable as building materials, and the practice seems to have been widespread during the medieval period (Rackham 1980). Suggestions of coppice management may be revealed in the waterlogged wood by concentrations in the ages and sizes of the stems.

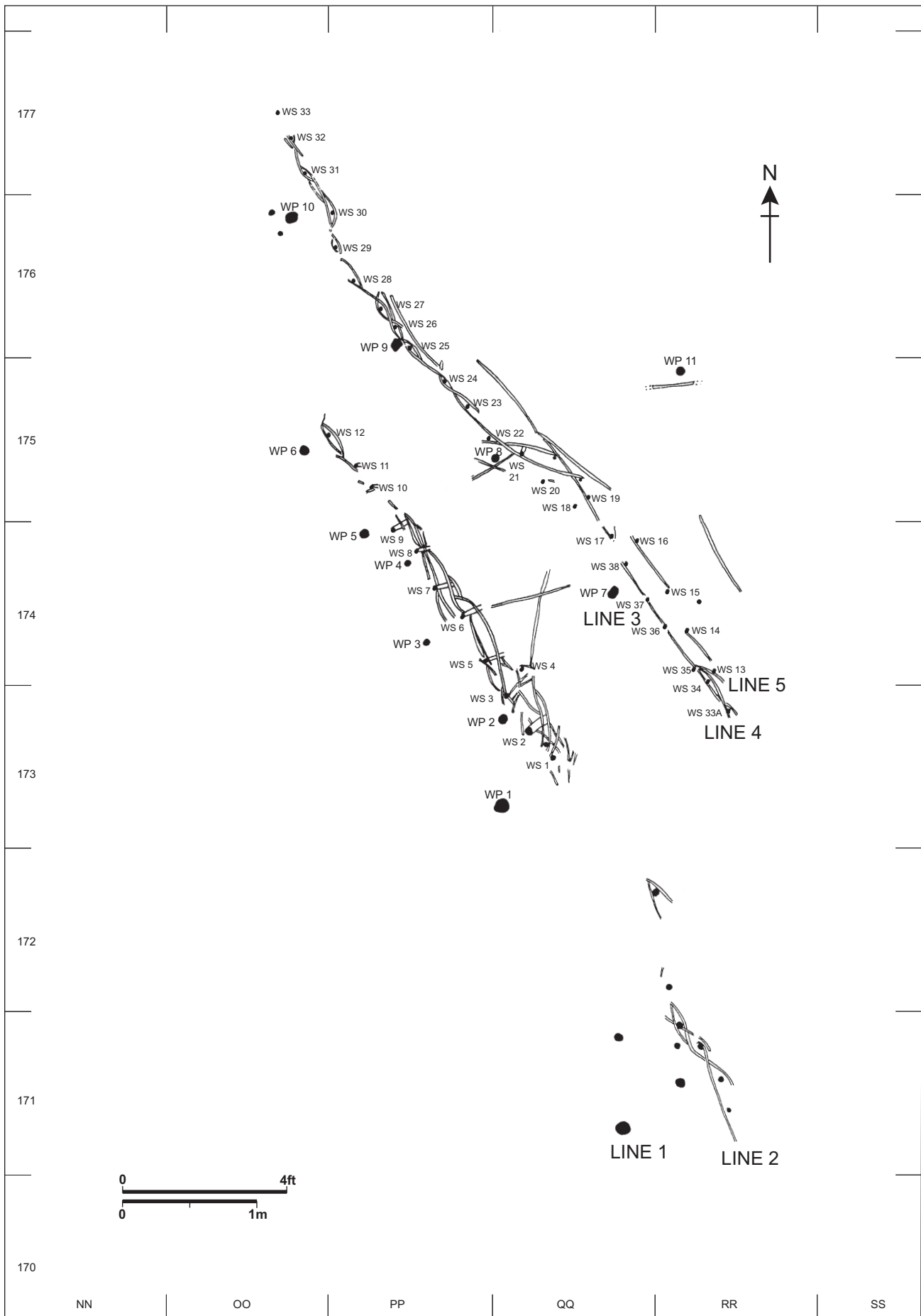


Fig. 77. Detailed plan of sampled wattle features. (E. Marlow-Mann)

In addition, the substantial size of a series of posts running parallel to the wattle suggested that tree-ring studies might be appropriate. Similarities in the ring-width patterns of the posts could show whether they were contemporary and if they originated in the same area of woodland; even the season of felling can be determined from the stage of growth of the outermost ring.

Methods of analysis

Cross-sections of waterlogged wood were removed from the horizontal elements of the wattle, the rods, as well as from the small upright posts, and the large posts. Duplicate samples were identified at the Ancient Monuments Laboratory, HBMC, by D. Haddon-Reece and J. Ede.

The samples for tree-ring studies were examined in the Dendrochronology Laboratory in the Archaeology Department of Sheffield University. The wood was deep-frozen and the transverse surface planed to reveal the growth rings clearly. The age of the stems was recorded by counting the rings, and general observations were made on the character of the growth pattern from which various deductions can be made. Stem diameter beneath the bark was measured. Some of the posts had series of over twenty clear growth rings; these were measured and compared using standard dendrochronological techniques which are further described in Baillie 1982, Morgan 1988b and Hillam 1985. The study of wattle is discussed in Morgan 1988a.

The data for stem size and age were compared between the different lines of wattling, between tree species, and with material from other sites. The

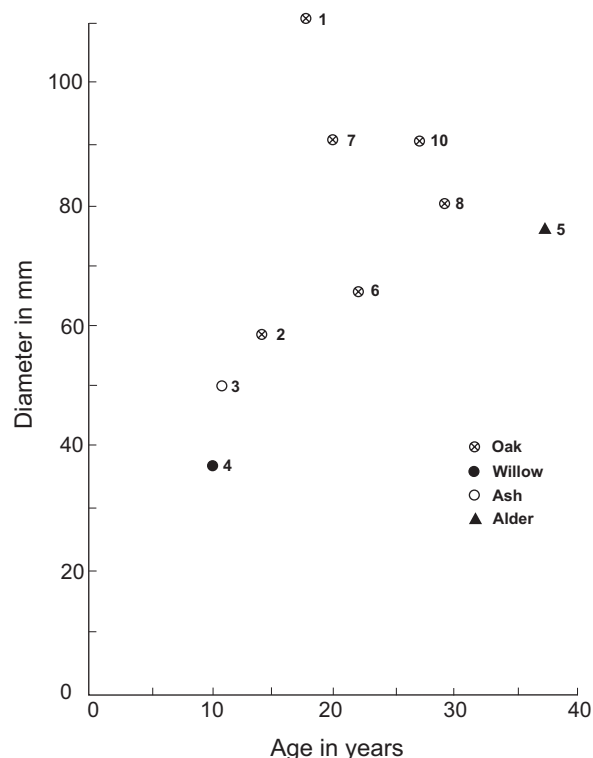


Fig. 78. Age and size distribution of posts WP1-8 and 10 from lines 1 and 3.

techniques have been developed during research on wattle trackways (Morgan 1988b), which have provided very large quantities of hazel (*Corylus avellana* L.); the Wharram Percy assemblage is small with 16 posts, 52 small posts and 42 rods, but this extremely important building material survives too rarely to go unrecorded.

Results on the wood from each wattle line

Site 30

Each line of posts and wattle is considered separately, starting from the south-west. The lines are shown schematically in Figures 77 and 19 and are as follows:-

Line 1 – one, or possibly two, lines of posts

Line 2 – a 3m length of wattle immediately behind the posts (see also Fig. 18)

Line 3 – a line of at least four large posts some 2m to the north-east

Line 4 – a 1.4m length of wattle running parallel and merging with line 5 (see also Fig. 18)

Line 5 – a 5.5m length of wattle (see also Fig. 18)

Line 1 – the south-west line of posts

A series of posts was set around 0.25m to the south-west of the wattle forming Line 2, not sufficiently close for support and thus not clearly associated. Four posts (WP1, WP3, WP5 and WP6) were aligned, as were two posts further south (WP17 and WP18) which were not sampled. Intervals between the posts were irregular, between 0.7 and 1.9m. Two other posts (WP2 and WP4), 1.35m apart, stood closer to Line 2.

Identification showed WP3 to be ash (*Fraxinus excelsior* L.), WP4 to be willow (*Salix* spp.), WP5 to be alder (*Alnus glutinosa* Gaertn.), and WP1, WP2 and WP6 to be oak (*Quercus* spp.). Post diameters ranged from 37mm (WP4) to 110mm (WP1), and ages from 10 and 37 years; the wide variation is illustrated in Figure 78. The stage of growth of the outermost ring beneath the bark indicated that four posts were cut in winter and two probably in summer – WP1 and WP3 (of oak and ash) had only the spring vessels, suggesting cutting in about June. These latter two posts may have been inserted at a different time, or all could have been accumulated in a stockpile.

Ring-widths were measured on two posts, WP5 of alder 37 years old and WP6 of oak 22 years old; their growth patterns showed no similarities.

Line 2 – south-west line of wattle

This line of woven wattle ran in a south-east to north-west direction for about 3m; a further short southern extension was not sampled. The small uprights around which the rods were woven were set into the ground at regular intervals of about 0.3m. A total of twelve uprights (WS1-12) were sampled, and proved to consist largely of oak (eight posts), with two of birch (*Betula* spp.) and one each of willow and hazel. The size of posts was very consistent (Fig. 79, left) at around 30-35mm; only WS2 was larger at 60mm. This suggests that selection was made with care

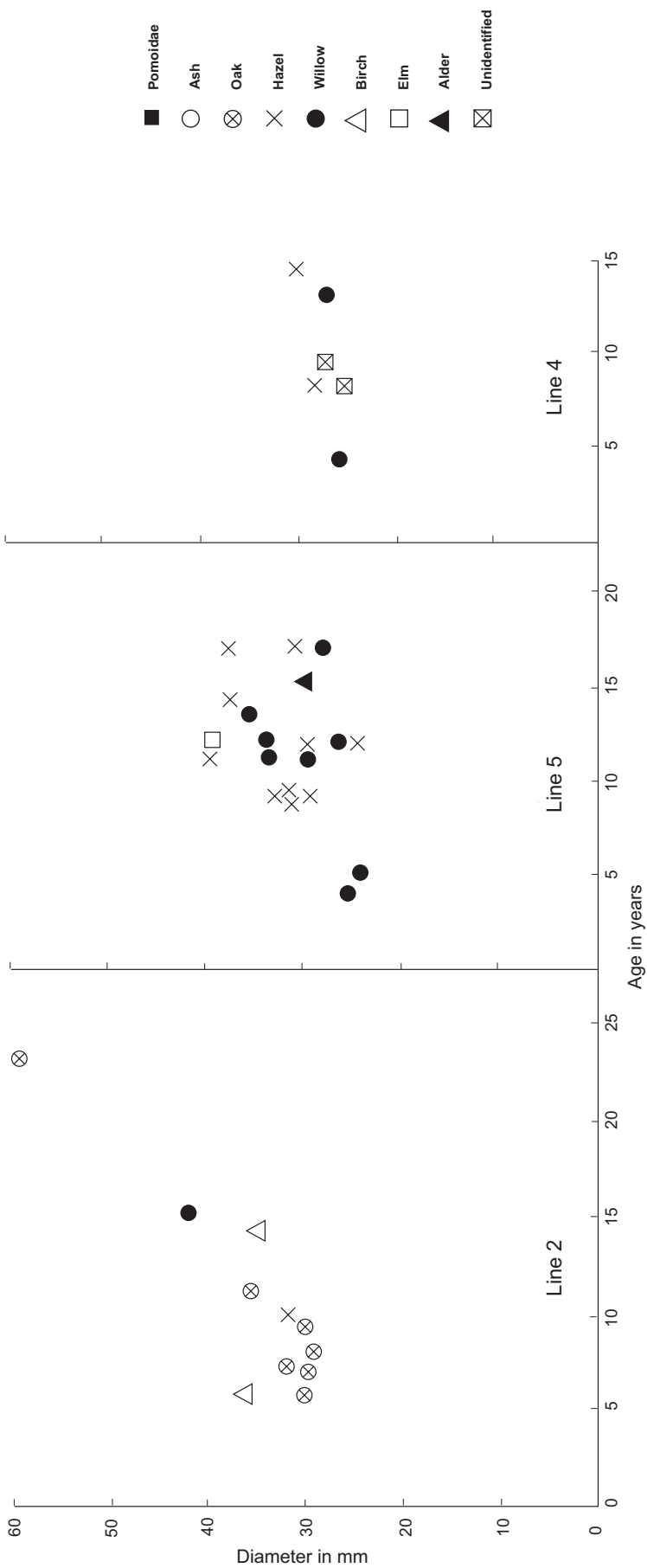


Fig. 79. Age and size distribution of small uprights from three lines of wattling.

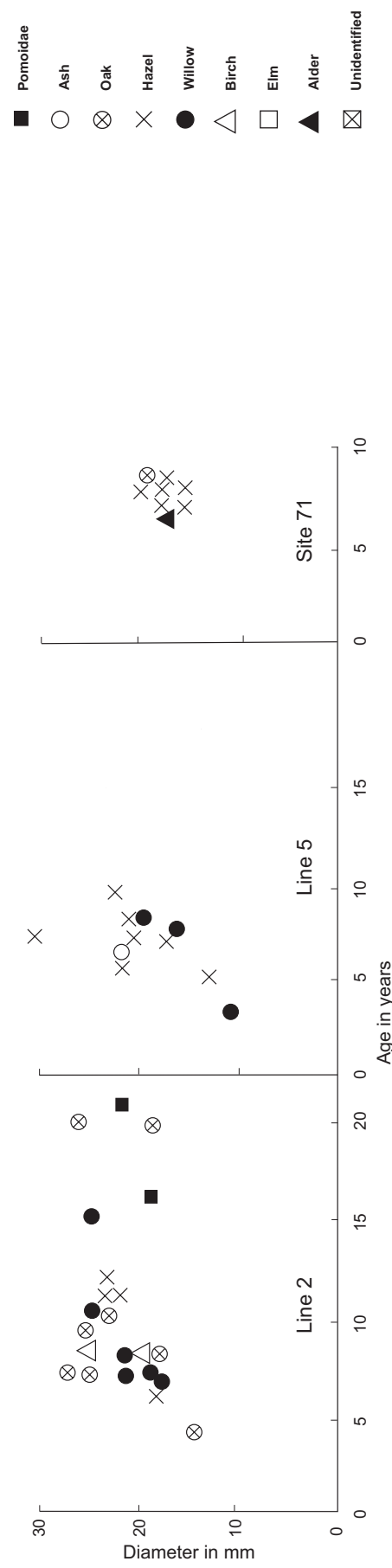


Fig. 80. Age and size distribution of horizontal rods from two lines of wattling.

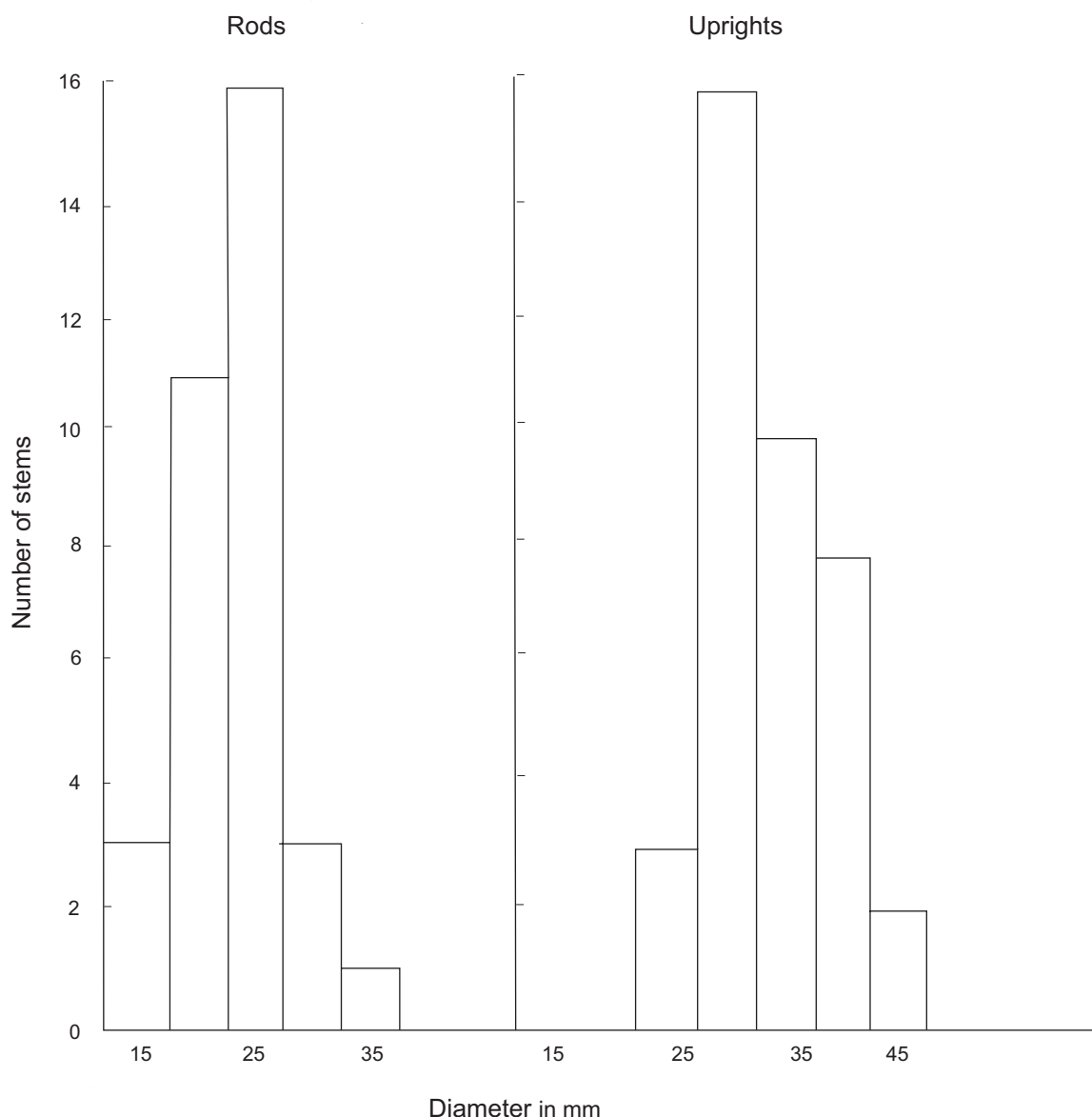


Fig. 81. Size range of the rods and uprights.

from stems of a suitable size. Ages ranged from 6 to 48 years, though the majority were between 6 and 15 years old. Ten stems were almost certainly cut in winter.

The rods woven around the small posts were of indeterminate length, as they had been compressed and broken into short fragments. As a result, all trace of the weaving method had been lost. The original height of the wattle and the number of rods used is not now known.

Samples were collected from 22 rods (WR1-21 and WR7a), of which eight were oak, six were willow, four were hazel, two each were birch and hawthorn type (*Pomoideae*). Again stem diameters clustered between 15-25mm (Fig. 80, left), but ages varied widely between 4 to 21 years. Almost all the stems were cut in winter.

Line 3 – the north-east line of posts

Four posts stood at intervals of 1.1-1.3m, close to the north-east line of wattle (Line 4/5). Numbered WP7-10, they were all of oak and ranged from 90mm to more than

160mm in diameter (Fig. 78); since WP9 lacked its outer surface, its full size is unknown. Ages varied between 20 and 29 years. Two posts were winter cut while WP10 may have been felled in summer.

The ring-widths of WP8 and WP10, 29 and 27 years old respectively, were measured but showed little similarity in growth pattern. This does not necessarily indicate that they were growing at different times; they could have been growing under very different conditions.

Line 4 – west side of the north-east line of wattle

The southernmost 1.4m of the north-east line of wattle consisted of a double line of small upright posts with fragmentary remains of rods. It is not clear why the wattle was double at this point, nor whether the two lines were contemporary. The full length is labelled Line 5, and the results from both should possibly be considered together.

From Line 4, six small posts (WS33A, WS34-38), standing at 0.25m intervals, were sampled. The woods

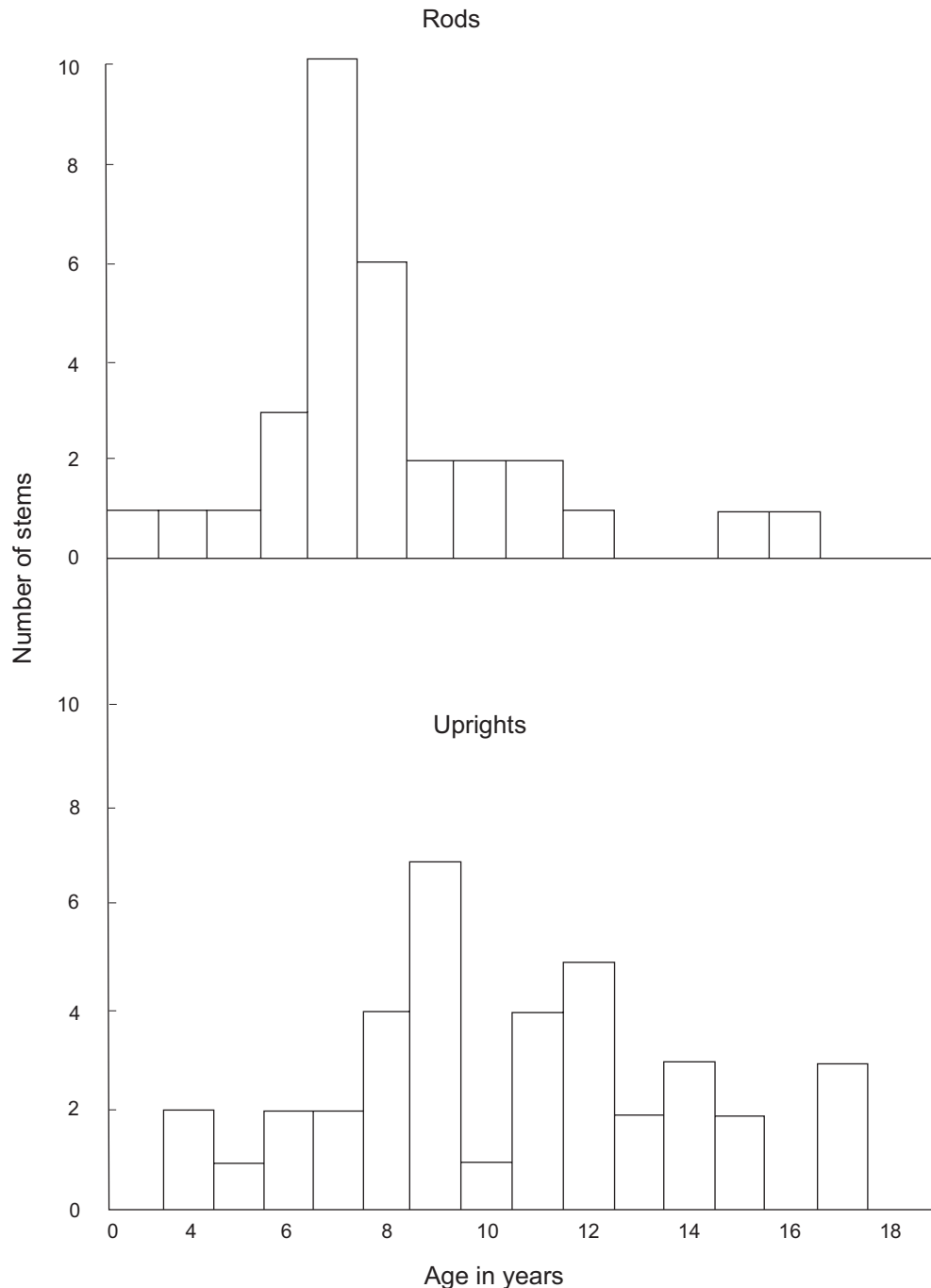


Fig. 82. Age range of the rods and uprights from the millpond.

used were hazel and willow. In diameter, the posts clustered around 25-30mm (Fig. 79, right), with an age range of 4 to 14 years.

No rods were sampled from this area.

Line 5 – east side of the north-east line of wattle

This material includes posts and rods from the entire 5.5m length. The small posts were set at intervals of 0.2-0.3m. Of the 21 sampled (WS13-33), eight were willow, ten were hazel, one was elm (*Ulmus spp.*), one was alder and one unidentified. Their range in size and age was much the same as for the other wattle lines (Fig. 79, centre), with diameters from 25-40mm, and ages from four to seventeen years.

A total of twelve rods were sampled from the northernmost 3m of the line (WR22-33). They included seven of hazel, four of willow and one of ash. Both age and size were quite widespread (Fig. 80, centre), with a diameter range of 11-31mm and an age range of three to nine years.

Other samples

Some outlying posts not associated with the wattle features were also examined. WP11 was related to a line of stones to the east; it consisted of a knotty piece of oak more than 26 years old and about 100mm in diameter. WP12 was an isolated oak timber, 2.6m to the north-east of the wattling. It had been tangentially split to form a

plank 100mm x 35mm in section, with at least eighteen growth rings including six of outer sapwood.

A pair of small posts or stakes (WP13 and WP14) lay to the south-west of the mill-pond. Both were of hazel, 50mm and 36mm in diameter and aged about 35 and 32 years respectively.

Site 71

Wattling was also found in Site 71, on the south-east boundary of the graveyard (See Figs 14 and 18). The posts around which the rods were woven were more substantial than the small posts of Site 30, and most had been split, in contrast to the roundwood used in the millpond. Six uprights (WP13, WP17-21) were sampled, of which three were oak and three were alder. Alder post WP13 was about 200mm in diameter; the others were 70-120mm. Two of the alder posts were aged around 45 years, and the oak posts were 21-26 years old; they were probably cut in summer.

The rods were represented by eight samples (WR1-8), including seven of hazel and one of alder. The rods were very uniform in both age and size (Fig. 80, right), clustering around seven to eight years old and 15-20mm diameter. This is the traditional size for cutting hazel coppice (Edlin 1973; Forestry Commission 1956). Most of the rods were roundwood, but two appeared to be cleft, as is modern practice; they may however have been sampled across a facet near the base.

Two pieces of wood lying just to the south of the wattle were also sampled. WP11 was a hazel stem 100mm in diameter; its 49 rings were measured, but their pattern bore no resemblance to that of other posts. WP12 was a chip of oak with sapwood and bark surface, perhaps produced during trimming of a post. WP14, located just north of the wattle, was a piece of split oak with very narrow growth rings.

Discussion

Information on the entire wood assemblage has been drawn together in order to assess the proportions of species and the overall character of the stems. The study was intended to examine the value of the wood as an indicator of the original woodland composition, and of how the local woodland was being exploited by the community. Since the chronological relationship of the post and wattle lines is unknown, the data from each structure have been drawn together as well as compared, on the assumptions that the wood is local in origin and that traditions do not change very rapidly.

Overall, the woods used were equally divided between oak, willow and hazel, with a small contribution from ash, alder, birch, elm and hawthorn-type (the wood cannot be identified beyond *Crataegus/Sorbus/Pyrus/Malus*). Exact numbers of samples are given in Table 36. The range of species suggests that deciduous woodland clothed the surrounding hill-slopes and valleys, consisting largely

Table 36. Summary of samples and species used in the tree-ring study from the wattle and posts of the millpond and graveyard.

| Species | Function | | | |
|--|----------|----------------|-------|---------------|
| | Rods | Small uprights | Posts | Total samples |
| Site 30 | | | | |
| Oak <i>Quercus spp.</i> | 8 | 8 | 9 | 25 |
| Hazel <i>Corylus avellana L.</i> | 11 | 13 | 3 | 27 |
| Willow <i>Salix spp.</i> | 10 | 12 | 2 | 24 |
| Ash <i>Fraxinus excelsior L.</i> | 1 | - | 1 | 2 |
| Alder- <i>Alnus glutinosa Gaertn.</i> | | 1 | 1 | 2 |
| Birch <i>Betula spp.</i> | 2 | 2 | - | 4 |
| Elm <i>Ulmus spp.</i> | - | 1 | - | 1 |
| Hawthorn type POMOIDAE | 2 | - | - | 2 |
| Unidentified | - | 3 | - | 3 |
| Total | 34 | 40 | 16 | 90 |
| Site 71 | | | | |
| Oak <i>Quercus spp.</i> | - | 3 | 2 | 5 |
| Hazel <i>Corylus avellana L.</i> | 6 | - | 1 | 7 |
| Alder <i>Alnus glutinosa Gaertn.</i> | 1 | 3 | - | 4 |
| Unidentified | 1 | - | 2 | 3 |
| Total | 8 | 6 | 5 | 19 |

of oak with hazel understorey, but with some willow growing in drier conditions than it usually prefers.

The species range shows very little preference for certain woods for particular purposes; the only concentration was in the use of oak for the posts. The variety of woods used for the small upright posts and the rods is apparent in Figs 79 and 80.

As the variety of wood species represented suggests that the choice of species was of little importance, the quantities may thus reflect their relative importance in the woodland. Among the charcoal fragments found in these excavations (see Appendix 4), there was a rather higher frequency of ash; the range of species was otherwise similar.

Most of the wood was of small dimensions, consistent with the cutting over of underwood. No trees of timber size were represented – the largest post was 200mm in

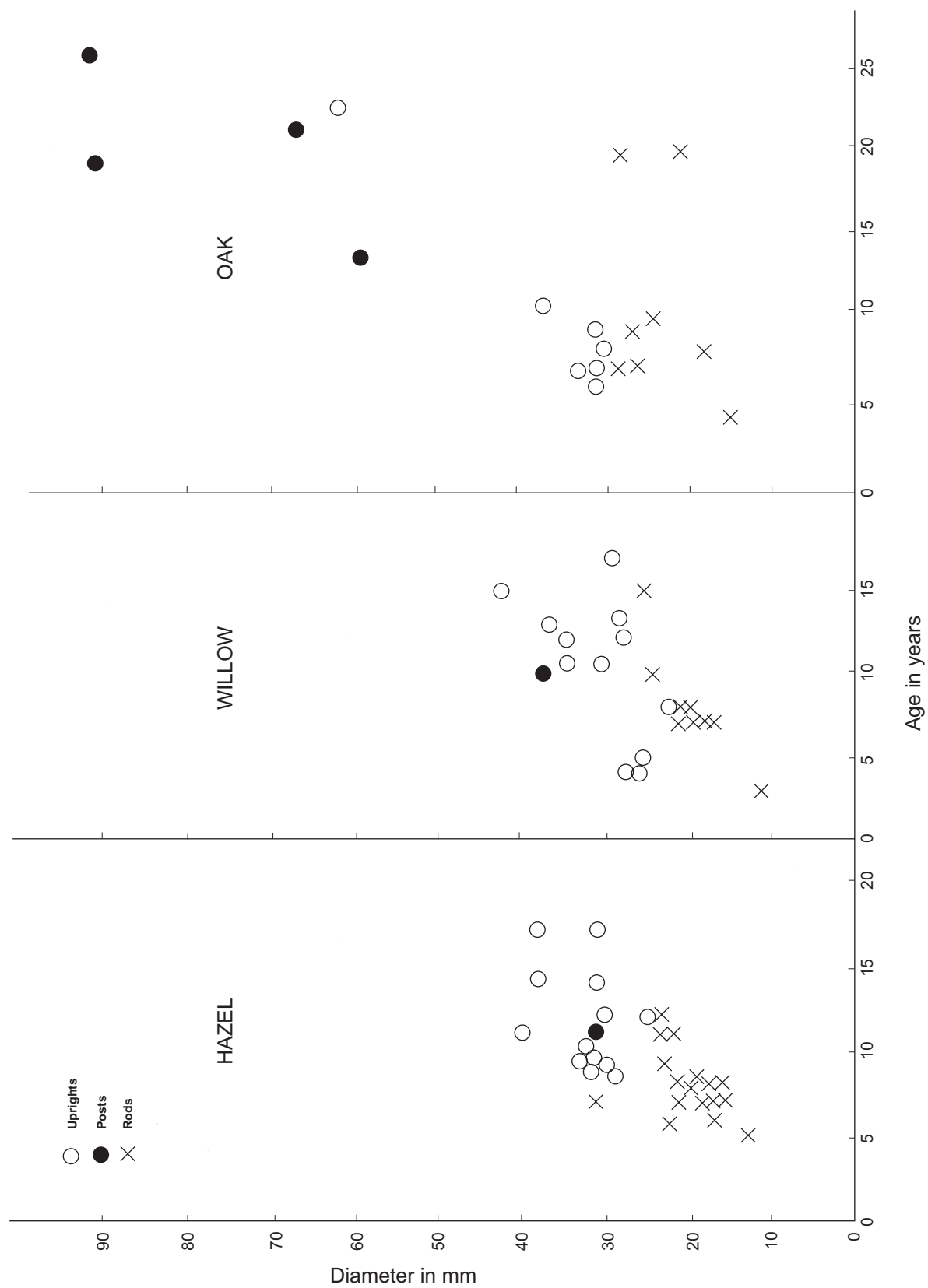


Fig. 83. Age and size ranges of the hazel, willow and oak serving different functions from Sites 30 and 71.

diameter, and no stems exceeded 50 years old. This does not, however, indicate the absence of mature trees from the woodland.

Size and age of the rods and posts are summarised in Figs 81 and 82. The histograms show size concentrations of 15-25mm for the rods and 25-40mm for the uprights (Fig. 81). The ages of the posts were widespread (Fig. 82), but the rods showed a peak in stems aged seven and eight years. Size appears to have been the main criterion for selection; some of the age spread could be the result of draw-felling, or selecting stems of a particular size leaving smaller stems to continue growing (Rackham 1980, 107). Alternatively the woods could have been clear-felled, and the stems of unsuitable size used for other purposes.

The seven to eight year peak in the rods hints at some degree of coppice management, perhaps in a small area of the local woodland. Much of the oak was 20-25 years, the traditional age for cutting the crop for tan-bark (Lindsay 1975).

The rate of tree growth can be determined by studying the relationship of the stems' age and size. Figure 83 compares the age and size distribution of the three commonest species, oak, hazel and willow, and reveals a similar growth rate in each. The growth rate of the oak is more rapid than usual, and the rate of willow much slower – compared, for example, to the scatter of willow from a prehistoric trackway (Morgan 1988b, fig. II.10). The chalk slopes may have been too dry for willow's usual rapid growth.

The two lines of wattle in Site 30 (Lines 2 and 4/5) differed in character, which may suggest that one replaced the other or that they were made by different people. The differences are:

- 1) the intervals between uprights were shorter in Line 4/5 than in Line 2.
- 2) oak was used both for uprights and rods only in Line 2.
- 3) the uprights of Line 2 were slightly more mature than those of Line 4/5 (Fig. 79; Table 37).
- 4) the rods of Line 2 were more mature, but of similar size, to those of Line 4/5 (Fig. 80; Table 38).

No chronological information could be extracted from the short tree-ring series, which might indicate the construction sequence of the series of posts and wattle. No similarity of growth pattern could be found in the posts, four of oak, one of alder, one of hazel and one unidentified, which were measured. This is not necessarily evidence that the posts were put in at different dates, but may suggest a variety of origins or the reuse of wood.

The exact function of the wattling is not now known, but it probably served as consolidation of a bank or dam for an early pond. Wattling and brushwood still serve similar purposes today, for reclamation and sea defences (Rackham 1980, 144). The wattling would have been constructed *in situ*, unlike wattle panels which are made in the woods. The thin upright posts would have been pushed or hammered into the ground, to facilitate which their ends were sharpened; although sampling did not

Table 37. Summary of age and size figures for the upright posts used in the wattle.

| Origin | Age | | Diameter in mm | |
|--|---------|--------|-------------------|---------|
| | Average | Range | Average | Range |
| Site 30 | | | | |
| Line 2 s-w line of wattle | 13.6 | 6 - 48 | 36.1 | 29 - 60 |
| Line 4 west side of n-e line of wattle | 9.3 | 4 - 14 | 28.2 | 26 - 31 |
| Line 5 East side of n-e line of wattle | 11.4 | 4 - 17 | 32.2 | 25 - 40 |
| All posts | 11.65 | 4 - 48 | 32.5 | 25 - 60 |

Table 38. Summary of age and size figures for the rods used in the wattle.

| Origin | Age | | Diameter in mm | |
|--|---------|-------|-------------------|-------|
| | Average | Range | Average | Range |
| Site 30 | | | | |
| Line 2 s-w line of wattle | 10.5 | 4-21 | 21.5 | 14-27 |
| Line 5 East side of n-e line of wattle | 6.6 | 3-9 | 19.5 | 13-31 |
| Site 71 | 7.6 | 7-8 | 18 | 16-20 |
| All rods | 9.2 | 3-21 | 20.8 | 13-31 |

always include the base of the posts, multiple facets left by axe blows were noted in eleven cases and single facets in four cases. The horizontal rods were then woven around the uprights; their fragmentary nature has removed any evidence of the original weave, or their length and total number. Thus the original height of the wattle is unknown. Most of the rods were complete stems; only four out of the 42 examined were cleft, as is the modern practice. Single facets left by the one axe blow which severed the stem from the tree were noted at the base of several stems.

Few other examples of early wattle have been the subject of detailed examination; those with some information are listed in Table 39 for comparison. A similar range of wood species seems to have been common to several early medieval wattle structures, reflecting either similar woodland conditions or similar

Table 39. Some records of the age, size and species of rods used in hurdling from archaeological sites.

| Site | Period | Approx. age of rods Average/range | | Approx. diameter of rods | Most common species | Reference |
|---------------------------|-----------------|--------------------------------------|------|--------------------------|----------------------|---|
| WHARRAM PERCY | early medieval | 9.2 | 6-11 | 15-25 | oak/hazel/ willow | |
| HONEYBEE track | Neolithic | 3.9 | 2-4 | 10-15 | hazel | Coles, Orme, Caseldine and Morgan 1985 |
| ROWLAND'S Track | Neolithic | 5 | 3-6 | 10-20 | hazel | Coles and Orme 1977 Morgan 1988, fig. IV.5 |
| ECLIPSE 1982 track | late Bronze Age | 8 | 6-10 | 17-20 | hazel | Coles, Caseldine and Morgan |
| MINNIS BAY, Kent | late Bronze Age | | | 25-40 | hazel | Worsfold 1943 |
| BLACKWATER, Estuary Essex | Early Iron Age | | 3-6 | 8-26 | oak | Wilkinson and Murphy 1986 |
| GLASTONBURY Village | Iron Age | | | 12-20 | hazel/alder | Bulleid and Gray 1911 |
| MEARE Village | Iron Age | | | 10-25 | alder | Gray and Bulleid 1953 |
| CARLISLE | Roman | | 5-20 | 10-50 | oak/alder | Huntley 1987 |
| COLWICK, Trent | 9th century AD | | 4-10 | 7-22 | hazel/ash/ willow | Salisbury 1981 |
| COPPERGATE, York | early medieval | 9.5 | 8-50 | | oak/hazel/ willow | Hall in prep. |
| DUBLIN | early medieval | | | 15-25 20-30 | ash | Murray 1983 |
| BRAYFORD POOL Lincoln | early medieval | | 5-10 | 15-30 | oak/hazel/ willow | Morgan 1985 |

preferences. Stem diameters lie within a similar range throughout, and it is clear that the tradition of weaving wattle with stems of 10-30mm in diameter has a very long history. Fewer records of stem age have been made, but those that are available show more variation; the Wharram Percy rods are comparable with those from Coppergate in York (Hall 1984) and the Eclipse trackway in the Somerset Levels (Coles, Caseldine and Morgan 1982; Morgan 1988b).

At Wharram Percy the 0.25-0.30m intervals between the upright posts (or sails in the case of hurdle panels) are shorter than those in the Somerset trackways – 0.30-0.50m in the Walton Heath track (Coles and Orme 1977) or 0.30-0.40m in the Eclipse track (Coles, Caseldine and Morgan 1982). Placing the uprights closer together, for example between 0.18-0.30m in medieval Dublin (Murray 1983) or 0.10-0.15m in the Iron Age village at Meare (Gray and Bulleid 1953), is also more common today.

Conclusions

The examination of wood, probably of Anglo-Saxon date, used for wattling and posts in and near the mill pond at Wharram Percy, has contributed to our knowledge of the composition and use of the local woodland. The results are beginning to emphasise the potential value of studying small, waterlogged roundwood from archaeological sites; this material has been badly neglected, despite its evident importance as a means of constructing house walls and for use as fencing, pathways and pit linings.

Despite the relatively small sample numbers considered here, it has been possible to show that the wood was collected from mixed deciduous woodland, largely of oak, hazel and willow. The oak had grown quickly in favourable conditions, which were probably rather dry for the slow-grown willow. Only young trees or

underwood were collected. The small upright posts of the two wattle lines were 25-40mm in diameter, while the rods were clustered in the 15-25mm size range. Ages of the stems were widespread, though a small concentration of rods seven to eight years old may suggest a small amount of coppice management. The stems were collected on the basis of their size.

Several differences in species and size of the wood from the two lines of wattle in the millpond, as well as different construction techniques, suggests that they may have been made by different people or at different times.

Two lines of posts running parallel to the wattle were made largely of substantial split oak. Despite recording the ring-widths of seven posts, no chronological information could be derived to suggest either the time interval between the lines of posts and wattle, or their absolute dates.

28 The Insect Assemblages from the Pond Sediments at Site 30

by M. Girling and M. Robinson

Three sequences of samples from Phase 2 waterlogged sediments which accumulated in the pond behind the dams at Site 30, were examined for insect remains. The sample codes, weights and descriptions are given in Table 40; column 1 corresponds to Section 1 and column 2 to Section 2 of the pollen samples (Ch. 24).

The insect remains were recovered by Maureen Girling, using the standard paraffin flotation technique (Coope and Osborne 1967) and identified by direct comparison with modern reference specimens. Results are given in Table 41 for the minimum number of

individuals represented by the fragments in each sample, the nomenclature following Kloet and Hincks (1977). The results for Coleoptera from the bottom three samples of Column 2 are also displayed in Figure 84 by species group after Robinson (1991, 278-81). This report has been written by Mark Robinson using the results of the late Dr Girling.

The environment of the pond

The pond at Wharram Percy was created by the damming of the valley bottom in Phase 1 to retain the flow of a small stream which issues from the chalk. The original purpose of the pond was probably to supply a water-mill but subsequently it is possible that it became used for other purposes. The chalk bedrock would have ensured that the pH of the water was high, a factor that would usually favour the colonisation of the pond by large numbers of insects. (This is in contrast to acid pools which tend to be inhabited by low numbers of fewer species.) Aquatic and marginal plants, with their attendant insect fauna, would also be expected to colonise readily. The majority of the samples, however, produced sparse insect assemblages. The amount of organic material in the samples was low and it is possible that rapid sedimentation behind the dam was in part responsible for the low concentration of insect remains.

The insects from the SW Column and Column 1 only included a small proportion of aquatic and pond edge taxa. Most seems to have been terrestrial individuals living in the vicinity which strayed into the water and drowned. The most numerous beetle from these samples was *Helophorus nubilus*, a phytophagous species which feeds on cruciferous weeds. The remaining insects were from a variety of habitats but even summation of the

Table 40. Pond samples.

| Column Identifier | Column depth (mm) | Sample No. | Weight (kg) | Description |
|-------------------|-------------------|------------|-------------|-----------------------------------|
| SW Column | | | | |
| SW79 | 0-90 | 1291 | 7.95 | clay and chalk gravel |
| SW75 | 330-360 | 1294 | 2.5 | silt and chalk gravel |
| SW72 | 550-750 | 1474 | 10.8 | dark clay and stones |
| Column 1 | | | | |
| WP30 (top) | | 1461 | 2.95 | dark slightly organic clay silt |
| WP30 | | 1467 | ? | ? |
| WP30 | | 1464 | 3.0 | dark organic silt |
| WP30 | | 1465 | ? | ? |
| Column 2 | | | | |
| WP30 (top) | | 1472 S6 | ? | slightly organic brown silty loam |
| WP30 | | 1473 | 5.3 | dark organic silty clay |
| | | S3&S4 | | |
| WP30 | | 1474 S2 | 20.5 | dark organic silty clay |
| WP30 | | 1475 S1 | 2.6 | very stony clay |

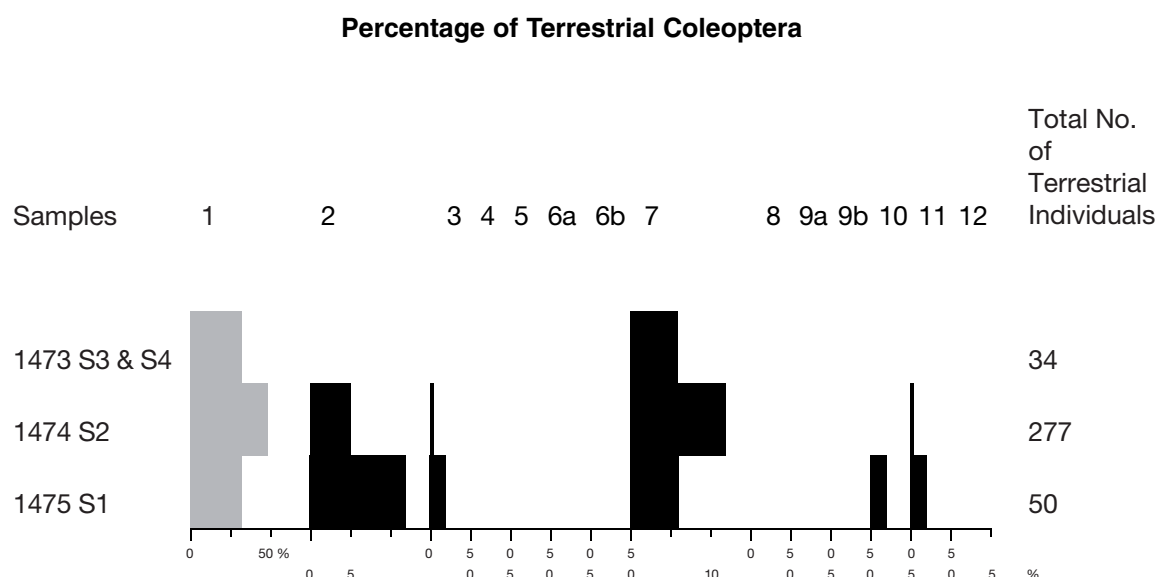
Table 41. Pond insects.

| Minimum Number of Individuals | | | | | | | | | | | | |
|--|-----------|---------|---------|----------|------|------|------|----------|------------|---------|---------|---------------|
| Sample | SW Column | | | Column 1 | | | | Column 2 | | | | Species Group |
| | SW79 | SW75 | SW72 | 1461 | 1467 | 1464 | 1465 | 1472 S6 | 1473 S3,S4 | 1474 S2 | 1475 S1 | |
| Depth (mm) | 0-90 | 330-360 | 550-750 | | | | | | | | | |
| DERMAPTERA | | | | | | | | | | | | |
| <i>Forficula auricularia</i> (L.) | 2 | 8 | 4 | 2 | 13 | 2 | 7 | 1 | 1 | 9 | 2 | |
| TRICHOPTERA | | | | | | | | | | | | |
| Gen. et spp. indet. | | | | | | | | 8 | 6 | 10 | | |
| COLEOPTERA | | | | | | | | | | | | |
| CARABIDAE | | | | | | | | | | | | |
| <i>Carabus nemoralis</i> Mull. | | | | | | | | | | 1 | 1 | |
| <i>Notiophilus biguttatus</i> (F.) | | | | | | 1 | | | | | | |
| <i>Bembidion lampros</i> (Herbst) | | | | | | | | | | 1 | | |
| <i>B. bipunctatum</i> (L.) | | | | | | | | | | 1 | | |
| <i>B. doris</i> (Panz.) | | | | | | | | | | 1 | | |
| <i>B. unicolor</i> Chaud. | | | | | | | | | | 1 | | |
| <i>Bembidion</i> spp. | | | | | | | | 1 | | | 1 | |
| <i>Pterostichus cupreus</i> (L.) | | | | | | | | | | 1 | | |
| <i>P. melanarius</i> (Ill.) | | | | | | | | | | 1 | | |
| <i>Calathus fuscipes</i> (Goeze) | | | | | | | | | | | 1 | |
| <i>Harpalus</i> sp. | | | | | | | | | | | 1 | |
| DYTISCIDAE | | | | | | | | | | | | |
| <i>Agabus bipustulatus</i> (L.) | | | | | | | | | | 1 | | 1 |
| <i>Colymbetes fuscus</i> (L.) | | | | | | | 1 | | 1 | 1 | 1 | 1 |
| HYDROPHILIDAE | | | | | | | | | | | | |
| <i>Helophorus aquaticus</i> (L.) | | 1 | | | | 1 | 1 | 1 | | 12 | 2 | 1 |
| <i>H. brevipalpas</i> Bed. | | 2 | | | | | | 1 | 6 | 90 | 7 | 1 |
| <i>H. grandis</i> (Ill.) | | | | | | | | | | 3 | 1 | |
| <i>H. nubilus</i> F. | 1 | 2 | | | 3 | 4 | 2 | 1 | | 5 | 3 | |
| <i>Cercyon</i> | | | | | | | | 1 | | | | 7 |
| <i>Megasternum obscurum</i> (Marsh.) | 1 | | | | | 2 | 2 | 2 | 1 | 4 | 1 | 7 |
| <i>Cryptopleurum minutum</i> (F.) | | | | | | | | 1 | | | | 7 |
| <i>Hydrobius fuscipes</i> (L.) | | | | | | | | | | 1 | | 1 |
| <i>Anacaena</i> sp.1 | | | | | | | | | | | 1 | 1 |
| <i>Enochrus</i> sp. | | | | | | | | | | 1 | | 1 |
| HISTERIDAE | | | | | | | | | | | | |
| <i>Acritus nigricornis</i> (Hoff.) | | | | | | | | | | | 1 | |
| HYDRAENIDAE | | | | | | | | | | | | |
| <i>Ochthebius minimus</i> (F.) | | 1 | | | | | | | 3 | 17 | 2 | 2 |
| <i>Limnebius aluta</i> (Bed.)- | | | | | | | | | | 1 | | 1 |
| <i>Limnebius</i> spp. | | | | | 1 | | | | 1 | 7 | 2 | 1 |
| SILPHIDAE | | | | | | | | | | | | |
| <i>Silpha atrata</i> L.- | | | | | | | 1 | | | | | |
| <i>Silpha</i> sp. | | | | | | | | 1 | | | 1 | |
| STAPHYLINIDAE | | | | | | | | | | | | |
| <i>Micropeplus porcatus</i> (Payk.) | | | | | | | | | | 1 | | |
| <i>M. staphylinoides</i> (Marsh.)- | | | | | | | | | | | 1 | |
| <i>Olophrum piceum</i> (Gyll.)-1 | | | | | | | | | | 1 | | |
| <i>Lesteva longoelytrata</i> (Goeze) | | 1 | | | | | | | 4 | 20 | | |
| <i>Carpelimus</i> or <i>Thinobius</i> spp.-- | | | | | | | | | 4 | 13 | 2 | |
| <i>Platystethus arenarius</i> (Fourc.) | | | | | | | | | | 10 | | 7 |
| <i>P. cornutus</i> gp. | | | | | | | | | 1 | | | |
| <i>P. nitens</i> (Sahlb.)- | | 1 | | | | | | | | 13 | 2 | |
| <i>Anotylus sculpturatus</i> gp. | | | | | | | | | | 10 | | 7 |
| <i>A. nitidulus</i> (Grav.) | 1 | 2 | | | | | | | 10 | 54 | 4 | |
| <i>A. rugosus</i> (F.) | | | | | | | | | 1 | 9 | 2 | 7 |

Table 41 continued.

| Minimum Number of Individuals | | | | | | | | | | | | |
|---|-----------|---------|---------|----------|------|------|------|----------|------------|---------|---------|---------------|
| Sample | SW Column | | | Column 1 | | | | Column 2 | | | | Species Group |
| | SW79 | SW75 | SW72 | 1461 | 1467 | 1464 | 1465 | 1472 S6 | 1473 S3,S4 | 1474 S2 | 1475 S1 | |
| Depth (mm) | 0-90 | 330-360 | 550-750 | | | | | | | | | |
| <i>Anotylus</i> sp. | | | | | | | | 1 | | | | |
| <i>Stenus</i> spp. | | 4 | | 1 | 2 | 1 | 2 | 1 | 1 | 6 | 1 | |
| <i>Lathrobium</i> sp. | | 1 | | | | | | | | 2 | 1 | |
| <i>Xantholinus linearis</i> (Ol.) | 1 | | | 1 | 2 | 1 | 1 | | | 4 | | |
| <i>Philonthus</i> spp. | 3 | | | | 3 | | | | | 4 | 1 | |
| <i>Tachinus signatus</i> Grav. | | | | | | | | 1 | | 2 | | |
| Tachyporinae indet. | | 2 | | | 3 | 1 | | | | 7 | 2 | |
| <i>Drusilla canaliculata</i> (F.) | | 1 | | | | | | | | | | |
| Aleocharinae indet. | 2 | 1 | | 1 | 2 | 2 | 2 | 1 | 12 | 57 | 4 | |
| GEOTRUPIDAE | | | | | | | | | | | | |
| <i>Geotrupes</i> sp. | | | | | | | | | | 1 | 1 | 2 |
| SCARABAEIDAE | | | | | | | | | | | | |
| <i>Aphodius ater</i> (Deg.) | | | | | | | | | | 1 | | 2 |
| <i>A. rufipes</i> (L.) | | | | | | | | | | | 1 | 2 |
| <i>A. sphacelatus</i> (Panz.) | | | | | | | | | | | 2 | 2 |
| <i>Aphodius</i> spp. | 1 | 2 | | | | | | 3 | | 12 | 2 | 2 |
| <i>Serica brunnea</i> (L.) | | | | | | | | | | 1 | | 11 |
| <i>Phyllopertha horticola</i> (L.) | | | | | | | | | | | 1 | 11 |
| SCIRTIDAE | | | | | | | | | | | | |
| Gen. et spp. indet. | | | | | | | | | | 2 | | |
| HETEROCERIDAE | | | | | | | | | | | | |
| <i>Heterocerus</i> sp. | | | | | | | | | | 1 | | |
| ELMIDAE | | | | | | | | | | | | |
| <i>Normandia nitens</i> (Mull.) | | | | | | | | | | | 1 | 1 |
| <i>Oulimnius troglodytes</i> (Gyll.) | | | | | | | | | | 1 | | 1 |
| or <i>tuberculatus</i> (Müll.) | | | | | | | | | | | | |
| ANOBIIDAE | | | | | | | | | | | | |
| <i>Anobium punctatum</i> (Deg.) | | | | | | | | | | | 1 | 10 |
| CRYPTOPHAGIDAE | | | | | | | | | | | | |
| <i>Cryptophagus</i> sp. | | | | | | | | | | 2 | | |
| LATHRIDIIDAE | | | | | | | | | | | | |
| <i>Corticaria</i> sp. | 1 | | | | | | | | | | | |
| CHRYSOMELIDAE | | | | | | | | | | | | |
| <i>Phyllotreta nigripes</i> (F.) | | | | | | | | | | 6 | | |
| <i>Longitarsus</i> spp. | 2 | 2 | | | | | | | | 15 | 5 | |
| <i>Chaetocnema concinna</i> (Marsh.) | | | | | | | | | | 3 | | |
| <i>C. confusa</i> (Boh.) or <i>hortensis</i> (Fourc.) | 2 | | | | 1 | | | | | | | |
| APIONIDAE | | | | | | | | | | | | |
| <i>Apion</i> spp. | | 1 | | | | | | | | 1 | 1 | 3 |
| CURCULIONIDAE | | | | | | | | | | | | |
| <i>Barynotus</i> sp.- | | | | | | 1 | | | | | | |
| <i>Sitona</i> sp. | | | | | | | | 1 | | | | 3 |
| <i>Ceutorhynchus contractus</i> (Marsh.) | 1 | | | | | | | | 3 | 5 | | |
| <i>Ceutorhynchus</i> sp. | | | | | | | | | | | 1 | |
| Total Coleoptera | 13 | 27 | 0 | 3 | 16 | 15 | 12 | 17 | 45 | 412 | 66 | |
| HYMENOPTERA | | | | | | | | | | | | |
| FORMICIDAE | | | 5 | 1 | 7 | | 14 | 1 | 6 | 29 | 2 | |
| PARASITICA | | 3 | | 1 | 2 | | 4 | 4 | 3 | 75 | | |
| DIPTERA | | | | | | | | | | | | |
| Chironomidae larval heads | | | | | | | | + | + | + | | |
| Gen. et spp. indet | 3 | 13 | 12 | 7 | 16 | 8 | 16 | 9 | 25 | 288 | 10 | |

+ present



Species groups expressed as a percentage of the total terrestrial Coleoptera (i.e. aquatics excluded). Not all the terrestrial Coleoptera have been classified into groups.

Key to columns

| | | | |
|----|-----------------------------------|----|----------------------------|
| 1 | Aquatic | 7 | Dung/Foul Organic Material |
| 2 | Pasture/Dung | 8 | Lathridiidae |
| 3 | ?Meadowland | 9a | General Synanthropic |
| 4 | Woodland Trees | 9b | Serious Stored Grain Pests |
| 5 | Marsh/Aquatic Plants | 10 | Esp. Structural Timbers |
| 6a | General Disturbed Ground/Arable | 11 | On Roots in Grassland |
| 6b | Sandy/Dry Disturbed Ground/Arable | 12 | Heathland and Moorland |

Fig. 84. Species groups of Coleoptera from Wharram Percy pond Column 2.

results from the two columns does not give a large enough assemblage for further interpretation.

Only a small assemblage was recovered from Sample 1472 S6, but the combination of a greater concentration of insect remains with, in some instances, large samples, makes a more detailed interpretation possible for the lower part of Column 2, Samples 1473 S3 and S4, 1474 S2 and 1475 S1. Again aquatic Coleoptera were in the minority but they were a significant part of the assemblage, comprising about a third of the total number of individuals. The aquatic fauna, however, was not one of a mature pond. By far the most abundant water beetle was *Helophorus brevipalpis*. This species is much more common in temporary ponds, puddles and ditches than permanent ponds and streams. It readily takes to the wing and newly created bodies of water can be colonised rapidly by quite large numbers of individuals (Grenstead 1939). The only other water beetles that were at all well represented were *Helophorus aquaticus* and *Ochthebius minimus*, which again tend to favour stagnant water and do not require a well-vegetated habitat. Two examples of

elmid beetles, *Normandia nitens* and *Oulimnius* sp., which require very clean flowing water, had perhaps been washed into the millpond by the stream which fed it. Beetles which feed on aquatic and marsh plants were entirely absent.

Staphylinidae which live at the edge of ponds etc, in accumulations of decaying vegetation or on exposed mud, formed the other main group of Coleoptera from Samples 1473 S3 and S4, 1474 S2 and 1475 S1. The most abundant taxa were *Lesteva longoelytrata*, *Carpelimus* spp., *Platystethus nitens* and *Anotylus nitidulus*. (These species, which do not fall into any of the categories in Fig. 74, formed 35% of the non-aquatic Coleoptera.) Some of them, for example *P. nitens* and *A. nitidulus*, also occur in other sorts of decaying organic material such as manure heaps but *L. longoelytrata* is restricted to the waterside habitat (Horion 1963, 130, 231, 250). Many of the taxa of Staphylinidae from the Wharram Percy pond, including Aleocharinae, were recorded by Donisthorpe (1939, 25-50) at Windsor Great Park in reed refuse, on mud around ponds and alongside ponds or in a willow swamp. The

numbers of Species Group 7, such as *Anotylus sculpturatus* gp., which occur in a range of decaying organic material can be found in waterside organic debris. They formed up to 12% of the terrestrial Coleoptera.

Various factors could have contributed to the impoverishment of the fauna of the pond including a rapid rate of silting resulting in frequent clearing out of sediments and regular weeding of the vegetation, but they do not provide sufficient explanation. The main factor was perhaps related to the use of the pond as a source of power for a water-mill. The flow of the stream in summer was probably insufficient for continuous operation of the mill. The insect fauna suggested a rather hostile environment of a temporary pool and temporary expanses of mud. This would be consistent with milling commencing with a full pond and continuing until the pond was empty.

The surrounding environment

The insects from Column 2 suggest that the background environment of the site was an open agricultural or pastoral landscape. There was no evidence for woodland or scrub. A couple of chafers, *Serica brunnea* and *Phyllopertha horticola* (Species Group 11), were present and they have larvae that feed on the roots of plants in permanent grassland. Scarabaeoid dung beetles (Species Group 2), mostly from the genus *Aphodius*, suggest the presence of pastureland because they only occur in dung as individual droppings, not manure heaps. The phytophagous beetles *Helophorus nubilus*, *Phyllotreta nigripes* and *Ceutorhynchus contractus* suggest cruciferous weeds growing in the vicinity.

There was no evidence of human habitation given by the insect remains. Synanthropic species, including household pests and grain beetles, were absent apart from a single specimen of *Anobium punctatum* (Species Group 10). There was a notable absence of insects associated with accumulations of rubbish other than the pondside species. Studies of other Saxon and medieval insect assemblages have demonstrated how sensitive the faunas are to nearby human presence (Girling 1981; Girling and Robinson 1989; Hall *et al.* 1983; Robinson 1980).

Comparison with other biological evidence from the site

The waterlogged samples from the adjacent depression (273) of Site 71 contained few seeds of aquatic species and none which suggests a standing body of water (Ch. 26). Thus conditions in the ponds of Sites 30 and 71 show certain similarities.

In Section 2, the only sequence of pollen samples from the pond at Site 30 to contain well preserved pollen, grassland taxa predominated and values for tree and shrub pollen were low (Ch. 24). The consistent representation of *Helianthemum* sp. and *Poterium sanguisorba* indicates unploughed calcareous grassland. Cereal pollen and pollen from arable weeds were also

present. The pollen evidence serves to amplify the evidence from Column 2, the analogous sequence of samples for insects, of an open landscape.

Much charred grain, some of it showing insect damage, was recovered from the upper sediments behind the dam at Site 30 (Ch. 25) in complete contrast to the absence both of grain beetles and of those beetles which tend to occur in mill buildings (Walker 1916) from the waterlogged sediments. The reason for this discrepancy is uncertain, but it is possible that the carbonised remains are unrelated to the functioning of the mill and represent the disposal of crop-processing waste. Insect pests of stored grain were absent from the Saxon millpond at West Cotton (Robinson n.d.).

29 Environment and Economy at Wharram Percy: Evidence from the Pond and Dam Samples

by W.J. Carruthers

In this section, environmental information has been drawn from the study of pollen, charred and waterlogged fruits and seeds, waterlogged wood and insect remains from Sites 30 and 71.

Charcoal is not included, as this will be discussed as a whole in a later volume, drawing together information from a wide range of sites and phases at Wharram Percy. Absence of charcoal information from these discussions does cause some difficulties, since one of the interesting points is the apparent scarcity of woodland in the medieval period. For this reason, the interpretation may need to be adjusted at a later date, following analysis of the charcoal.

Further difficulties arise from the fact that the reports used for this synthesis were written in the 1970s and 1980s. Although some of the authors have made revisions to their original reports, some information about the samples has been lost. Inevitably, methods have changed to a certain extent over the last 30 years. Nevertheless, because several sources of information can be examined together (i.e. insects, pollen and seeds), some aspects of the data can still be interpreted with a reasonable degree of confidence. In addition, some of the charred seed samples were quite productive, and the information they provide about crop plants at Wharram Percy is significant.

The operation and environment of the millpond

a) Phase 1

The earliest samples came from pond silts associated with the earliest dam in Sites 30 and 71, lines of wattles from both sites, and from a dump of charred grain in Site 30 (see 'economy' discussion below). Unfortunately, pollen samples from the Phase 1 silts (Ch. 24) showed

consistently high levels of *Liguliflorae* pollen (dandelion etc.), a characteristic indicative of poor conditions of preservation resulting in differential preservation. The results from this section, therefore, are not very informative. The limited range of pollen taxa that was recorded indicated that chalk grassland was present throughout the phase, and that arable cultivation was taking place nearby. Bush notes that the poor preservation could indicate that the pond had been emptied at some point, or perhaps from time to time, allowing the sediments to be exposed to atmospheric oxygen. This is a feature of the millpond that was also indicated by insect remains from the later (Phase 2) clay dam sediments (see Ch. 29 and discussion below), and Robinson suggests (pers. comm.) that the pond was probably drained by each milling operation. It appears that, from the earliest damming of the stream in order to create a millpond, the flow of the stream was insufficient to maintain a continuous high water level while the mill was in operation. This may have been a particular problem during the summer months, perhaps resulting in the construction of the later clay (Phase 2) and chalk and earth (Phase 3) dams in attempts to raise the water level.

Evidence from waterlogged plant macrofossils in the silts from depression (273) of Site 71 (adjacent to Site 30) supports these suggestions (Ch. 26). No plants indicative of a standing body of water were recorded, and the occurrence of marginals was fairly low. Brooklime and celery-leaved crowfoot were growing in the muddy margins of the pond, along with rushes, sedges and a few other damp-ground taxa. Celery-leaved crowfoot is characteristic of nutrient-enriched sediments. Since seeds from weeds of disturbed, nutrient-rich soils such as docks and stinging nettles were also frequent in the samples, it is likely that livestock was grazing nearby and using the pond as a waterhole. Uncharred seeds from the lowest sample in a dump of charred cereals from Site 30 examined by Hillman (Ch. 25) consisted primarily of numerous henbane and stinging nettle seeds. These species are indicative of nutrient-rich soils such as are found in farmyards and waste places, so their presence in the Site 30 pond silts reinforces this suggestion.

Grassland plants were also well-represented in the Site 71 samples, including a species characteristic of lightly grazed chalk grassland communities, fairy flax. At the other end of the pH scale, heather flowers and leaves were present (particularly in sample 174), providing evidence that a 'chalk heath' may have formed in some of the more exposed areas of grassland. Heather leaves and seeds were also present in small numbers as charred remains in the grain dump from Site 30 (Ch. 25) and in Late Saxon and Norman samples from the South Manor site (Carruthers 2000). These remains may have been derived from waste being deposited in the pond, or dung from animals that had been grazing on the hillsides. Ericaceae pollen was only recovered from one Phase 2 sample in Section 1, so the plant macrofossils may have been transported for some distance. Evidence for the deposition of burnt domestic waste is provided by the

recovery of charred cereal remains from three of the four Phase 1 samples (see discussion of 'economy' below).

Sites 30 and 71 also produced lines of wattling and posts dating to Phase 1 (Ch. 27). These may have served to consolidate the bank, or contributed to the damming of an early pond. Differences in the characters of the two lines of wattling suggested that one line may have been constructed to replace the other. Oak, willow and hazel were the main species used, but the presence of a wide range of taxa including birch, alder, elm and *Pomoideae* suggested that little care was invested in selecting the most suitable wood for the job. Birch rots rapidly in water, and alder is not durable out of water. This could suggest that there was not a wide choice of suitable-sized wood when the wattles were being constructed, or that the builders were not particularly concerned that the structure should survive for a long period of time. Evidence from counting growth rings indicated that it is unlikely that regular coppicing was being carried out. The ages of the stems were very variable, suggesting that the wood had been selected by size (rather than age) from the underwood of a mixed, deciduous woodland. The growth rate of the three dominant timbers, oak, hazel and willow, was similar for each species, indicating a common origin for the wood. The growth rate for the oak was relatively rapid, but it was slower than usual for the willow. Therefore, the woodland was probably located on the drier hillslopes surrounding Wharram Percy, where the calcareous soils would have favoured oak but been drier than is optimal for willow.

b) Phase 2

The second and third series of pollen samples (Sections 2 and 1, Ch. 24) were from Phase 2 silts that had accumulated behind the clay dam. Differences in the preservation between sections 2 and 1 were observed by Bush, with most of the lower section (section 2) appearing to have remained waterlogged throughout its history, but the upper section (section 1) showing signs of having dried out at some point. Bush suggested that the new clay dam was either built in two phases with only the lower phase maintaining a continuous high water level, or, if a single clay dam was built, it must have been damaged at some point allowing the water level to drop.

These differences were also seen in the preservation of insects (Ch. 28). Most of the samples were found to produce far fewer insects than might be expected for a pond located in a calcareous landscape. As with the pollen, the best preserved assemblages were recovered from samples in the lower part of column 2 (samples 1473 S3 and S4, 1474 S2 and 1475 S1; equivalent to pollen Section 2, 1474). Robinson notes that the low organic content of the poorer samples suggests that rapid silting may have occurred behind the dam. This would result in low concentrations of environmental remains being present, and may have led to frequent clearing out of the pond silts and vegetation. He suggests, however, that a more important factor was likely to be the small size of the feeder stream flowing into the pond. The water

level appears to have fallen to somewhere between samples 1472 S6 and 1473 S3 and S4 for long enough periods to have caused the decay of environmental remains in the upper levels. The frequency of aquatic beetles characteristic of temporary bodies of water, and terrestrial beetles of exposed mud and rotting vegetation around the margins of ponds provided further evidence in support of this interpretation.

Pollen and insect evidence from the better-preserved samples indicated that an open, predominantly pastoral landscape existed around the pond. The arboreal pollen count was low (c. 10%), and most of the tree species represented were associated with damp ground (e.g. willow and alder) or scrub (e.g. birch, hazel, elder). Larger woodland species such as oak were very scarce. Since there was no evidence for woodland or scrub from the insect assemblages, the arboreal pollen may have been derived from scrub growing along the feeder stream or on the opposite side of the pond from the sampling point.

Grass pollen (family Gramineae, now called Poaceae) and the pollen from grassland herbs such as plantains were dominant in all of the samples in Section 2. Plants characteristic of dry chalk grasslands, such as rock-rose and salad burnet, were recorded. The presence of dung beetles that only occur in droppings (as opposed to dung heaps) and chafers whose larvae feed on roots in permanent grassland provided further evidence for the existence of a pastoral landscape. There was no evidence of human habitation in the insect assemblages, or of accumulated domestic debris, such as is typical of urban sites.

Modern comparative pollen studies carried out by Bush (Ch. 24) in the area produced results that were very similar to the archaeological samples. The present vegetation is predominantly chalk grassland on the valley slopes, with arable farming on the tops of the Wolds and some commercial woodland c. 500m from the site. The level of cereal cultivation in the medieval samples (c. 2-3%) appears to be similar to that found today, probably because cultivation of the steep-sided valley slopes is not much easier today than it would have been in the medieval period. This subject is discussed more fully below, as is the possibility of the cultivation of other crops including flax, hemp and cruciferous vegetables.

Silts from the adjacent Site 71 produced a very similar range of waterlogged plant remains to that recovered from the Site 71 Phase 1 silts. There was no clear evidence of changes having taken place through time, although fewer charred cereals were recovered from the Phase 2 samples. Weeds of nutrient-enriched soils (e.g. broad-leaved dock) were just as frequent in silts from this phase as in Phase 1, but the insect evidence from nearby Site 30 showed no signs of the deposition of domestic waste or human habitation. The evidence for dung beetles in Site 30 again points to the source of the nutrients as being grazing animals.

c) Phase 3

No environmental samples were taken from Phase 3.

d) Phase 4

A few waterlogged seeds were recovered from the Site 71 charred grain deposit (Ch. 26). These were mainly from elderberry and stinging nettles, reflecting the continued high-nutrient status of the soil. Brooklime was still growing along the shallow, muddy margins of the depression (273) at this time, as in the Phase 1 and 2 samples. The most numerous remains were the oospores of aquatic stonewort algae (*Chara* sp.). This group of algae is often abundant in ponds and ditches, particularly where waterlogging is only seasonal or temporary. From this limited information it appears that the environment of the pond had not changed a great deal over the centuries. No information about the surrounding area was retrieved.

The arable economy of Wharram Percy, and evidence for other crop plants

a) Phase 1

One notable feature of this phase was the large number of charred grain deposits listed in the Archive for Site 30. In addition to the samples from five contexts examined by Hillman (Samples B; D19 to D29; Ch. 25), a further 26 contexts were recorded as 'Carbonised Grain Deposits'. It is unfortunate that these are now unavailable for study, but the records do suggest that a lot of activity associated with the mill was taking place during this phase. Some signs of insect damage were found in each of the grain deposit samples. No insect samples were examined from this phase, but Robinson comments on the absence of insect pests of stored grain from the Phase 2 pond samples.

The dump of grain examined by Hillman was uniform enough to be considered as a single deposit, although there appears to be a gap in the middle where no cereals were recorded, so it may be sequential dumping of two very similar deposits. Barley (six-row hulled barley, both lax and dense varieties) was the most frequent component but oats were also common, at the ratio of 5:1 barley to oats. Small sand oat (*Avena strigosa*) was the main species of cultivated oat present, a crop that is now mainly grown in mountainous areas or places with harsh winters. Oats are often difficult to identify to species level because elements of the chaff (florete bases) are required, and these are delicate once charred. Therefore, only a few sites have confirmed records of small sand oat, and it is difficult to know how widely it was being cultivated during the medieval period. Because oats are a useful crop on poor, acidic clay soils and have a high water requirement, they have been recorded from several medieval sites in Wales (e.g. Loughor, West Glamorgan; Carruthers 1993), south-west England and Scotland. This crop does not appear to have been very well-suited to the free-draining calcareous soils of the Wolds, although they may have been grown on low lying moist soils of the valley bottom. A few remains from damp-ground plants such as lesser spearwort and sedges were present amongst

the grain, but these were not particularly frequent and it is not certain that they were growing as crop weeds, since other types of waste may have been mixed in with the cereals.

The similarity of the samples through this dump suggest that these two crops could have been grown together as a maslin or 'drage' (a mixed crop of barley and oats), but this is difficult to prove. Drages would have been useful fodder crops, since barley was the usual grain used for fodder and the addition of oats would have provided a high-energy supplement to the diet. This would have been particularly important for draught animals. There is also evidence for malting drage crops (Murphy 1991). Bread-type wheat (and possibly also rivet-type wheat, according to the variable grain morphology) was much less frequent, and rye was so scarce as to have probably have been a weed. Hillman suggests that the deposit may have been derived from the ash of hearths or ovens fired with chaff or straw, since chaff fragments were abundant. The weed seeds present in these samples included typical weeds of arable such as poppy, charlock, corncockle and throrow-wax. The last of these reflects the calcareous nature of the local soils being cultivated.

A few charred cereals were recovered from the four Phase 1 sediment samples from Site 71 examined by Jones (Ch. 26). Barley was the predominant cereal, followed by oats (including a few identified as cultivated oats; *Avena sativa*). A few grains of free-threshing wheat (bread-type and/or rivet-type) were present. Because barley and oat chaff were relatively frequent, this could represent burnt unprocessed cereals (perhaps fodder), mixed processing and domestic waste or oven sweepings.

b) Phase 2

Very few charred cereals were recovered from sediments of this phase, which is a pity since this is the Phase that produced the best-preserved insect and pollen assemblages. Three samples from Site 71 examined by Jones produced one or two grains of barley and oat, and samples from the Site 30 silts associated with the clay dams examined by Arthur (Ch. 25) contained a few charred ruderal weed seeds and sedge nutlets. Evidence from the waterlogged seeds, pollen and insects, however, does suggest that a few other economic plants may have been grown in the area, perhaps on a small scale as garden plants. A single cultivated flax seed was recovered from a Site 71 sample, and flax (*Linum* sp.) pollen was present in ten samples from Site 30. Although the pollen could have come from the chalk grassland plant, fairy flax, the seed evidence does demonstrate that cultivated flax was being grown. A few charred flax seeds were also recovered from Late Saxon and Norman samples from the South Manor Area (Carruthers 2000). This useful fibre, medicinal and oil plant was widely grown during the Saxon and medieval periods, and its remains are often recovered from streams and ditches, as water is required to rot ('ret') the fibres out from the plant stems. The evidence from these samples, however, was not sufficient

to demonstrate that flax processing was being carried out in the pond. Running water is preferable for retting, since it is a smelly process.

Cannabaceae pollen was present in many of the fossil samples. This family includes both hemp and hops, but Bush suggests that hemp is the most likely candidate, since there does not seem to have been sufficient woodland in the area to provide a habitat for hops. Hemp (*Cannabis sativa*) is valued for its fibre and its medicinal properties. It was often grown as a garden plant in medieval times (Skeat 1882), as was flax.

The third possible garden plant is a member of the Cruciferae family, perhaps cabbage, wild turnip or mustard. Pollen from this family was fairly frequent in several samples, and the most numerous beetle in the poorly preserved insect assemblages from the SW Column and Column 1 was a species that feeds off cruciferous plants (*Helophorus nubilus*; Ch. 28). A few waterlogged *Brassica* sp. seeds were recovered from the Site 71 silts (Ch. 26) and charred *Brassica/Sinapis* sp. seeds were fairly frequent in Norman samples from the South Manor Area (Carruthers 2000). Of course, most of the plants grown as vegetables would not be left to set seed, so seed assemblages are not good sources of information about garden vegetables. It is unfortunate that none of the cruciferous remains can be identified to a level where common weed taxa can be differentiated from vegetables such as cabbage. Since Cruciferae pollen was not present in the modern analogue samples, Bush suggests that these remains might represent garden cultivation of cruciferous vegetables.

c) Phase 3

No plant macrofossil samples from this phase were examined.

d) Phase 4

Economic information for this phase has been obtained from dumps of charred material deposited in depression (273) in Site 71 (Ch. 26). Large quantities of pot and bone were also deposited at this time in an attempt to extend the level of the terrace platform. Eight samples containing charred and silicified plant material were examined, and these produced large quantities of charred cereal grains, a little chaff and a few weed seeds.

Free-threshing wheats (including both bread-type and rivet-type wheat) and hulled barley were recorded in roughly equal numbers on average, although there was some variation between the samples. Oats amounted to 15% of the identified cereals, some of which were confirmed as cultivated oat (*Avena sativa*) and a few that were identified as wild oats (*A. fatua/ludoviciana*). Rye was so rare as to have either been grown as a forage crop (i.e. grazed off while still green), or have been a weed.

The frequency of silicified cereal chaff, including awns, wheat glume beaks and straw nodes amongst the charred grain suggests that the material may have originated in the sweepings from a corn drier, oven or kiln. Silicification frequently occurs under these types of

high temperature, oxidising conditions (Robinson and Straker 1991). Hillman (Ch. 25) describes how grain-rich assemblages may have originated as cereal processing waste, through differential preservation of the more robust grains. Therefore it is possible that, like Hillman's large deposit of grain from the Phase 1 silts in Site 30, this large dump had also been derived from cereal processing waste that had been used as fuel or tinder for ovens and kilns. An alternative explanation is that it consisted of unprocessed crops that were accidentally burnt.

The weed species present amongst the grain deposits were typical of medieval assemblages and similar to other assemblages from Wharram. Because the samples contained mixed cereal crops in a secondary context it is not possible to use weed ecology to determine where each crop was grown. Species such as common chickweed and corn marigold are likely to have grown as weeds of spring sown crops such as barley, oats and pulses. Stinking chamomile, a weed of heavy damp soils, is more likely to have been a weed of the free-threshing wheats, which would have been sown in the autumn. It is interesting to note (with caution, since only a few samples have been analysed) that stinking mayweed has only been recovered from the later samples, i.e. the Phase 4 grain deposit and a large 13th-century grain deposit from the South Manor area. This could suggest the ploughing up of new areas of low-lying heavy, clay soils in the 13th century.

An additional important crop plant that is often underestimated in the archaeobotanical record is the garden pea (*Pisum sativum*). Seeds of this type were recovered from all of the samples, although in many cases they were fragmentary and could not be identified to species level. A few definite peas were identified, however, and these records can be added to the body of evidence from Wharram Percy that suggests peas were an

important crop from the Late Saxon period through to the 13th/14th centuries.

There is evidence that native hedgerow fruits and nuts were being exploited since hazelnut shell was recovered from six of the eight grain-rich samples from Site 71.

Comparisons with other samples from Wharram Percy and sites in the region

The results from the Pond and Dam samples, therefore, paint a picture for the medieval period of a pond in the bottom of the valley set within an open chalk grassland landscape. Little woodland survived in the area by the end of the Anglo-Saxon period, although some scrub may have persisted along the small feeder stream. Livestock grazed around the pond, and the water level of the pond rose and fell according to how much rain fell on the surrounding hills. Bread wheat, rivet wheat, hulled barley (both lax and dense-eared, six-rowed and possibly two-rowed), cultivated oats and small sand oat were grown on the flatter ground of the Wolds (possibly not all during the same phase), although damper, poor soils may have been used to grow oats. Peas, flax, hemp and possibly brassicas such as cabbage may have been grown as garden plants. Heather was gathered for fuel and bedding or building materials from 'chalk heathland' that had developed in the locality.

There is no evidence to suggest that the rural medieval diet at Wharram was made more varied with the addition of imported fruits, nuts or spices, such as are found on urban sites of this period, for example figs, grapes, dill, fennel, coriander, walnuts etc. Admittedly, charred assemblages seldom contain remains from these foods, and there is no evidence to suggest that the waterlogged

Table 42. Comparison of cereal data between Wharram Percy sites.

| Site | Deposit | % wheat | % barley | % oats | % rye | Total identifiable grains |
|------------------|---|---------|----------|--------|-------|---------------------------|
| South Manor Area | L. Saxon bone spread | 56 | 30 | 13 | <1 | 824 |
| | Norman slot, ditch and grain drier | 37 | 43 | 20 | <1 | 1822 |
| | 13th-century grain deposit from quarry 61 (Monk 1979) | 83 | 3 | 13 | <1 | 4912 |
| Pond and Dam | Phase 1 grain deposit (Ch. 25, Table 33) | 2 | 83 | 15 | <1 | 7094 |
| | Phase 4 grain deposit (Ch. 26, Table 34) | 43 | 42 | 15 | <1 | 5259 |

assemblages contained faecal material or much in the way of domestic waste. Native fruits and nuts such as hazelnuts, sloes and brambles were being gathered from the hedgerows. Although difficult to prove, it is also likely that full use was made of the native flora as vegetables, e.g. mallow, which can be eaten like spinach, and especially for use as medicinal plants. Plants recovered from the samples that can be used medicinally include henbane, fairy (or purging) flax, self-heal, meadowsweet and many others.

Evidence for marked changes in the economy at Wharram Percy over approximately five centuries of occupation is hard to find. It should be noted, however, that very few samples in total have been examined from the settlement as a whole, so it is difficult to interpret the minor variations in, for example, charred cereal types between different types of deposit, different phases and different areas of the site. In addition, the state of preservation in the South Manor Area samples was poor, so it was not possible to determine whether both bread-type and rivet-type wheat were present, or which species of oats was represented. Table 42 summarises the cereal data under broad categories in order to make the data from the two sites comparable.

The main pattern to emerge from this exercise is that rye was at no point grown in any quantity at Wharram Percy. Even if it had only been grown as a forage crop, the seed corn is likely to have left more evidence in the deposits than these results show. This is interesting, since most Anglo-Saxon and medieval sites across England have produced evidence for the cultivation of rye. In the nearby Anglo-Saxon settlement of West Heslerton (Carruthers forthcoming) 31% of the *c.* 2000 samples contained rye, and in six samples rye was the dominant cereal. On most Anglo-Saxon and medieval sites rye is present in low but constant numbers, and it was probably treated as a useful stopgap for poorer soils. Where soils are poor and sandy it has been recovered in much larger numbers, e.g. West Stow (Murphy 1985). Perhaps at Wharram Percy small sand oat was grown on the poorest soils, in place of rye.

The other constant factor is the presence of oats at around 13 to 20%. This level is higher than is found on many sites, (apart from sites on poor, acid soils, e.g. Wales and South-west England), which perhaps adds support to the suggestion that oats were being grown

where rye might have been grown on other sites. This may indicate an increased requirement for oats to feed draught animals; certainly, the animal bones recovered reflect the presence of draught animals, in particular horses (see Chapter 21).

The occurrence of wheat and barley shows no clear pattern, but this is undoubtedly affected by the fact that three of the deposits were large dumps of charred cereals. Such deposits will be highly influenced by whichever cereal was last processed in the oven, if they are derived from ash cleaned out of that type of feature, i.e. they are strongly subjective to chance. The South Manor Area figures may provide a more accurate impression of the relative importance of cereals, since they were derived from a range of feature types or, in the case of the Late Saxon deposit, material that had accumulated over a period of time. These two figures suggest that wheat and barley were probably being cultivated in roughly equal proportions.

Peas were clearly an important crop at Wharram Percy, since they were recovered in much greater numbers than usual from several of the deposits. At West Heslerton only 34 peas were identified from around 2000 samples. Over 200 peas were present in the South Manor Area quarry sample alone. Because peas do not need to come into contact with fire during their processing (and when they are burnt they often do not survive charring in an identifiable form) the importance of this crop during the Saxon and medieval periods is not always appreciated. Recent studies of mineralised faecal remains from a large number of Saxon pits at Hamwic (Carruthers 2005) have redressed the balance to some extent by showing that the consumption of peas was as frequent and widespread at that of cereals. As a leguminous crop, peas can help to restore fertility to the soil due to the presence of nitrogen-fixing bacteria in their root nodules. They are also a protein-rich food that can easily be stored for long periods, and used either as a vegetable, in soups and savoury puddings or as flour, mixed with cereals to make bread. At Wharram Percy there are records for the cultivation of peas on the South Manor Area and Pond and Dam sites from the Late Saxon period to the 13th century (Carruthers 2000). There is little definite evidence that other legumes were being cultivated, although a single horse bean was recovered and a few possible cultivated vetch seeds were tentatively identified.

Part Six

The Dating and Functions of the Dams and Ponds

30 Radiocarbon Dates from the Dam by A. Bayliss

Seven samples from the dam sequence were submitted for radiocarbon dating. Six were processed at AERE Harwell in 1975 and 1981. These were dated using methods outlined in Otlet and Warchal (1978) and Otlet and Polach (1990). A single sample was dated at the Scottish Universities Research and Reactor Centre in 1991. This was processed and dated as described by Stenhouse and Baxter (1983) and Tamers (1965).

The results are conventional radiocarbon ages (Stuiver and Polach 1977), and are listed in Table 43. They have been calibrated using the maximum intercept method (Stuiver and Reimer 1986), and the calibration curve of Stuiver *et al.* (1998). Figure 85 shows the probability distributions of the calibrated dates (in outline; Stuiver and Reimer 1993).

In this case, however, it is not the simple calibrated radiocarbon dates which provide the best estimate of the dating of the dam. We have additional relative dating information from stratigraphy which can be incorporated with the radiocarbon dates into a Bayesian chronological

Table 43. Radiocarbon measurements from Site 30.

| Laboratory Number | Material and context | Radiocarbon Age (BP) | $\delta^{13}\text{C}$ (‰) | Calibrated date range (95% confidence) | Posterior density estimate (95% probability) |
|-------------------|---|----------------------|---------------------------|--|--|
| HAR-1329 | Carbonised grain from sample D25-D29, context 1278 | 1300±80 | -25.0 | 600 – 940 cal AD | 740 – 980 cal AD |
| HAR-1337 | Carbonised grain from sample D20-D21, context 646 | 1200±80 | -26.1 | 650 – 1020 cal AD | 770 – 1010 cal AD |
| HAR-4649 | animal bone from context 1640, the lowest excavated layer beneath the carbonised grain deposits | 1080±100 | -21.1 | 690 – 1190 cal AD | 670 – 910 cal AD |
| HAR-4650 | animal bone from context 1640, the lowest excavated layer beneath the carbonised grain deposits | 1060±100 | -22.1 | 720 – 1220 cal AD | 680 – 910 cal AD |
| HAR-4651 | waterlogged wattle fragments (<i>Quercus</i> sp. and <i>Salicaceae</i>) from line 1 or 2 of wattle structure (context 1641) | 860±70 | -28.4 | 1020 – 1290 cal AD | 1030 – 1280 cal AD |
| HAR-4652 | waterlogged wattle fragments (unidentified) from line 1 or 2 of wattle structure (context 1641) | 750±90 | -29.2 | 1040 – 1410 cal AD | 1150 – 1330 cal AD |
| HAR-6787 | wooden shovel fragment (SF120) from waterlogged silts (context 1569) | 660±90 | -25.5 | 1210 – 1440 cal AD | 1210 – 1420 cal AD |
| GU-5183 | Carbonised grain from context 644 | 1250±60 | -23.6 | 650 – 960 cal AD | 760 – 980 cal AD |

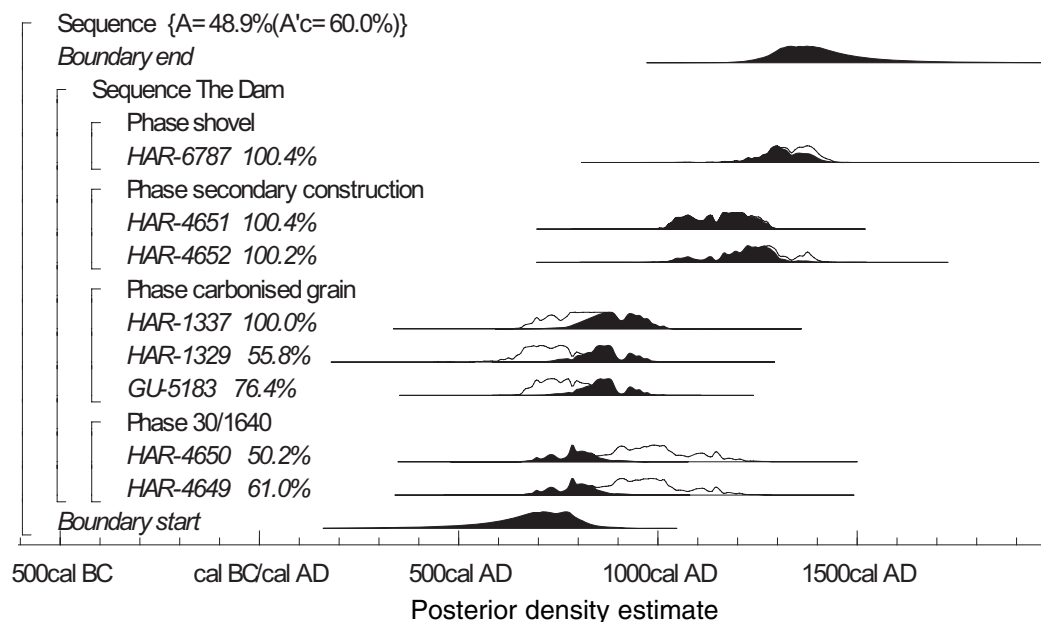


Fig. 85. Radiocarbon dates from Site 30. Distributions in outline represent the calibration of individual radiocarbon results by the probability method (Stuiver and Reimer 1993), and are independent of other radiocarbon dates. Solid distributions are *probability density estimates* of the calendar ages of samples and events. They have been calculated using a Bayesian chronological model, whose structure is exactly defined by the square brackets and OxCal keywords at the left hand side of the diagram.

model of the structure. This has been implemented using OxCal v3.5 (Bronk Ramsey 1995; 1998; 2001). Date estimates arising from this interpretative model are given *in italics* to distinguish them from simple calibrated radiocarbon dates. An introduction to the Bayesian approach for interpreting archaeological information is provided by Buck *et al.* (1996).

The Phase 1.1 'burnt grain mound' is dated by three samples of carbonised grain. The three measurements on these samples are statistically consistent ($T'=0.8$; $T'(5\%)=6.0$; $\chi^2=2$; Ward and Wilson 1978). This suggests that the material was fresh when it was deposited, as, if it had contained a significant proportion of residual or reworked grain, it is unlikely that a similar proportion of old material would have been incorporated in each bulk sample. For this reason, the model incorporates the information that these samples are stratigraphically later than the bones which were recovered beneath them. The grain is certainly earlier than the samples of posts and wattle, which represent Phase 1.2 of construction in the dam sequence. In turn, these samples are earlier than the sample from the wooden shovel which was lost in the silts which accumulated during the use of the Phase 2 dam structure.

All this information is incorporated with the radiocarbon dates in the model shown in Figure 85. This model has poor overall agreement ($A=48.9\%$), although no individual measurement appears to be an extreme outlier. It seems likely that the overall model is robust, and that the rather poor agreement between the radiocarbon results and the stratigraphic sequence is explained by the limited range of scientific standards which were available to dating laboratories over 20 years ago.

The model shown in Figure 85 is therefore considered to be the most reliable estimate of the absolute chronology of the dam sequence which is available. This suggests that the initial construction of the dam occurred in the *9th or early 10th century AD* (HAR-1329, HAR-1337, GU-5138), with the secondary line of wattling constructed in the *late 12th or 13th century AD* (HAR-4651–2). The shovel dates to *cal AD 1210–1430* (95% probability; HAR-6787).

31 The Evidence for Milling Sites by M. Watts

The earliest excavated features clearly connected with water control and management are the Phase 1 banking and two lines of wattles and stakes that were built into it, aligned approximately south-south-east to north-north-west across the valley bottom. It has been suggested that the wattling was connected with strengthening of the earliest dam structure (Ch. 2). Alternatively, similar structures have been associated with fish traps at other sites. An example of a silted-up fish weir within a later, 12th-century, mill dam has been identified at Hemington Fields, Leicestershire (Clay and Salisbury 1990). At Wharram Percy the later of the two post-and-wattle structures has been dated by Bayliss to the late 12th or 13th century (Ch. 30).

At the north-west end of the more westerly line of wattles an erosion hollow (116) was found, with a rectangular feature which extended from its north-west side. The area immediately to the north of these features appears to have contained a small, raised, rectangular structure set on a slightly different alignment. The shape

of this structure is defined by two stone post pads (44 and 92) on the downstream side and an eroded post-hole (175) to the south-east. Evidence of structural support for the south-west corner was not found, but it is feasible that horizontal timbers could have simply been located on the raised clay bank to the west of feature 116.

The lack of evidence of groundwork or clearly defined water channels in this area makes it difficult to determine the form of water-mill that was apparently located there. The floor area of the building defined by the post pads and post-hole is approximately 3.5m west-east and 3.2m north-south. These dimensions are comparable with those of a small horizontal-wheeled water-mill, although to date only three mid/late Anglo-Saxon horizontal water-mill sites have been positively identified in England, at Tamworth in Staffordshire, Corbridge in Northumberland, and Ebbsfleet in Kent. The plan dimensions of these three mills, taken from published drawings and other available information, are: Tamworth (second mill, mid-9th century) about 4.2m by 4.0m (Rahtz and Meeson 1992); Corbridge (mid-9th to 11th century) about 3.9m by 3.2m (Snape 2003); Ebbsfleet (?early 8th century) about 2.9m wide by at least 1.7m long, the timber structure having been truncated at its downstream end (Brown, pers. comm.). The wide range of geographical locations and dates therefore makes it difficult to use these three sites for direct comparison with the site at Wharram Percy. It is also possible that all three were double flume mills, in other words, each with two waterwheels driven by independent chutes.

The putative mill building at Wharram Percy was smaller than these, which therefore suggests that it was a single-wheeled mill. There are further problems of interpretation of the excavated features which make it difficult to determine whether the site is that of a horizontal or a vertical-wheeled mill. While the erosion hollow (116) is of sufficient size to have housed a horizontal wheel, it is in the wrong position relative to the probable position of the building structure and evidence from the other sites indicates that the area beneath the working positions of the horizontal waterwheels was floored to prevent such scour. Timber boards were found at Tamworth, reused Roman masonry at Corbridge and compacted rubble stone at Ebbsfleet. So the hollow is perhaps best interpreted as having been caused by erosion during flooding or a period when the mill was damaged or disused.

The rectangular pit extending from the north-west side of 116 is similarly difficult to relate to the probable mill position, as it is neither directly below the structure nor on the same alignment. Its position, cut into the lowest level, is too low for housing any structure related to a flume or penstock serving a waterwheel, or for a sole tree carrying the foot bearing of a horizontal waterwheel assembly.

The channel that extends northwards from the north-east corner of 116 is in better alignment with the possible mill building structure, but the evidence for the orientation of a waterwheel is far from clear. If this

channel contained a vertical wheel it would have been located beneath the milling floor of the building. Examples of this arrangement have been interpreted at the 2nd-century AD Roman water-mill site excavated at Ickham, Kent (Spain 1984) and, possibly, the first late 3rd to early 4th-century mill at Fullerton, Hampshire (Cunliffe 2001), but the layout has not yet been identified from the small sample of known early-medieval Irish, Anglo-Saxon and Norman mills. The erosion trench that cut down through these features (65, Phase 1.2) has the appearance of a vertical waterwheel emplacement such as those excavated at Morett, Co. Laois, Ireland (originally interpreted by Lucas (1953) as a horizontal-wheeled mill emplacement but subsequently reinterpreted) and more recently at West Cotton, Raunds, Northamptonshire (Chapman forthcoming). At both of these sites a timber structure, in the shape of a truncated triangle on plan, was built at the upstream end of a narrow timber trough to direct water onto the floats or paddles of a vertical undershot waterwheel. At the downstream end of the wheel trough there was a timber-built tailrace of similar plan form to the headrace channel, which widened out to get rid of the water as quickly as possible after it had turned the waterwheel. At Wharram Percy it is possible that the line of the wattles may indicate the east side of a truncated asymmetric triangular headrace for feeding a vertical waterwheel, located in a trough in feature 65.

Although two further probable vertical waterwheel emplacements have been excavated and identified in Ireland, at Little Island (Rynne 1989) and Ardclloyne (Cleary 1999), both in Co. Cork, there is no evidence from any of these sites to confirm the position or extent of an associated mill building, although the construction of these waterwheel emplacements indicates that any associated structures would probably have been built of timber. Whether a mill was powered by a vertical or a horizontal waterwheel, some structural integrity between the wheel chamber, or underhouse, and the milling chamber above or beside the wheel position, which would have housed the millstones, would have been essential, in order to maintain the precise relationship that is needed between the prime mover and the millstones for them to have operated effectively as parts of the same machine.

The relationship of the possible mill structure to the Phase 1 dam at Wharram Percy may perhaps suggest that the mill would have operated with a horizontal rather than a vertical waterwheel, for the vertical-wheeled mill sites mentioned above appear generally to have been served by pond and leat systems, rather than being located directly on or next to a dam. A closer relationship between a dam and a timber structure interpreted as having contained a vertical, breast-shot waterwheel is indicated at the 12th-century site excavated at Hemington Fields, Leicestershire (Clay and Salisbury 1990). Both the likely dating of the wattle-strengthened dam at Wharram Percy and the size and nature of the water supply are therefore relevant.

The construction and use of the first dam and its various modifications are likely to belong to the period between the 9th and the late 12th centuries, from the

evidence of the radiocarbon dating, a period for which there is little comparable archaeological evidence in England with regard to milling structures. It is now considered that both horizontal and vertical-wheeled mills existed side by side in the early medieval period, from the evidence cited above and that from Old Windsor, Berkshire, where the excavator's preliminary interpretation was that a large mill with three vertical waterwheels in parallel was superseded by a horizontal waterwheel-driven mill in the 10th century (Wilson and Hurst 1958, 184-5). As part of a high-status royal site, however, it is likely that the mill at Old Windsor was not typical of early-medieval village mills. At West Cotton, Raunds, where three successive waterwheel emplacements have been identified, a similar progression has been proposed (Chapman, forthcoming). The earliest mill, which was constructed during the second half of the 10th century, appears to have had a vertical waterwheel located in a timber trough. The second phase mill was very poorly preserved but the third phase mill, which occupied the same site, has been interpreted as having been driven by a horizontal waterwheel, although this is open to question (Watts 2002, 79).

Richard Holt (1988, 120-21) has discussed the argument that horizontal-wheeled mills, with low installation and maintenance costs, were a product of peasant culture and that their use indicates a lack of seigneurial monopoly, whereas vertical-wheeled mills, with their higher building cost and greater maintenance requirement, were associated with large-scale milling. Holt also notes that, from documentary evidence, the vertical-wheeled mill had completely replaced the horizontal-wheeled mill on English manors by the beginning of the 13th century (Holt 1988, 118). Whether the efficiency and output of medieval vertical-wheeled mills was that much greater than contemporary horizontal-wheeled mills still requires detailed examination, however, and it is likely that the selection of waterwheel type was dependent on a number of factors, economic, technical and topographical.

The pond at Wharram Percy is spring fed and it has been suggested (Ch. 2) that the fairly constant flow of the stream all year round implies that the pond was intended more to regulate the pressure of the flow onto a waterwheel than to create a large reservoir for the summer months. It is perhaps worth noting that a medieval watermill would be busiest between harvest and spring, when water supplies would be anticipated to be at their best. The 11th-century *Gerefa* states that 'in May and June and July, in summer, one may... construct a fish-weir and a mill' (Cunningham 1915, 574). Some seasonal reduction in flow, particularly during the summer months, may not, therefore, have been of great significance. The storage capacity of the original pond and the working head that would have been available for a waterwheel are now difficult to ascertain, but evidence from horizontal-wheeled mill sites suggests that a head of at least 1.0 to 1.5m would have been required. The head requirement for an undershot waterwheel would have

been considerably less, although volume would have been important. The presence of quern as well as millstone fragments in the later phases of the dam site may be an indication that there were times when the water supply was inadequate to drive a waterwheel and the milling requirements of the settlement had to be met by the use of hand mills.

There is also a lack of artefactual evidence from Phase 1 which might lend some weight to support the interpretation of either a horizontal or a vertical-wheeled mill. The millstone fragments, which are from later phases, (Ch. 4) could have come from either type of mill and indeed may not be original to the dam site. Colin Rynne has suggested that the only truly diagnostic parts of a horizontal-wheeled mill that can be identified by archaeological excavation are paddles from a waterwheel and the penstock or flume (Rynne 1988), but analysis of some of the timbers found *in situ* at other sites where such specific artefacts have not been found, for example at Corbridge, can also be used to provide evidence for the positions of the inclined timber chutes or penstocks that were required to deliver water to horizontal wheels.

At sites such as Wharram Percy and West Cotton, however, no such evidence has survived to aid interpretation. The find of a stone bearing (WP54/249; SF2285), reused in a wall in the churchyard, for a vertical shaft or spindle at Wharram Percy may be significant, but neither its original provenance nor its date are known. It could have been either a basal bearing, which would have been located in a sole tree beneath the foot of the upright shaft of a horizontal waterwheel assembly, or the footstep bearing for a millstone spindle in a geared mill driven by a vertical wheel. The overall dimensions of the stone block and the shape and wear pattern within the bearing hollow, which is about 50mm diameter by 25mm deep, suggest the latter use however, when it is compared with known examples of horizontal-wheel bearings (Rynne 1988, 77; Rahtz and Meeson 1992, 83-7).

It appears, therefore, that the small structure, the plan of which is defined by the pad stones and post-hole, which is sited on the Phase 1 dam over a watercourse, was a small water-mill. While the lack of structural evidence for a mill makes this interpretation a little insecure, it should be noted that a small timber-framed building, such as the early 20th-century Norwegian horizontal-wheeled mill illustrated by Curwen (1944, plate IV), would be unlikely to yield any more archaeological evidence than has been found at Wharram Percy, if the structure and machinery were dismantled, demolished or simply washed away. It is not possible to argue conclusively that the millstones were driven through a pair of gears by a vertical undershot waterwheel located in a timber trough below the milling floor, or directly by a horizontal waterwheel. Both the chronology of the site and the function of the mill in its manorial context make the former the more likely, on present evidence.

The archaeological evidence indicates that the Phase 1 mill site became silted up and the structure was removed

before the site was covered by the clay dam of Phase 2.1. Documentary sources of the early 14th century refer to a former South Mill, but the raising of the dam and the lack of any identifiable mill structures or associated watercourses within the subsequent phases serve to indicate that the later medieval mill was located further downstream. Fieldwalking in May 2002 produced good evidence for a number of possible mill sites down the valley, where a greater head and perhaps a more consistent flow would have been available after the dam was raised later in the medieval period. Little is known at present about the possible continuity of 11th-century mill sites into the later medieval period, although it is significant that none of the 6000 plus mills recorded in Domesday Book has yet been positively identified by archaeology. The more substantial later medieval and post-medieval mills with vertical waterwheels were often rebuilt over or close to the footprint of their immediate predecessors, in order to make continued use of watercourses and wheelpits (Goodchild and Wrathmell 2002, fig.5), but evidence for pre-Conquest mills has rarely been identified, suggesting that either their sites have been completely obliterated by subsequent developments, or their structures were generally insubstantial and have left very little evidence in the archaeological record.

The only later feature from the dam excavation that has been tentatively connected with possible water-milling activity is a rectangular depression (1182) in Phase 4.1, which is associated with a water channel or gully and is closely comparable in dimensions to the rectangular feature in Phase 1, discussed above. The position of the Phase 4.1 feature, on a small channel on the west side of the valley and at some distance from the main area of activity on the dam, makes it unlikely that this was connected with a waterwheel. It may have contained a storage tank for fish, or may have been connected to collecting spring water for domestic purposes, such as the laundering of clothes.

32 Discussion

by S. Wrathmell and E. Marlow-Mann

It is difficult to assign meaningful absolute dates to the construction and use of successive dams on this site. In the first place, almost all the datable items incorporated in these structures will represent earlier activity – in some cases much earlier, and possibly unrelated to any of the purposes for which the dams may have been constructed. Secondly, though the evidence allows us to define three main phases of dam construction, there are likely to have been numerous modifications, made at varying dates, for the dams will have required continual modification as the earthworks slumped, as floods caused them to be breached, or as longer-term variations in water flow necessitated a response. The cutting of the replacement spillways is indicative of maintenance work at the point at which stress might first be expected.

Such difficulties are typified by the table of radiocarbon dates (Table 43). As far as the carbonised grain dump is concerned, Bayliss proposes a date in the 9th or early 10th century for this material. She also confirms (*in litt.*) that the two samples of bone from below the dump are consistent with this date range: ‘a later 11th-century date [for the bones] is possible, but less likely than a 9th or 10th-century date’. The burnt grain has been interpreted as spent fuel from a kiln or oven (Ch. 25), and it can hardly have been chosen as the ideal material for dam construction. Nevertheless, it is hard to believe that the integrity of such a dump would have been sustained for long in conditions which exposed it to the weather, to water erosion and perhaps to the trampling of animals. Nor, Bayliss argues (*in litt.*), would anything other than fresh crop-processing waste have been evidenced by such statistical consistency in the radiocarbon measurements. Therefore, we are drawn to the conclusion that its incorporation into the earliest recorded dam, interleaved with layers of clay (see Fig. 16), took place in the 9th or early 10th century. Furthermore, it suggests that crop-processing was already by this time taking place in the vicinity of the site chosen for the dam.

The radiocarbon determinations of the *in situ* line of posts and wattles provide a date in the late 12th or 13th century (Ch. 30). The line chosen for sampling, line 1-2, is one that has been interpreted as a replacement for line 4-5. This is based not only on their spatial relationship, but also on the evidence of the tree-ring analysis (Ch. 27), which suggests the two lines were not contemporary constructions. This means that Phase 1 has an outside date range of 9th to 13th centuries, and an inner range of early 10th to late 12th centuries. There is scarcely any pottery to be assigned to Phase 1 in Site 30: one sherd of High Medieval date was in the top of the clay, just below the topsoil, and probably therefore intrusive. Phases 2 and 3, by contrast, contained significant quantities of Early Medieval pottery, attributed to the period 1150-1250.

The function of the dam was probably to power a mill. Watts has outlined the possibilities (Ch. 31), but the precise details remain frustratingly elusive. This is partly because of the ephemeral character of the evidence for mills of this period, partly because of the difficult conditions encountered during the excavations and the unhelpful circumstances for excavation. The initial trenches provided good stratigraphic records of sequences of dam construction, but the excavation of discrete areas in different seasons (necessitated by the short Wharram excavation seasons) will have made it extremely difficult to gain a broad view of the development of the dam and patterns of dam structures in plan. On the positive side, the documentary evidence accords with the existence of a water-mill here before the mid-13th century, and its abandonment then or certainly by the early 14th century (Ch. 3). The fragment of structural timber recorded from Phase 1 (Ch. 17, no.7) may well be the only remnant of the mill building.

Of the fragments of grinding stone recovered from these excavations, a quarter were recovered from Phases

2 and 3 features; two-thirds from Phase 4. It is assumed that they are all residual in these phases, given the lack of structural evidence for contemporary milling, and the documentary evidence that appears to support this conclusion. Some stones are from powered mills, but there are also handquerns of typical Anglo-Saxon and early post-Conquest form. As suggested in the report (Ch. 10) the hand querns may have been used when the watermill was inoperable, or for specialist grinding activities.

The environmental evidence (Ch. 29) provides no evidence of standing water in Phase 1; or, more correctly perhaps, no evidence of continuously present standing water. It is possible to envisage a system where water was drawn into the 'pond' at specific times and, once full enough, was directed onto the wheel to power the mill. As Oswald has pointed out (Ch. 2), the initial dam for the south pond was of a similar size to those identified as earthworks downstream. In particular, the excavated part suggests an affinity with the northernmost, U-shaped dam in Wharram le Street (Site E). An arrangement whereby the pond was sited next to a stream, and water was diverted into it for specific purposes, is precisely the kind of arrangement envisaged by Oswald for Site E.

In the Site 71 excavations, the hollowed area immediately north of the Phase 1 dam, context 273, was interpreted at one stage as perhaps another pond, indicating a series of water-control and utilisation features running down the beck. Whilst this cannot entirely be discounted, there is no clear evidence for such a function, and it may equally have been a depression created to encourage the dispersal of water in the tailrace of the mill, as well as a means of carrying away water from a spring on the western hillside. Again, the environmental evidence refutes the idea of continuously present standing water. A similar hollowing of the ground on the downstream side of a dam was found at the northernmost mill in Wharram le Street, Site E. Furthermore, the positioning of dams just above tributary stream courses is a characteristic of several of these mill sites. Clay bank 238 was the only Phase 1 feature from the Site 71 excavations to produce significant parts of pottery vessels, all from wares in the Early Medieval group (1150-1250).

In Chapter 31, Watts has raised the possibility of the wattle lines and posts being used for fish-traps. There is documentary evidence for millponds being used as fisheries – the north millpond at Wharram being the closest example (Ch. 1). Furthermore, the wattle lines could be interpreted as weirs intended to channel fish into a basket in the manner exemplified at Colwick, Nottinghamshire (Losco-Bradley and Salisbury 1988, 346-8). Against this is the environmental analysis that indicates one or more periods of dessication in the Phase 1 'pond', and the suggestion that the orientation of the wattle linings was intended to direct water into the driving chute of a mill.

There is no evidence for the continued use of the pond to power a mill in Phase 2. Further dumps of material

used to heighten the dam produced pottery belonging to the Early Medieval group (1150-1250). One High Medieval sherd (1250-1400) came from the pond silts associated with the Phase 2 dam, and broadly provides a *terminus post quem* for the Phase 3 dam that was partly built over these silts. So, too, does the wooden shovel blade that was also found in these silts, perhaps having been used to clean out the pond. The shovel's date is highly likely to fall within the range 1220-1430 (Ch. 30).

The cess staining of the pond-edge silts suggests that in this period, perhaps covering all or part of the 13th and early 14th centuries, the pond was used for watering animals. Yet the environmental evidence (p. 183) once more suggests that the pond did not contain standing water continuously, at least for Phase 2.1. It may be that the transition from intermittent ponding to permanent standing water came at the transition from Phase 2.1 to 2.2. This was the point at which a broad spillway (context 1603) seems first to have been constructed. Besides watering animals, the pond will presumably have served a range of other functions that required the application of water. In Phase 2.2 there are traces of timber lining on the dam that may suggest some kind of water container fed by a channel from the pond (Fig. 22).

North of the dam, in Site 71, the topmost filling layer of channel 262, disused in this phase, produced sherds of Early Medieval pottery (1150-1250), as did the gravel (240) beneath the Phase 3 bank, 235; neither context produced any High Medieval (1250-1400) sherds.

The chalk and earth dam that marks the start of Phase 3 contained once again large quantities of Early Medieval pottery, but this simply reflects activity in the (unlocated) area from which this material was extracted. The dam also contained smaller but significant amounts of High Medieval pottery, including Brandsby ware and Hard Orange ware, and other types of the period 1250-1400. It was probably, therefore, constructed initially in the 14th century. There was also a scatter of Late Medieval pottery (1400-1500), but this mainly came from the upper layers of dumped material and could well originate in periodic cleaning and repairs. An 18th-century button was recovered from dam material, but from a context that in places lay directly below topsoil (context 500, see Fig. 15). A leather shoe sole that could be of post-medieval date, recorded from the lowest fill of channel 1262, is less easy to explain.

It is the pond of this period that ceases to have any affinity, in terms of its size and shape, with the earthwork dams identified further down the stream. It was a much larger structure, and would have retained continuously standing water to a level 1.2m higher than its predecessor. This in turn, as Oswald has established, would have doubled the length of the pond. The failure to remove the earlier silts suggests that the surface area of the pond was considered more important than its depth. It is in this phase that the pond may have become truly a village pond, a reservoir of water for the general use of the inhabitants. It may have become a facility rather more akin to the village ponds of Fimber and other settlements

on the High Wolds (Ch. 1), though fed by springs rather than solely by rainwater. Both on the dam itself and on the Western Hillside Terrace, there were series of channels through the top of the dam as well as curved 'embayments' cut into its north face. At least one of these (context 65) had a flat base and vertical sides, and could well have housed a wooden container. There is no evidence that it was used as a fishpond: it was the pond of the northern mill, away from the village and under the control of Haltemprice Priory, that is recorded as a fishery in the early 14th century (Ch. 1).

In Site 71, the banks and the ditches, which had presumably carried away spring water from the western hillside into the beck north of the dam, were now supplemented by a rubble wall, signalling more firmly in the archaeological record the boundary between graveyard and pond area that could already have been in existence for centuries. The Phase 3 features of Site 71 produced, as with Phase 2, rather more sherds of Early Medieval pottery than of types belonging to the High Medieval group.

Phase 4 on Site 30 provides us with the only medieval surfaces and structures recorded in these excavations. They survived only in the western half of Site 30: any surfaces and structures that formerly existed further east might conceivably have been removed in post-medieval modifications to the dam. Most notable were the successive, east-west lines of stonework extending up to about 12m and running eastwards towards the dam. The facing stones all faced south: there was no sign of an equivalent north face to these lines. Nor was there any sign of an accompanying, parallel wall foundation further to the north. The character of the stonework is, perhaps, more in keeping with revetments or edgings rather than with the walls of buildings, as can be seen from the cross-section of the best-preserved example (context 19; S.30, Fig. 30). The most plausible explanation is that these were revetments, edgings or footings for pathways that led to the dam, forming part of the route southwards from Wharram Percy village to Thixendale. The post-holes and surfaces at the west end of footing context 19 (Fig. 32) may have related to some kind of timber bridge across ditch 1189/1208 (Fig. 32). At some stage a stone causeway was inserted into the ditch at this point (context 1200; Pls 10 and 11).

Various dumps of material were used to build up areas of the Western Hillside Terrace to the south of the lines of edging stones; these were then topped off by chalk surfacing, presumably for pond-side activities. A large part of a milling stone was reused in the surfacing (see Ch. 4). One of the build-up layers (context 1164, above 1216 on Fig. 29) included what seem to be large quantities of waste resulting from horse knackerage: numerous major bones of horses (see Ch. 6) and many horseshoes (Ch. 4), along with large numbers of horseshoe nails (Ch. 4). Horseshoes make up no less than 43% of the assemblage of iron objects from the pond and dam sites, as against 3% or less on the North and South Manor Areas. Over 60% of the Phase 4 nails on Site 30

were horseshoe nails, and nearly 80% of the horseshoe nails had lost their points when the shoes had been removed from the horses' feet. The horseshoes in this context date from the mid-13th to mid-14th centuries, and the dumping presumably occurred at the end of that period.

The pottery and other artefacts indicate that the Phase 4 surfaces and structures were created mainly during the 14th and 15th centuries. The pottery report (Part Three) indicates that both sites produced a remarkably high proportion of jugs: no less than 92% of the total assemblage of identifiable forms. The ratio of jugs to jars has often been used as one indicator of social status; yet the proportion of jugs from the dam sites is far higher than on either the North Manor Area or the South Manor Area excavations. Furthermore, the jugs come from a wide variety of sources, from the Tees Valley potteries in the north to Buckinghamshire kilns in the south. Yet, as Slowikowski has commented, the other vessel forms indicative of high status are absent.

The simplest explanation for the preponderance of jugs is that they indicate function rather than status: this margin of the pond was where Wharram's inhabitants came to collect water, and numerous jugs were smashed in the process – often, perhaps, as a result of handles coming away from the vessel walls and rims as the water was being scooped into them. This accounts for the eclectic character of the jug assemblage: it is a selection of the vessels used in a variety of domestic contexts from different parts of the village. It also accounts for the recovery of large parts of vessels despite the difficult excavation conditions. Slowikowski notes that nine of the jugs have white internal residues indicative of boiling water. And if it seems unlikely that Wharram's inhabitants would resort to taking water from a pond where animals drank and defecated, and where at least one dead dog had been dumped in the silts (p. 167), one need only recall Edmonson's complaints about a similar range of uses for the pond at Fimber as late as the 19th century (Ch. 1).

Oswald has discussed the evolution of the southern trackways in an earlier chapter (Ch. 2), and has come to the conclusion that the cross-dam route did not come into use until after construction of the chalk and earth dam of Phase 3. The doubling of the length of the pond probably resulted in the abandonment of an earlier route that had crossed the stream near the southern limit of the smaller Phase 1-2 pond. Therefore the Phase 4 trackway may in fact have come into use soon after the construction of the Phase 3 dam, during the 14th century.

On Site 71, Phase 4 is marked by a substantial dumping of rubble and ash at the north-east corner of the trench. This seems to represent an attempt to extend the level area in this corner of the graveyard, accomplished with the admixture of large quantities of domestic refuse. This included a significant assemblage of fishbones, animal bones, pottery, nails and a dump of carbonised grain again interpreted as crop-processing waste used as fuel or tinder for ovens or kilns. The fishbones are

evidently from a domestic context rather than being associated with the adjacent pond - they represent almost exclusively marine species (Ch. 23). The nails are largely joinery nails, and nearly 90% had been used in domestic structures. This contrasts markedly with the nails from Site 30 Phase 4, which were preponderantly horseshoe nails. The pottery, though there were large numbers of Early Medieval sherds, was principally High Medieval in terms of the numbers of sherds representing individual vessels: one of the best represented vessels is a probable Brandsby handled jar dating to the late 13th or 14th century.

Overall, it seems that the refuse dumped in this area originated in domestic occupation during the period 1250-1350/1400. Furthermore, the proportion of finewares in the assemblage, along with the marine fishbones and other finds of stone and metal, suggests a relatively high standard of living for the shark-eating occupants of a property that was presumably located not far from the dump. It raises the possibility that a rectory or vicarage house lay in the vicinity. A forthcoming volume on the late medieval vicarages (*Wharram XII*) will consider the possibilities in more detail.

Phase 5 represents the continuation into the post-medieval period of the Site 30 Phase 4 trackway (context 7). Its resurfacing with soil and packed chalk pebbles (context 1092) and the occurrence of clay-pipe fragments and post-medieval pottery indicate that this path was still in use, although the scarcity of finds suggests a decline in traffic. There is approximately a 50% reduction in the amount of pottery recovered from Phase 5 compared with Phase 4, with a fairly even spread dating from Early to Late Medieval (1150-1500). This is all likely to be residual and probably became incorporated during the trackway repairs. This route would have continued to be used by villagers from the surrounding townships as a means of reaching St Martin's Church, as well as by

traffic associated with the remaining farmstead on the village site. One of the casual losses that may represent such traffic is a spur dating to c.1700 (p. 134, No. 36). In the 19th century Wharram Percy farmstead was moved to a new site away from the village area, and in 1870 Thixendale attained its own church (Beresford and Hurst 1990, 118; *Wharram III*, 35). These events will have reduced even further the use of this routeway.

The pond edge face of the dam was re-faced in Phase 6 with a stone wall (context 582), possibly as a more permanent face which required less maintenance. This greater permanence of the dam is also indicated by the wall (context 588) forming a stone edging to the channel through the dam. There are only two sherds of pottery from this phase and both are residual. The bone button found in the brown clay packing (context 599) behind wall 582 is impossible to date precisely but was in general use during the 18th century, suggesting that the stone walls were built during this period.

Phase 7 of Site 30 is more accurately dated. Map evidence shows that a sheepwash was built alongside the ashlar wall of Phase 6 between 1850 and 1888 and this was then extended at some point before 1909. Like the dams, the sheepwash was also subject to maintenance as seen by the changes in drainage systems used. A scatter of residual medieval pot was derived from this phase. The buckle, coin and other finds from this phase correspond with a mid to late 19th-century date, though the objects themselves were manufactured in the 18th century. A new concrete sheep-dip was built further downstream in about 1927, at which point the Phase 7 sheepwash fell into disrepair.

Shortly afterwards, waterworks were carried out in which the springs were capped and fed into collection tanks before being transported to a pumping station. The final phase of Site 30, therefore, relates to this project of works which took place in the 1930s.

Appendices

Appendix 1: The Animal Remains from Sites 9 and 12 (Areas 10 and 6)

by J. Richardson

Introduction

When the first volume in the Wharram series was published on the excavations in Areas 10 and 6, reference was made to Michael Ryder's assessment of the animal bones (Ryder 1974). They are now published in full here in order to allow comparison with the animal bone assemblages from the rest of the village. The faunal assemblages from Sites 9 and 12 have been treated here as discrete medieval assemblages. These bones have not been assigned to the periods used by Ryder due to uncertainties with the building phases. Earlier deposits were heavily disturbed by later development and a reliable occupational sequence was precluded by the shallow nature of deposits in certain areas (Hurst 1979, 139). Here, the animal bones from the two sites are compared to each other and to comparable data from other areas of Wharram Percy, in order to understand intra-site variability in terms of bone treatment and disposal and to investigate further, animal husbandry practices.

Methodology

In total, 5125 bone fragments were recovered from Site 9, of which 70% were identified to species or a lower-order group. From the 9663 bone fragments associated with Site 12, 67% were diagnostic. Given that only 28% of bone fragments from the North Manor Area and 40% from the Pond and Dam area were identifiable (Richardson 2004a, 257), such high percentages are surprising. It is possible that the bones from Sites 9 and 12 were better preserved and hence more readily identified than bones from the other areas, although suspicions were raised during the analysis that smaller, apparently undiagnostic fragments had been discarded during excavation or subsequent finds processing. Certainly, as for the majority of excavations at Wharram Percy, deposits were not routinely sieved for the retrieval of smaller ecofacts.

The methodologies used to record the bone assemblages from Sites 9 and 12 are those detailed earlier in this volume (Ch. 21). In addition, the recording procedures adopted during the excavation of the

buildings occupying Sites 9 and 12 have allowed for the spatial analysis of bone deposition, although an assessment of the distribution of horse bones, neonatal bones and articulated body parts revealed no clear patterning.

Taphonomic bias

In order to assess the usefulness of the assemblages for the reconstruction of animal husbandry practices, bone retrieval, formation process and bone condition/treatment have been analysed.

Bone recovery

As mentioned above, sieving was not carried out during the excavation of Sites 9 and 12. This may explain the dearth of the smaller, typically undiagnostic fragments, but discard policies during excavation, finds processing or preliminary sorting are also suspected. As a result, biases in favour of the larger bones and elements that are more likely to remain complete are assumed.

Formation processes

The presence of articulated skeletons and body parts indicates the rapid disposal of carcasses and the discard of low utility joints following primary carcass processing. Nine partial skeletons and a further three articulated body parts were identified from Sites 9 and 12, including two partial pig skeletons, two partial cat skeletons and a puppy from Site 9 and two further pig skeletons and two cat skeletons from Site 12. A complete pig's head (with the atlas) and a hind leg of a horse from Site 9, plus cattle hooves from Site 12 were also noted. All the pig skeletons are from juvenile or sub-adult animals, but none displays cut marks that may have indicated some carcass processing prior to disposal. The puppy and adult cats may have been pets, although equally the dog may have been culled as an unwanted nuisance and certainly one cat had sustained a rib fracture indicative of mistreatment. The juvenile pig's head, the horse's leg and the cattle hooves presumably underwent some dismemberment prior to disposal. Clearly cut marks to the hooves indicated their removal from the lower limb, although neither the pig's head nor horse's leg were marked. The articulated parts at Site 12 were concentrated towards the northern limits of the excavated area away from indisputably inhabited Building 1 (*Wharram VI*, 23f).

In contrast to these primary deposits, disarticulated bones (which account for the majority of the faunal

Table 44. Bone preservation and treatment by site and deposit type.

| | Site 9 | Site 12 | Primary deposits | Secondary deposits |
|-----------------|--------|---------|------------------|--------------------|
| Size index | 0.25 | 0.25 | 0.39 | 0.25 |
| Condition index | 0.96 | 0.98 | 1.00 | 0.97 |
| Erosion index | 0.95 | 0.96 | 0.99 | 0.96 |
| % butchered | 4.3% | 3.1% | 1.8% | 3.5% |
| % gnawed | 12.4% | 8.9% | 1.5% | 10.4% |
| % burnt | 1.7% | 0.8% | - | 1.1% |
| % fresh break | 20.7% | 12.7% | 42.3% | 14.8% |
| % loose teeth | 40.1% | 48.9% | 3.3% | 46.9% |

For the size, condition and erosion index, values closer to 1.0 indicate more complete or better preserved bones

Table 45. The proportion of butchered bones by site for all species and knife and chop marks for cattle, sheep, pig and horse.

| | Site 9 | Site 12 |
|---------------------|--------|---------|
| Butchery marks % | | |
| Cattle | 6.6 | 6.2 |
| Sheep | 3.0 | 2.3 |
| Pig | 4.4 | 3.6 |
| Horse | 1.4 | 1.1 |
| Dog | 2.4 | |
| Fallow deer | 20.0 | |
| Deer sp. | | 100.0 |
| Domestic fowl | | 4.0 |
| Wild/domestic goose | | |
| Large-size mammal | 17.5 | 13.0 |
| Medium-size mammal | 33.3 | 6.9 |
| Small-size mammal | 5.9 | 4.9 |
| Knife marks % | | |
| Cattle | 2.9 | 3.0 |
| Sheep | 1.8 | 1.2 |
| Pig | 2.2 | 1.7 |
| Horse | 1.4 | 0.8 |
| Chop marks % | | |
| Cattle | 3.8 | 3.2 |
| Sheep | 1.2 | 1.1 |
| Pig | 2.2 | 2.0 |
| Horse | 0 | 0.4 |

Bones with both cut and chop marks are counted twice

Table 46. Fragment count by site.

| Site | Site 9 | Site 12 |
|------------------------|--------|---------|
| Cattle | 877 | 1122 |
| Sheep | 255 | 332 |
| Goat | | 1 |
| Sheep/goat | 1385 | 2882 |
| Pig | 454 | 659 |
| Horse | 279 | 523 |
| Equus sp. | | 1 |
| Dog | 83 | 200 |
| Cat | 44 | 97 |
| Red deer | | 1 |
| Fallow deer | 5 | |
| Roe deer | 4 | |
| Deer sp. | 2 | 1 |
| Hare | 4 | 12 |
| Rabbit | 4 | 208 |
| Weasel | | 8 |
| Mole | | 5 |
| Water vole | | 11 |
| Field vole | | 2 |
| Amphibian spp. | 1 | 21 |
| Microfauna | 1 | 11 |
| Domestic fowl | 33 | 25 |
| Domestic fowl/pheasant | 14 | 20 |
| Galliforme | 2 | 7 |
| Domestic goose | 8 | 6 |
| Wild/domestic goose | 15 | 11 |
| cf. Domestic duck | | 2 |
| Grey partridge | | 1 |
| Crow/rook | | 1 |
| Jackdaw | | 3 |
| Wood pigeon | | 2 |
| Columba sp. | 3 | 3 |
| Moorhen | | 1 |
| Falco sp. | | 6 |
| Bird spp. | 9 | 20 |
| Large-size mammal | 40 | 115 |
| Medium-size mammal | 9 | 29 |
| Small-size mammal | 68 | 102 |
| Total | 3599 | 6451 |

assemblage) were more heavily fragmented, more severely eroded and in poorer condition than the articulated primary deposits. The higher incidence of gnawed bones from secondary deposits also indicates that they were accessible to dogs for longer than those from primary deposits (Table 44). It is clear that the disarticulated bones were more frequently exposed to weathering, trampling and gnawing and may have been

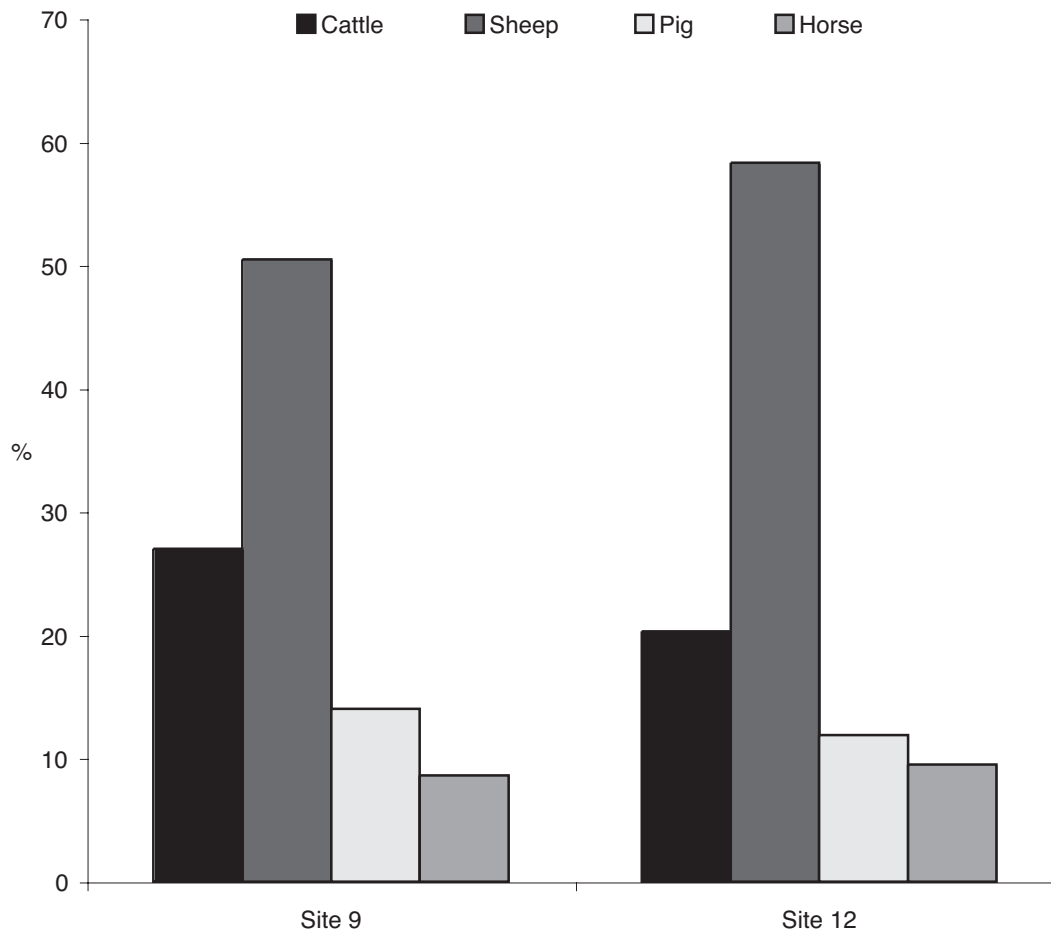


Fig. 86. The relative proportions of the main domestic animals by site. (J. Richardson)

incorporated into surface middens prior to final burial. An incidence of 10% gnawed bones, however, indicates that even disarticulated bones were not left exposed for any great length of time.

Pre-burial processes

While butchering and burning bones can result in bone loss, relatively few bones have been affected thus (Table 44). A slightly higher proportion of bones from Site 9 displayed the marks of burning and butchery, but it is unlikely that this has resulted in disproportionate bone loss from this area. The higher proportion of butchered cattle bones is a reflection of its large size and need for rigorous dismemberment (Table 45). It also reflects its routine consumption when compared to the similarly large horse, whose consumption was prohibited during the medieval period (Rau 1968 cited in Grant 1988).

Conclusions

Pre-discard processes such as butchery, and post-discard processes such as weathering and gnawing do not appear to have played a significant part in the destruction and/or biasing of the recovered bone assemblages. Although disarticulated bones were less well preserved than those which remained articulated, all bones were recovered in reasonable condition. In contrast, biases created by a suspected discard policy during excavation and/or post-

excavation will have influenced the assemblage severely. The dominance of identifiable bone zones suggests that 'undiagnostic' fragments were routinely discarded. Without any control over the discard policy, it must be assumed that this has biased the remaining assemblages.

Animal husbandry

Species proportions, age, sex, metrical and pathological data have been used to assess animal husbandry practices in terms of slaughter patterns, the exploitation of secondary products such as milk and fleeces and the movement/trade of livestock.

Species proportions

As with all the faunal assemblages analysed from Wharram Percy, the proportions of species from Sites 9 and 12 indicate a prevalence of domestic animals and a scarcity of wild mammals and birds (Table 46). Social restrictions on hunting have been suggested, with the hunting of deer remaining the preserve of the nobility (MacGregor 1989a, 108). Access to rabbits as a source of food was also restricted during the medieval period (O'Connor 2000, 169). Nevertheless, limited access to venison was identified, in particular from Site 9 deposits, although low-utility, lower limb bones predominated. In addition to the eleven deer bones from Site 9 (compared

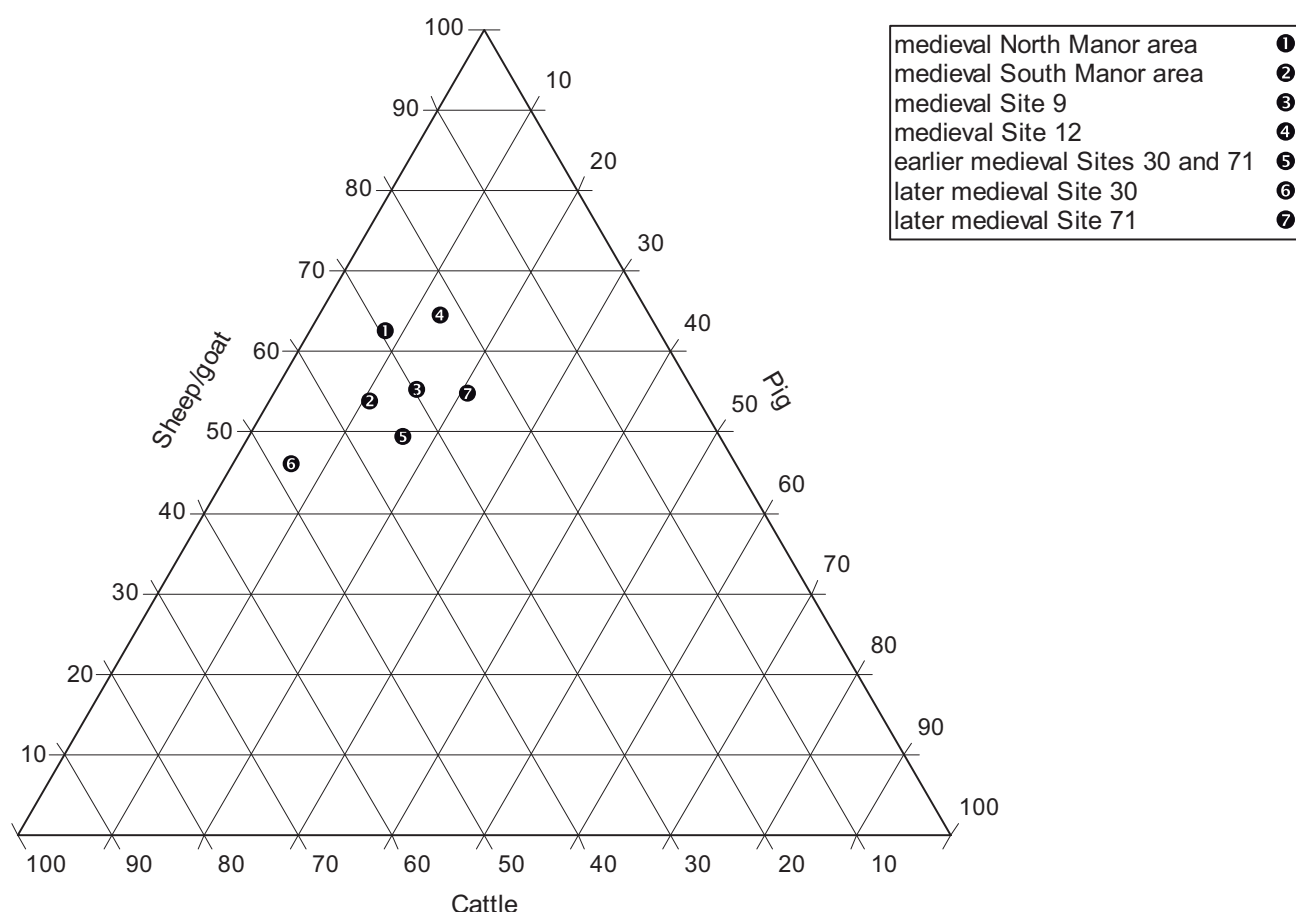


Fig. 87. Relative proportions of the three main 'meat' animals by site. (J. Richardson)

to only one from Site 12), a higher proportion of domestic fowl bones was also noted from this site. Preservation factors are probably not responsible for this variation: instead the inhabitants of the buildings within Site 9 may have had access to a more varied diet or perhaps a diet of higher status than those occupying Site 12. It is tempting to relate the presence of high status meats such as venison from Site 9 to the early medieval Manor House (Building 5) (Hurst 1979, 138), although limited phase data prevents this from being stated categorically. In contrast, rabbit bones were more commonly recovered from deposits associated with Site 12 and while some may represent intrusive burrowers, no articulated remains were noted. Ryder (1974, 44), however, did record a rabbit skeleton from Site 12 (context 10001), although no evidence of it was found in the assemblage analysed here.

A comparison of the relative proportions of the main domestic animals from Sites 9 and 12 indicates that the proportion of cattle and pig bones was higher from Site 9, largely at the expense of sheep (Table 46; Fig. 86). Despite these apparent fluctuations in the diet of the inhabitants of these two areas, or alternatively in their rubbish disposal, sheep bones accounted for 50% to 58% of the main domestic animals and this reflects the suitability of the Wolds for sheep farming. Cattle, as a much larger animal, however, would have offered more in

terms of meat, perhaps contributing over 70% of the meat by weight (based on calculations by Ryder 1974, tables I and II). Comparison of the main meat animals with other areas of Wharham Percy reveals that while sheep bones are typically predominant, the proportions of sheep, cattle and pigs do vary (Fig. 87). As stated earlier (p. 157), these fluctuations probably reflect differences in the diets of households, or disposal biases due to spatially distinct activities and/or taphonomic damage, rather than variations in the animal husbandry regimes carried out by each household.

Horse bones were also well represented (c. 10%) at Sites 9 and 12 (Fig. 86), although even higher levels of horse bones were noted from later medieval deposits at Site 82K (Richardson 2004a, 261) and Site 30 (Ch. 6). These horse-rich deposits suggest that horses were valued as pack, riding and probably as traction animals by the medieval occupants of Wharham Percy, but at the end of their working lives, their carcasses were either processed for dog meat or dismembered to facilitate disposal (Rackham 2004, 19-20).

Age and sex data for cattle, sheep, pigs and horses

In order to assess medieval husbandry practices and in particular the targeting of secondary products, age and sex data have been used to consider the slaughter patterns

Table 47. Fusion data for cattle by site (zone > 0, F = fused, NF = not fused).

| | Site 9 | | | Site 12 | | |
|--------------|--------|----|----|---------|----|----|
| | F | NF | %F | F | NF | %F |
| 7-18 months | 146 | 5 | 97 | 165 | 1 | 99 |
| 24-36 months | 40 | 7 | 85 | 42 | 10 | 8 |
| 36-48 months | 26 | 7 | 79 | 31 | 11 | 74 |

7-18 months calculated from distal scapula, distal humerus, proximal radius, first phalanx, second phalanx

24-36 months calculated from distal metacarpal, distal tibia, distal metatarsal

26-48 months calculated from proximal humerus, proximal ulna, distal radius, proximal femur, distal femur, proximal tibia, calcaneus

Table 48. Fusion data for sheep by site (zone > 0, F = fused, NF = not fused).

| | Site 9 | | | Site 12 | | |
|--------------|--------|----|----|---------|----|----|
| | F | NF | %F | F | NF | %F |
| 6-16 months | 123 | 7 | 95 | 172 | 3 | 99 |
| 18-28 months | 94 | 11 | 90 | 109 | 19 | 85 |
| 30-42 months | 25 | 21 | 54 | 30 | 28 | 52 |

6-16 months calculated from distal scapula, distal humerus, proximal radius, first phalanx, second phalanx

18-28 months calculated from distal metacarpal, distal tibia, distal metatarsal

30-42 months calculated from proximal humerus, proximal ulna, distal radius, proximal femur, distal femur, proximal tibia, calcaneus

Table 49. Fusion data for pig by site (zone > 0, F = fused, NF = not fused).

| | Site 9 | | | Site 12 | | |
|--------------|--------|----|----|---------|----|----|
| | F | NF | %F | F | NF | %F |
| 12 months | 20 | 6 | 77 | 31 | 21 | 60 |
| 24-30 months | 9 | 52 | 15 | 8 | 31 | 21 |
| 36-42 months | 0 | 16 | 0 | 2 | 13 | 13 |

12 months calculated from distal scapula, distal humerus, proximal radius, second phalanx

24-30 months calculated from distal metacarpal, distal tibia, calcaneus, distal metatarsal, first phalanx

36-42 months calculated from proximal humerus, proximal ulna, distal radius, proximal femur, distal femur, proximal tibia

Table 50. Fusion data for horse by site (zone > 0, F = fused, NF = not fused).

| | Site 9 | | | Site 12 | | |
|--------------|--------|----|-----|---------|----|-----|
| | F | NF | %F | F | NF | %F |
| 9-20 months | 48 | | 100 | 90 | | 100 |
| 20-24 months | 15 | 1 | 94 | 20 | 1 | 95 |
| 36-42 months | 17 | 2 | 89 | 23 | 1 | 96 |

9-20 months calculated from distal humerus, proximal radius, distal metacarpal, distal metatarsal, first phalanx, second phalanx

20-24 months calculated from distal scapula, distal tibia

36-42 months calculated from proximal humerus, proximal ulna, distal radius, proximal femur, distal femur, proximal tibia, calcaneus

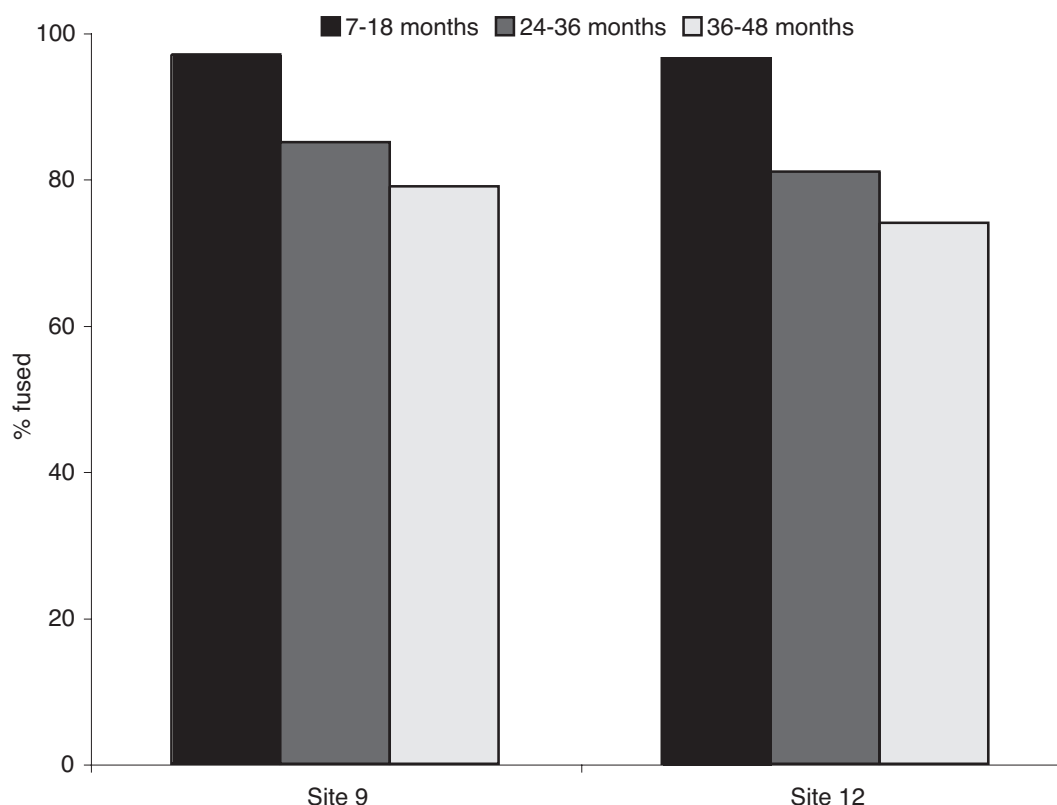


Fig. 88. Fusion data for cattle by site. (J. Richardson)

of cattle, sheep, pigs and horses. Fusion data are presented in Tables 47 to 50 for cattle, sheep, pig and horse and in Tables 51 to 54 for dental eruption and wear data.

The fusion data for cattle from Sites 9 and 12 indicated that the majority of the population was maintained to (osteological) maturity, although a slighter higher proportion of animals in their third year were slaughtered for their meat from Site 12 (Table 47; Fig. 88). The dominance of adult animals suggests that cattle were important for their secondary products of milk and traction and/or to maintain a breeding population. The presence of a few neonatal bones from both sites (0.3% of the assemblage from Site 9 and 0.6% of the assemblage from Site 12) certainly suggests that a breeding population was present and this is supported by a dominance of females (5 females: 0 males from Site 9 and 9 females: 6 males from Site 12). In contrast, the absence of significant neonatal/juvenile slaughter makes intensive milk production unlikely, although the proportion of males from Site 12 suggests that traction animals may have been important and three pelves from Site 9 showed signs of eburnation that may indicate work-related trauma. The slaughter pattern calculated for the medieval assemblage from the Pond and Dam sites reveals the same concentration of adult animals (Chapter 21), while a slighter higher proportion of sub-adult animals were deposited (and perhaps consumed) in the North Manor Area (Richardson 2004a, 264).

The dental eruption and wear data for cattle confirmed the higher proportion of juvenile and sub-adult deaths (up

to 36 months) at Site 12 when compared to Site 9 (Table 51; Fig. 89). The dental data for both sites, however, reveal a much more significant proportion of the animals were slaughtered when still sub-adult (50% from Site 9 and 61% from Site 12) when compared to the fusion data. This discrepancy probably arose because the mandibles and the limb bones in the assemblages each sampled a different population of individuals (O'Connor 2000, 96). A delay in dental eruption (and subsequently in tooth wear) due to malnourishment for example (Grant 1978, 103) would also have delayed fusion rates. Perhaps then dressed carcasses of young animals were traded and/or exchanged beyond the immediate area resulting in the deposition here of the heads of young animals, as well as all body parts from older animals that would have served as the usual fare for the local inhabitants. Dressed carcasses would usually have had their hooves as well their heads removed and this should result in higher proportions of young foot bones when compared to elements that fuse at around the same time. Some corroborative evidence of this is provided by the first phalange, but this is not supported by the second phalange (Table 55). Perhaps dressed carcasses from medieval Wharram had only their heads removed, or young foot bones were moved elsewhere perhaps attached to valuable skins.

The fusion data for sheep revealed very similar slaughter patterns from both Sites 9 and 12 (Table 47; Fig. 90) with nearly half of both populations slaughtered by 30 to 42 months. Given few juvenile deaths, slaughter

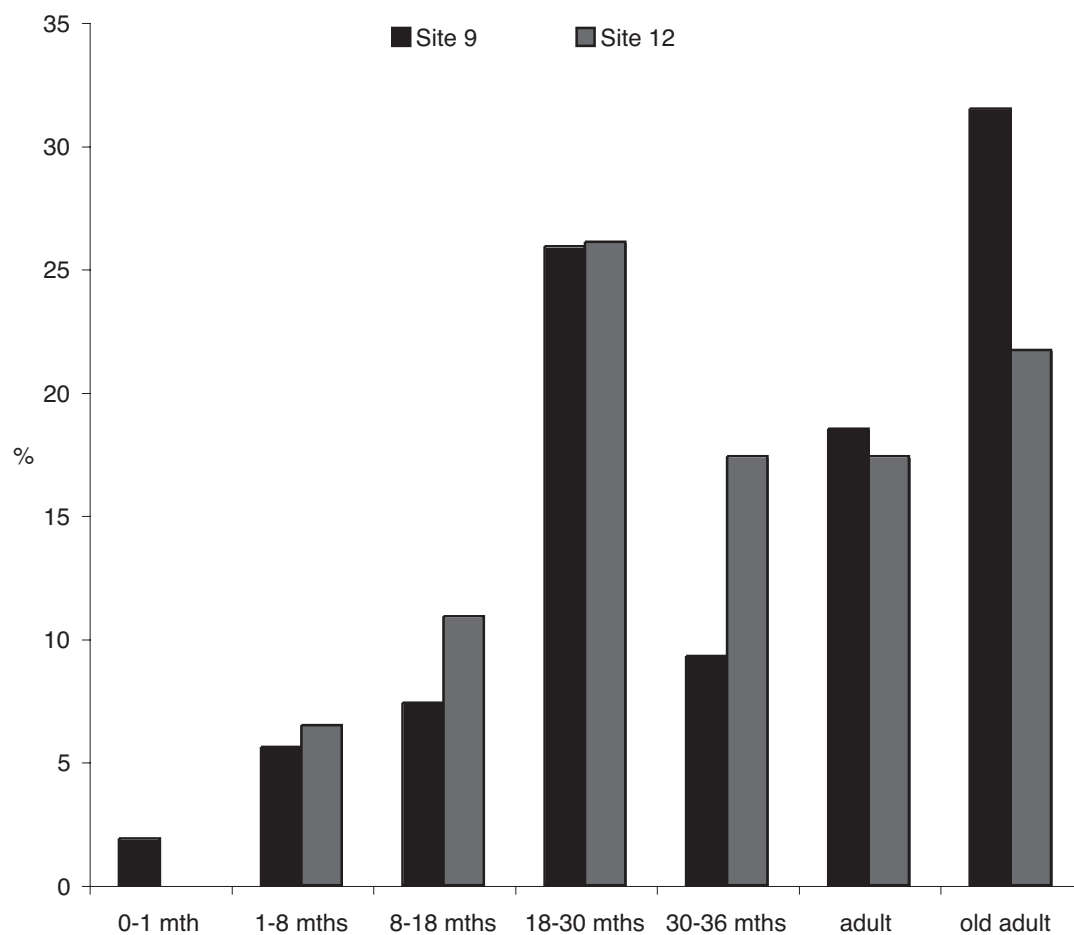


Fig. 89. Dental age data for cattle by site. (J. Richardson)

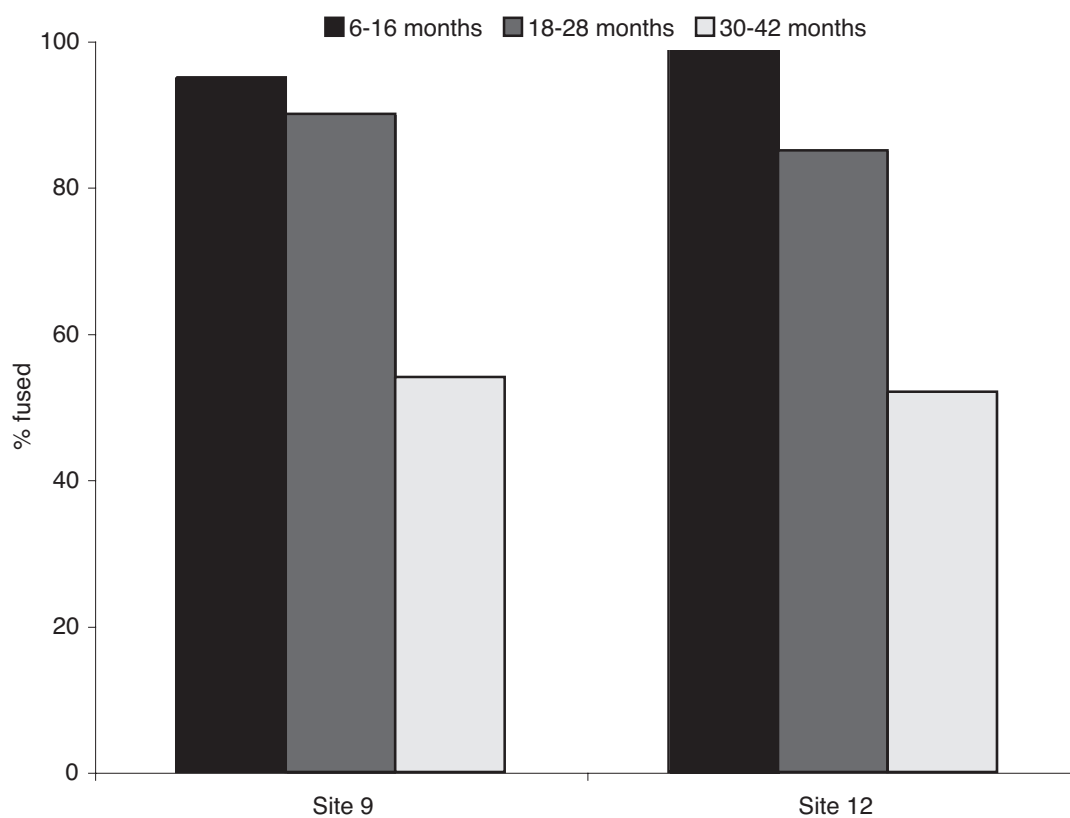


Fig. 90. Fusion data for sheep by site. (J. Richardson)

Table 51. Number of cattle jaws at various wear stages by site (after Halstead 1985).

| | Site 9 | Site 12 |
|----------------|--------|---------|
| A: 0-1 mths | 1 | |
| B: 1-8 mths | 3 | 3 |
| C: 8-18 mths | 4 | 5 |
| D: 18-30 mths | 14 | 12 |
| E: 30-36 mths | 5 | 8 |
| F: young adult | 2 | 4 |
| G: adult | 8 | 4 |
| H: old adult | 8 | 4 |
| I: senile | 9 | 6 |
| Total | 54 | 46 |

Table 52. Number of sheep jaws at various wear stages by site (after Payne 1973).

| | Site 9 | Site 12 |
|--------------|--------|---------|
| A: 0-2 mths | | 1 |
| B: 2-6 mths | | 2 |
| C: 6-12 mths | 13 | 42 |
| D: 1-2 yrs | 17 | 51 |
| E: 2-3 yrs | 23 | 57 |
| F: 3-4 yrs | 52 | 81 |
| G: 4-6 yrs | 41 | 90 |
| H: 6-8 yrs | 31 | 42 |
| I: 8-10 yrs | 5 | 12 |
| Total | 182 | 378 |

Table 53. Number of pig jaws at various wear stages by site.

| | Site 9 | Site 12 |
|---------------------------|--------|---------|
| A: d4 unworn | | |
| B: d4 in wear, M1 unworn | 6 | 4 |
| C: M1 in wear, M2 unworn | 5 | 6 |
| D: M2 in wear, M3 unworn | 10 | 11 |
| E: M3 in early wear | 2 | 2 |
| F: M3 beyond wear stage c | 2 | 1 |
| Total | 25 | 24 |

Table 54. Number of horse incisors (mandibular and maxillary) at various wear stages by site.

| | Site 9 | Site 12 |
|--|--------|---------|
| A: deciduous incisors present (< 2 yrs) | 3 | 9 |
| B: incisor erupted (2.5-4.5 years) | 3 | 3 |
| C: incisor first in wear (3-6 yrs) | | 3 |
| D: incisor with square enamel pattern (5-7 yrs) | 2 | 9 |
| E: infundibulum lost (7-9 yrs) | 10 | 14 |
| F: incisor with circular enamel pattern (8-10 yrs) | | 6 |
| G: incisor with no enamel (14 yrs +) | 7 | 59 |
| Total | 25 | 103 |

to facilitate milk production was unlikely and instead sub-adult animals were presumably killed for their meat. At the very best these animals would only have produced a couple of fleeces, suggesting that the local economy at medieval Wharram was sufficiently robust to allow for their early slaughter. Those animals exceeding 30 to 42 months would have been maintained as breeding livestock (corroborated by 0.4% neonatal bones from Site 9 and 0.7% from Site 12), as well as for their fleeces. Sex ratios of six females to four males from Site 9 and thirteen females to ten males from Site 12 suggest that the larger bodied males may have been preferred for their larger fleeces, although fleeces from castrated males (which are difficult to identify osteologically) were most highly valued. Teeth from possible wool combs (Goodall 1979, 118; 1989, 49) and spindlewhorls (Andrews 1979, 125; MacGregor 1989b, 56) indicate that wool was manufactured locally, although fleeces would also have been tradable commodities.

Sheep dental data were commonly recorded (Table 52; Fig. 91) and confirm the husbandry practices proposed by the fusion data that intensive milk production was unlikely in the absence of neonate/juvenile deaths, but lamb from animals in their first, second and third years was available (and in slightly greater proportions from Site 12). The dental data also indicate a peak in the slaughter of the livestock between three and six years. The youngest of these would have provided high quality meat, while the oldest represent animals whose breeding potential and fleece production had declined. Comparing the dental data from Sites 9 and 12 to the medieval data from the North Manor Area (Richardson 2004a, 264-8) indicates that while prime lamb (from animals up to two years old) was available to the inhabitants of the peasant houses in Sites 9 and 12, those living in the north of the village had access to greater proportion of young meat.

Pigs, as animals bred for their meat, tend to be slaughtered when they have gained the optimum amount of weight in relation to the quantity of food consumed. From Sites 9 and 12, the fusion data indicated that this occurred between 12 and 30 months, by which time nearly 80% of the population had been culled at Site 12 and 85% from Site 9 (Table 49). The fusion data suggest that animals surviving to (osteological) maturity were only apparent from Site 12 where they were presumably valued as breeding stock (Table 49), although the dental data indicate that a few animals over three years old were present at both sites (Table 53; the third molar erupts at three years according to Silver's (1969, table G) 18th-century data). Although ratios of fourteen males to six females from Site 9 and fifteen males to six females are not ideal for a breeding population, localised production is proposed due to the presence of a few neonatal bones (three from Site 9 and eight from Site 12).

The final animal to play a significant economic role was the pony (no horse-sized bones (see below) and no teeth indicative of the donkey/mule were identified). The fusion data suggest adult animals dominated the population at both sites (Table 50), although age data

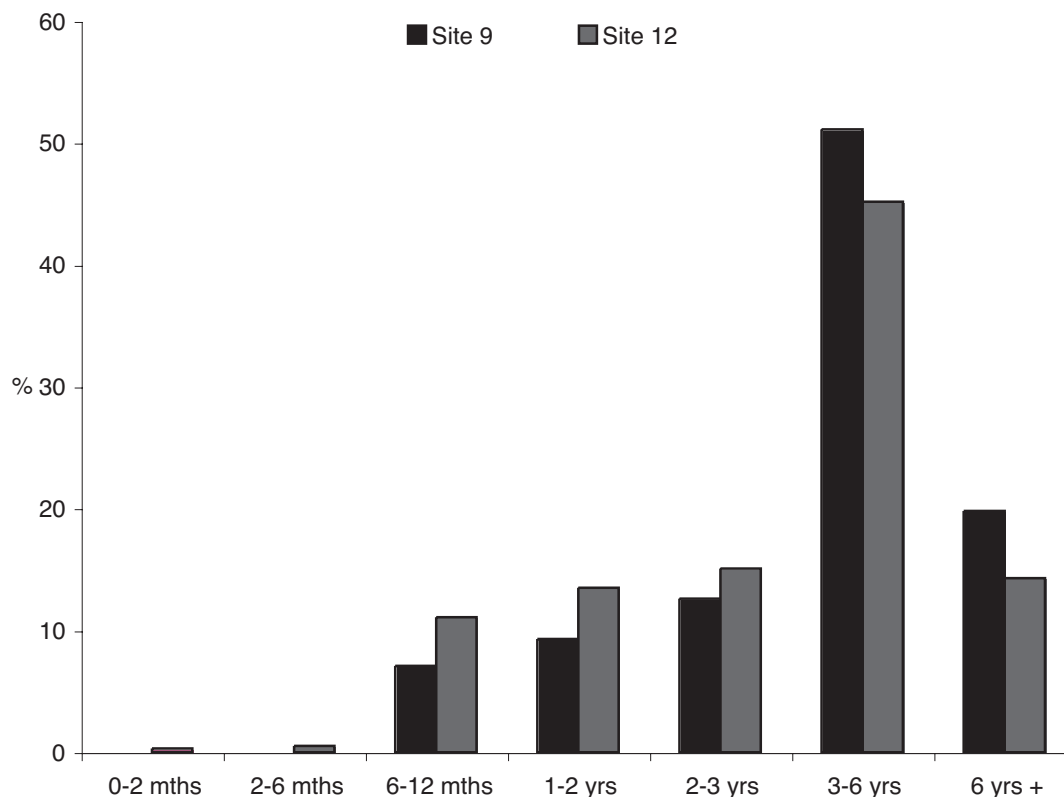


Fig. 91. Dental age data for sheep by site. (J. Richardson)

from the incisors indicate juvenile animals were present albeit in small numbers (Table 54). Adult animals would have been valued for transporting goods and people and also for ploughing with the advent of the rigid breast harness (Ch. 21). Certainly work and/or age-related traumas to the lower leg such as ring bone and spavin and the ankylosing of two lumbar vertebrae by the ossification of the dorsal longitudinal ligaments were noted. The presence of young, unbroken animals suggests that horses may also have been reared at medieval Wharram Percy. In the absence of neonatal bones, however, this could not be confirmed.

Metrical data

As from all the Wharram Percy sites recorded to date, metrical data from Sites 9 and 12 were relatively scarce due to the high levels of fragmentation. Only some of the sheep and horse bones provided sufficient data for a cursory comparison between the sites, although the distal breadth of the sheep tibia is the only measurement to have been taken in some number (Table 56). The deviation in the breadth of the sheep tibiae from Middle Saxon to medieval deposits suggests that the robusticity of the animals changed very little over time, despite some evidence (albeit from relatively few metapodials) that the mean height of sheep was greatest in the Anglo-Saxon period. The wither heights of the equids from Sites 9 and 12 indicate that these animals were pony-sized, ranging

from twelve hands one inch to thirteen hands, compared to a horse of nearly fifteen hands from the Pond and Dam sites.

Carcass processing

In addition to meat from cattle, pigs, sheep, domestic poultry and the occasional rabbit or deer, animal carcasses may also have been processed for their skins, horns and bones. Cattle horncores were rarely recovered, although one of four retrieved from Site 12 had chop marks indicative of horn removal. Conversely, sheep horncores were frequently marked with eight butchered examples noted from each site (from a total of 24 horncores from Site 9 and eighteen from Site 12). While the horn sheath may have been the particular target, cut and chop marks to the bases of horncores may also indicate the removal of the horns to facilitate skinning. No cut marks to the metapodials to indicate skinning were observed, however, although cut marks across the skulls of two sheep (one to the frontal bone and the second to the parietal bone) from Site 9 suggests that some skins were utilised. In addition, the four butchered horse bones from Site 9 and three of the six butchered horse bones from Site 12 (all lower limb bones) were probably marked during the removal of hides. Bone objects including a toggle from a pig metapodial and a spindlewhorl made from a cattle femur (Andrews 1979, 128; MacGregor 1989b, 56) indicate that bones were also worked.

Table 55. Fusion data for cattle by element (zone > 0, F = fused, NF = not fused).

| | | Site 9 | | | Site 12 | | |
|-------------------|--------------|--------|----|-----|---------|----|-----|
| | | F | NF | %F | F | NF | %F |
| Distal scapula | 7-10 months | 21 | 0 | 100 | 13 | 0 | 100 |
| Distal humerus | 12-18 months | 8 | 0 | 100 | 14 | 0 | 100 |
| Proximal radius | 12-18 months | 22 | 0 | 100 | 17 | 0 | 100 |
| First phalanx | 18 months | 57 | 5 | 92 | 71 | 1 | 99 |
| Second phalanx | 18 months | 38 | 0 | 100 | 50 | 0 | 100 |
| Distal tibia | 2-2½ years | 19 | 3 | 86 | 12 | 1 | 92 |
| Distal metacarpal | 2-2½ years | 10 | 2 | 80 | 15 | 5 | 75 |
| Distal metatarsal | 2½-3 years | 11 | 2 | 85 | 15 | 4 | 79 |
| Calcaneus | 3-3½ years | 4 | 2 | 50 | 5 | 3 | 63 |
| Proximal femur | 3½ years | 10 | 1 | 90 | 7 | 3 | 70 |
| Proximal humerus | 3½-4 years | 1 | 1 | 50 | 3 | 0 | 100 |
| Distal radius | 3½-4 years | 5 | 2 | 71 | 6 | 1 | 86 |
| Proximal ulna | 3½-4 years | 1 | 0 | 100 | 1 | 0 | 100 |
| Distal femur | 3½-4 years | 1 | 1 | 50 | 4 | 2 | 50 |
| Proximal tibia | 3½-4 years | 4 | 0 | 100 | 5 | 2 | 71 |

The majority of butchery marks, however, relate to the reduction of carcasses to facilitate food preparation and the removal of meat from the bone during consumption. Low-value body parts such as heads and feet would have been removed first and this is the process used to explain the presence of young cattle jaws, while young post-cranial body parts were absent (see above). In addition, a number of cattle, sheep and pig atlases and axes bear the marks of dismemberment as they were separated from the skull, while chops to the base of a cattle skull from Site 12 were effective in removing the head. Butchery marks to the mandible are restricted to cattle jaws where their removal would have facilitated access to the tongue and perhaps also the cheek meat. The next stage, to cleave the carcasses into two halves has rarely been recorded from medieval Wharram and has so far been restricted to cattle and sheep-sized animals (Chapter 21). The data from Sites 9 and 12 confirm this with only one sheep-size vertebra from Site 9 and two sheep axes from Site 12 chopped dorso-ventrally. Although this practice was becoming increasingly common at other medieval sites (O'Connor 1982, 16), it seems that the inhabitants of Wharram Percy chose not to adopt this butchery method as routine despite having cruck-built structures of sufficient strength to support the suspended carcasses. Finally, dismembering marks to create meat-rich joints and filleting marks to remove meat (in particular from the ribs) were observed on cattle, pig and sheep bones. Dismembering marks on domestic poultry were also noted, as well as butchery of a horse femur, humerus and tibia from Site 12. These butchered horse bones suggest that meat was being targeted, but whether this was for human or canid consumption is unknown.

The relative proportions of body parts have also been used to assess carcass processing and these data have been

analysed using the methodology as described earlier (Ch. 21). This analysis indicates that jaws and/or loose teeth are over-represented for cattle, sheep and pig from both sites (Figs 92 and 93). This may indicate a concentration of primary butchery waste in this area, although fragmentation and the robust nature of teeth may also be a factor (note for example that cattle jaws are relatively scarce from both sites, while third molars are over-represented from Site 9 and first/second molars over-represented from Site 12). Bones such as humerus (both sites) and scapula (Site 12), which are indicative of meat-rich joints, are over-represented for pig and these may indicate meat preparation and/or meat consumption in the vicinity. The absence and/or dearth of the scaphoid from both sites is a reflection of its small size and consequently its poor recovery. The scarcity of cattle horncores from Site 12 and their absence from Site 9 suggest that horns were not used for working in this area or alternatively that hornless cattle were the preferred breed.

Minor species

Although the food intake of the inhabitants of Sites 9 and 12 was clearly dominated by lamb, beef and pork (at least in terms of meat), chicken and geese may also have been kept in small numbers and their eggs and meat used to supplement the diet. Duck and partridge may have been consumed at Site 12, while birds of the pigeon family were probably utilised at both sites (Table 46). Deer also provided an additional, if rare source of meat. Six *Falco* sp. bones from Site 12 (context 12186) are probably from a kestrel that preyed on the voles, frogs and/or toads that are present in the assemblage, although its presence as a captive hawk cannot be ruled out (Prummel 1997, 336).

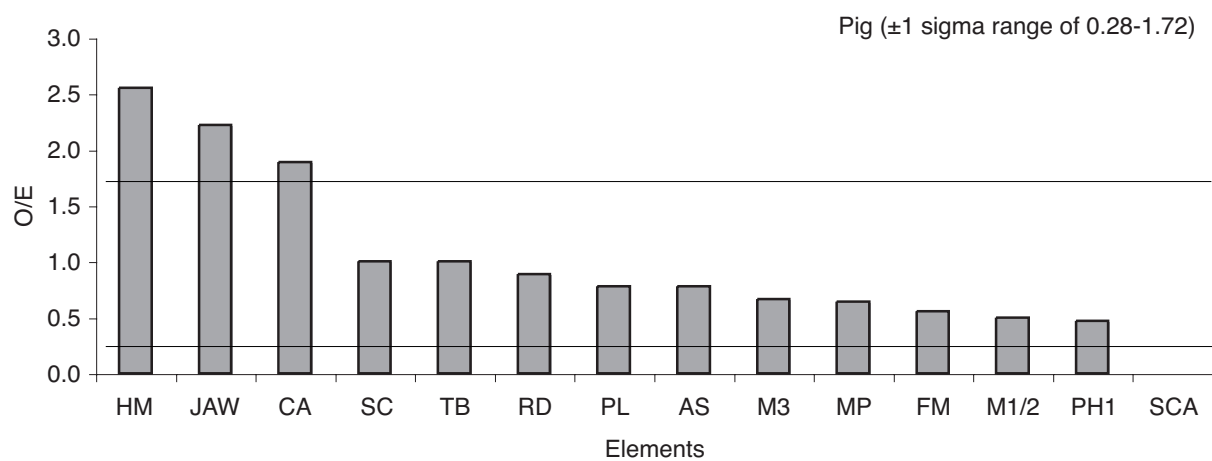
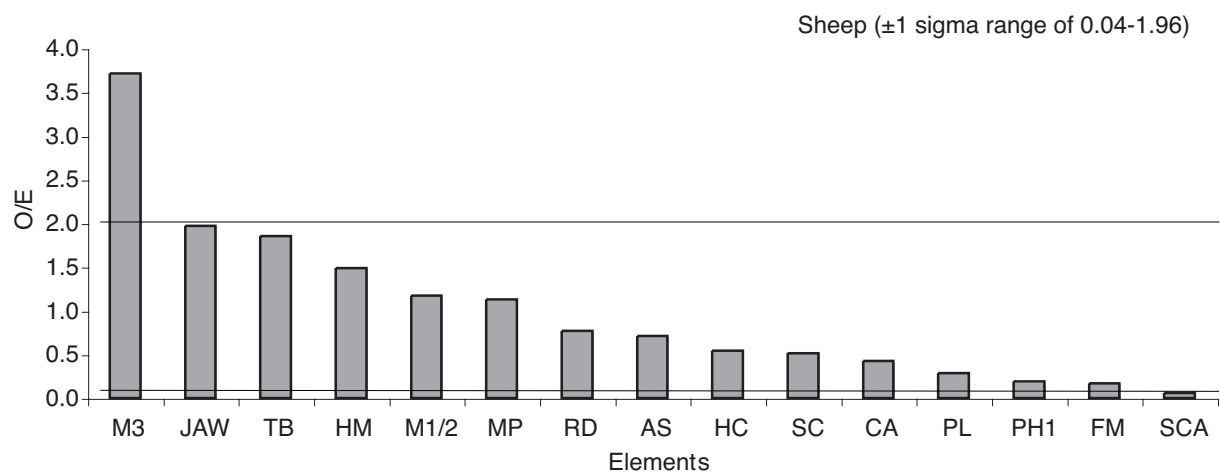
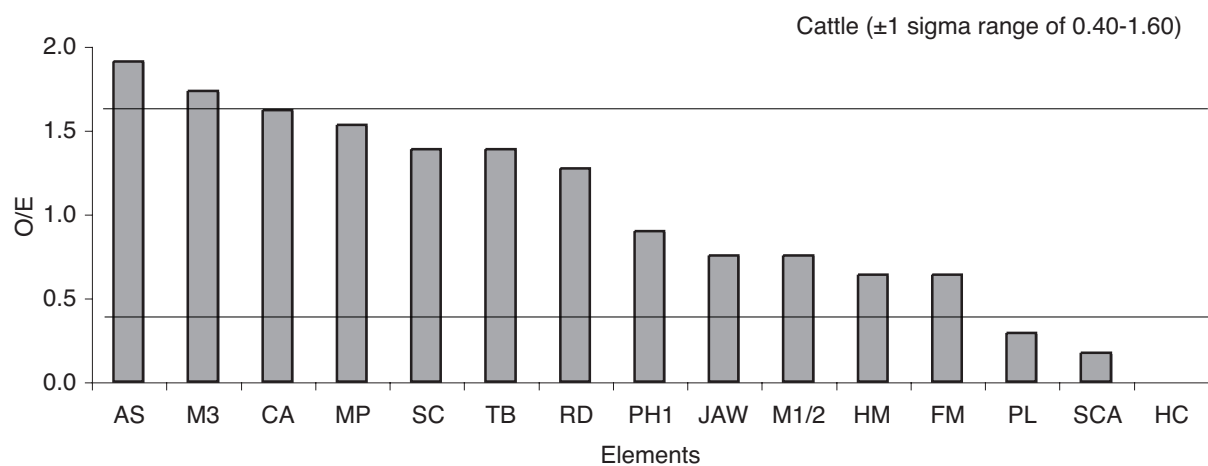
Dogs and cats were probably tolerated due to their abilities in reducing vermin and due to the guarding

Table 56. Metrical data for sheep and horse by site and period (in millimetres).

| Site | Period | Species | Element | Measurement | Number | Minimum | Maximum | Mean | SD | Withers |
|------|----------------------|---------|------------|-------------|--------|---------|---------|-------|------|-----------|
| SM | Middle Saxon | Sheep | Metacarpal | GL | 13 | 105.2 | 126.1 | 116.9 | 5.8 | 514-617 |
| SM | Late Saxon | Sheep | Metacarpal | GL | 6 | 112.0 | 133.1 | 119.1 | 7.5 | 548-651 |
| SM | Medieval | Sheep | Metacarpal | GL | 5 | 100.2 | 114.1 | 108.1 | 6.5 | 490-558 |
| NM | Medieval | Sheep | Metacarpal | GL | 6 | 106.1 | 120.5 | 113.4 | 6.4 | 519-589 |
| 09 | Medieval | Sheep | Metacarpal | GL | 3 | 95.1 | 118.6 | 108.6 | 12.1 | 465-580 |
| 12 | Medieval | Sheep | Metacarpal | GL | 8 | 109.5 | 130.1 | 114.2 | 6.7 | 536-636 |
| NM | Iron Age/early Roman | Sheep | Metatarsal | GL | 1 | | | 123.8 | | 562 |
| SM | Middle Saxon | Sheep | Metatarsal | GL | 6 | 125.3 | 137.5 | 129.3 | 4.6 | 569-624 |
| NM | Medieval | Sheep | Metatarsal | GL | 4 | 100.5 | 131.9 | 122.0 | 12.3 | 456-599 |
| 12 | Medieval | Sheep | Metatarsal | GL | 8 | 114.0 | 140.4 | 128.3 | 10.0 | 558-637 |
| SM | Middle Saxon | Sheep | Tibia | Bd | 99 | 23.0 | 29.0 | 26.2 | 1.4 | |
| SM | Late Saxon | Sheep | Tibia | Bd | 42 | 22.9 | 29.8 | 25.8 | 1.6 | |
| SM | Medieval | Sheep | Tibia | Bd | 100 | 21.6 | 29.1 | 25.5 | 1.5 | |
| NM | Medieval | Sheep | Tibia | Bd | 11 | 20.3 | 27.2 | 25.3 | 2.0 | |
| PD | Medieval | Sheep | Tibia | Bd | 11 | 25.0 | 30.1 | 26.6 | 1.5 | |
| 09 | Medieval | Sheep | Tibia | Bd | 25 | 23.1 | 30.7 | 25.4 | 1.7 | |
| 12 | Medieval | Sheep | Tibia | Bd | 24 | 22.0 | 28.0 | 25.5 | 1.5 | |
| NM | Iron Age/early Roman | Horse | Metacarpal | LI | 2 | 194.0 | 202.5 | 198.3 | 6.0 | 1244-1298 |
| NM | Medieval | Horse | Metacarpal | LI | 5 | 193.0 | 208.0 | 200.3 | 5.7 | 1237-1333 |
| PD | Medieval | Horse | Metacarpal | LI | 5 | 184.5 | 216.0 | 199.1 | 13.2 | 1183-1385 |
| 09 | Medieval | Horse | Metacarpal | LI | 2 | 206.0 | 219.0 | 207.5 | 2.1 | 1321-1404 |
| 12 | Medieval | Horse | Metacarpal | LI | 3 | 201.0 | 219.0 | 207.3 | 10.1 | 1288-1404 |
| NM | Medieval | Horse | Metatarsal | LI | 3 | 219.0 | 251.5 | 233.5 | 16.5 | 1167-1341 |
| PD | Medieval | Horse | Metatarsal | LI | 2 | 224.0 | 243.5 | 233.8 | 13.8 | 1194-1298 |
| 09 | Medieval | Horse | Metatarsal | LI | 1 | | | 245.0 | | 1306 |
| 12 | Medieval | Horse | Metatarsal | LI | 2 | 229.0 | 256.0 | 242.5 | 19.1 | 1221-1364 |
| PD | Medieval | Horse | Various | Withers | 15 | | | | | 1183-1513 |
| 12 | Medieval | Horse | Various | Withers | 6 | | | | | 1247-1367 |

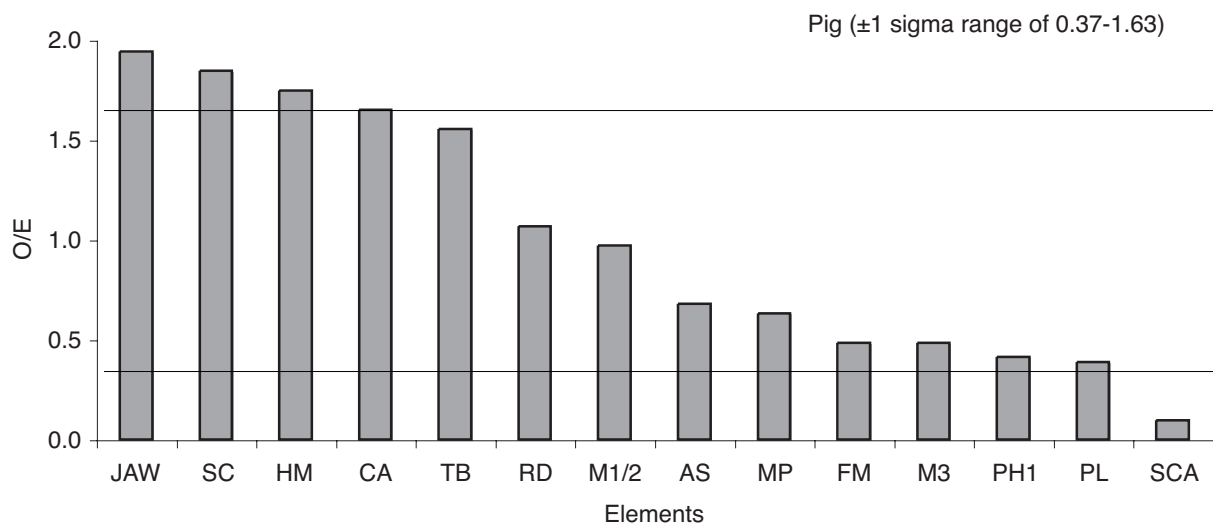
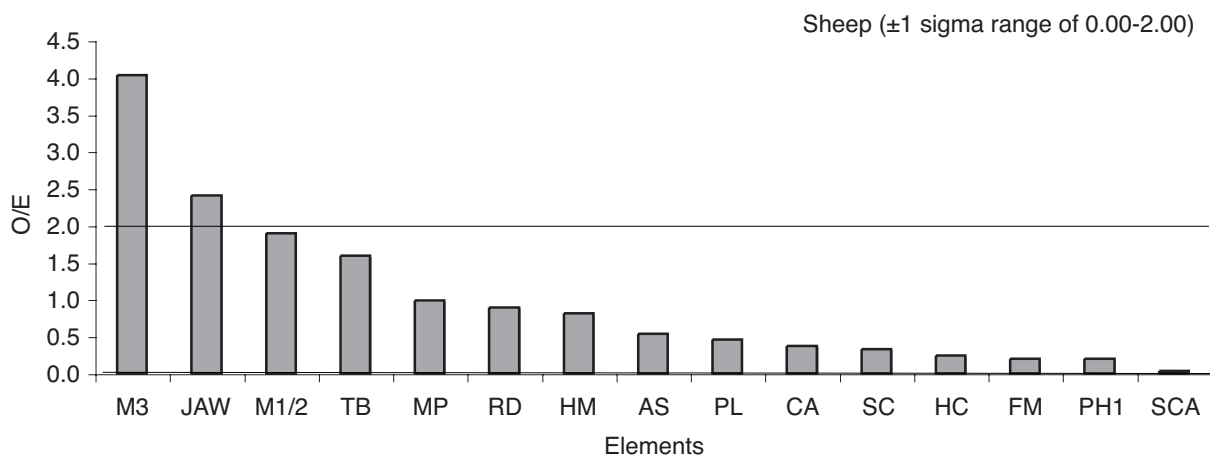
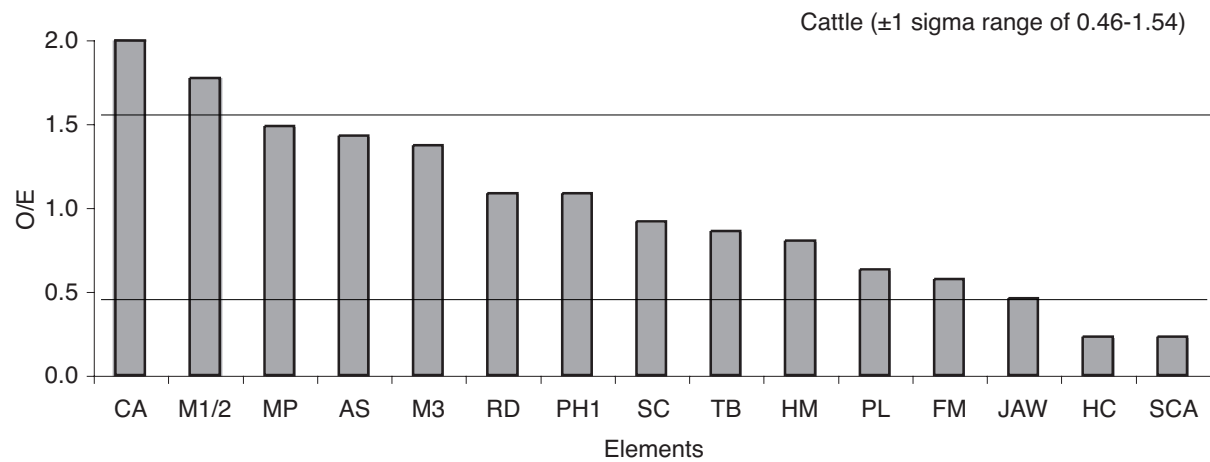
Bd = greatest breadth of distal articulation (after von den Driesch 1976), LI = lateral length (after Kiesewalter 1888 in von den Driesch and Boessneck 1974)

SM = South Manor Area, NM = North Manor Area, PD = Pond and Dam area



AS=astragalus, CA=calcaneus, FM=femur, HC=horncore, HM=humerus, M1/2=first/second molar, M3=third molar, MP=metapodials, PH1=first phalanx, PL=pelvis, RD=radius, SC=scapula, SCA=scaphoid, TB=tibia

Fig. 92. Distribution of skeletal elements: Site 9. (J. Richardson)



AS=astragalus, CA=calcaneus, FM=femur, HC=horncore, HM=humerus, M1/2=first/second molar, M3=third molar, MP=metapodials, PH1=first phalanx, PL=pelvis, RD=radius, SC=scapula, SCA=scaphoid, TB=tibia

Fig. 93. Distribution of skeletal elements: Site 12. (J. Richardson)

capabilities of dogs. Their status as pets is difficult to quantify, however, although evidence of their mistreatment may be telling. Fractures to a dog tibia (Site 9), a dog radius and cat rib (Site 12) and ossified haematomas to a cat tibia and a dog tibia and humerus (Site 12) suggest that their treatment was often poor. A dog axis from Site 9 that displayed cut marks indicative of beheading may indicate the occasional use of dog pelts.

Conclusions

A taphonomic analysis of the assemblages recognised that the majority of material from Sites 9 and 12 was not left exposed for any great length of time as only 10% of the disarticulated bones had been gnawed. Articulated body parts and partial skeletons were also present and these indicate rapid disposal. Modification of the recovered assemblage by butchery and burning was also minor. In contrast, a lack of sieving and a suspected discard policy during the archaeological investigations will have biased the bone samples most severely.

As identified from the medieval faunal assemblages from the North Manor Area and the Pond and Dam sites, the animal bone data from Sites 9 and 12 have revealed multi-purpose husbandry strategies. Here, cattle were raised for their meat while older individuals were used to preserve the breeding populations and also as traction cattle. The relatively high proportions of cattle bones suggest that favourable pasture was readily available to the inhabitants of Wharram Percy. Sheep provided significant quantities of lamb (around 50% of the population from Sites 9 and 12 were slaughtered when sub-adult), but they were also valued for their fleeces. This species was particularly well suited to the local environment and would have thrived on the free-draining soils of the Wolds. This diet of beef and lamb was supplemented by pork and occasionally by domestic poultry, venison, fish and rabbit. Variations in the assemblages from Sites 9 and 12 may reflect differences in status, for example higher proportions of deer and poultry were noted from Site 9, but typically both areas indicated similar husbandry practices. Interestingly, sub-adult cattle may have been traded beyond the village as dressed carcasses. Other tradable commodities such as fleeces and skins may also have been important, although these could not be identified directly from the faunal material.

Horses/ponies would also have been valuable assets for the medieval inhabitants of Wharram Percy, not only for the occupants of Sites 9 and 12 (8% horse bones from both sites), but also the North Manor Area (10% horse bones) and Site 30 (35% horse bones). Localised dumping of horse bones influenced the assemblages to a certain extent, as horse bones accounted for 35% of the bones deposited at Site 30 compared to only 4% associated with neighbouring Site 71. It is essential not to view the importance of horses at Wharram Percy as purely a medieval phenomenon, however, as early 2nd to

early 3rd-century AD deposits associated with the Northwest Enclosure contained 11% horse bones (Richardson 2004b, fig. 164). The faunal evidence from Sites 9 and 12 indicates that while horses were typically maintained well into adulthood, a few juvenile animals (too young to have been broken to the harness) were also present. These suggest that the occupants of medieval Wharram Percy were involved in rearing horses, perhaps for export purposes as well as for riding, transport and/or ploughing. Comparative material indicates that horses were also a relatively common phenomenon on other medieval rural sites (e.g. Sherburn, North Yorkshire (Rushe *et al.* 1994, table 2), West Cotton, Northamptonshire (Albarella and Davis 1994, table 1) and Thrislington, County Durham (Rackham 1989, 153)), and they may also have been raised locally at West Cotton (Albarella and Davis 1994, figure 7). Le Patourel (1974, 52) has suggested that the prevalence of horse bones at Wharram Percy may reflect their suitability as plough teams on the shallow chalky soils of the Wolds, although a medieval settlement at nearby Cowlam produced only 5% horse bones (Rushe *et al.* 1988, table 1). It is possible that the inhabitants at Wharram were successful horse breeders and not only kept animals for assistance during the farming calendar, but also traded their livestock onto other communities.

Appendix 2: A Note on the Burnt Clay

Of the 82 fragments of burnt clay recovered from Site 30, 55% came from the carbonised grain deposits of Phase 1. Some retain the imprint from wattles. Another 22 fragments were found on Site 71, mainly in medieval contexts. All the fragments are similar in texture and fabric to other burnt clay from Wharram. The full catalogue forms part of the Archive.

Appendix 3: A Note on the Mortar

The small amount of mortar found on these sites, mainly in Phase 4 contexts, has been fully catalogued and the catalogue forms part of the Archive.

Appendix 4: A Note on the Coal and Charcoal

Only small amounts of coal were found in these excavations; 58% of it was in Phase 4 and 5 contexts. At least six species were represented in the charcoal recovered on Site 30 from the carbonised grain layers of Phase 1: hazel, oak, willow, birch, cornus sp., prunus spinosa. Charcoal was also collected from contexts in Phases 3 and 4, including the 'rubbish dump' in Site 71, and suitable samples will be included in the charcoal survey to be undertaken at the end of the project.

Appendix 5: A Note on the Human Bone

Nearly 60 fragments of human bone, including a wide range of body parts, were recovered from these sites. The bones occurred in most phases but about 50% of them were in the chalk and earth dam of Phase 3 which is very near to the graveyard.

Appendix 6: A Note on the Slag

by G. McDonnell

A scatter of slag and other metalworking residues is found wherever excavation takes place at Wharram, probably

reused as filling material and originating elsewhere in the village. A smithy site dating to the Anglo-Saxon period was revealed in the South Manor area (*Wharram VIII*).

Some 7869g of metalworking residues were recovered from these sites. This was made up of relatively few fragments, some of them quite large. They include slag, hearth bottoms and lining material with a small amount of welding scale. Fragments of stock metal were also found. The residues are almost entirely from 12th to 14th-century contexts. A fragment of possible Iron Age Grey slag was found in cess-stained soil in Phase 2 (30/1297); other fragments of this type were found in a ditch at the north end of the settlement (*Wharram IX*).

Appendix 7: Concordance of the Contexts containing Pottery, Small Finds, Metallurgical and Environmental Remains, and of all Contexts mentioned in this volume, by Site, Phase and Context

The concordance lists medieval pottery by sherd count and weight; catalogue numbers of illustrated sherds are given. The presence of Roman pottery and post-medieval pottery is indicated. The published or Archive catalogue numbers are given for small finds of stone, clay, metal, wood, bone or ivory and leather. Nails, animal bone and burnt clay are listed by number of fragments; metallurgical waste, coal and charcoal by weight and, finally, glass, human remains, mortar and molluscs by presence.

Abbreviations

Pottery:

Rom.: Iron Age and Roman pottery

Med.: Saxon and medieval pottery

PM: post-medieval pottery

Small Finds:

Bone: bone or ivory artefact

Brick: brick fragments

Burnt: burnt clay fragments

Clay: clay artefacts

Coin: coin

Copper: copper-alloy artefact

Glass: glass

Iron: iron artefact

Lead: lead artefact

Leather: leather artefact

Lst.: limestone

Nail: nail including fragments (the second figure is nails from animal shoes)

Quern: quernstone

Roof.: roofing stone

Sst.: sandstone

St.: other stone

Stone: stone artefact other than quern, including stone possibly used for flooring

Tile: clay tile

Wood: wooden artefact

Environmental and Technological remains:

An.: animal remains

Char.: charcoal

Coal: coal

Hum.: human remains

Moll.: molluscs

Mortar: mortar and plaster samples

Slag: metallurgical waste

| Phase | Context | Description | Fig. Nos | Artefacts and environmental remains |
|----------------|--------------------|---------------------------|----------------|---|
| Site 30 | | | | |
| 1.1 | 522 | Carbonised grain deposit | 14, 16-18 | Med. (1:10); Iron A338; An. (3) |
| 1.1 | 612 | Chalk and gravel platform | 15, 17 | Med. (1:9); Iron 46; Nail (1:-); Roof. A243; Sst. A37, A38, A158, A159; Stone A22; Tile A41; An. (88) |
| 1.1 | 629 | Clay deposit | 16 | |
| 1.1 | 644=1328 | Silt/gravel deposit | 16 | |
| 1.1 | 645=1326 | Clay deposit | 16 | |
| 1.1 | 646=1327 | Carbonised grain deposit | 16 | Nail (1:-); An. (22) |
| 1.1 | 647 | Chalk/clay deposit | 16 | |
| 1.1 | 1278 | Carbonised grain deposit | 14, 16, 17-18 | Med.; Brick A113; Burnt (26); Stone 13; An. (2) |
| 1.1 | 1326=645 | Carbonised grain deposit | | |
| 1.1 | 1327=646 | Carbonised grain deposit | | |
| 1.1 | 1328=644 | Carbonised grain deposit | | |
| 1.1 | 1332 | Carbonised grain deposit | | Burnt (7); An. (5) |
| 1.1 | 1335 | Carbonised grain deposit | 14 | Burnt (11) |
| 1.1 | 1337 | Carbonised grain deposit | 14 | |
| 1.1 | 1342 | Carbonised grain deposit | | Burnt (2); An. (24) |
| 1.1 | 1578 | Channel | 14, 20 | |
| 1.1 | 1594 | Channel fill | | An. (1) |
| 1.1 | 1639 | Carbonised grain deposit | | Iron 25 |
| 2 | 619 | | 15 | |
| 2 | 622 | Clay deposit | 15 | |
| 2 | 623 | Silt deposit | 15 | |
| 2 | 1425 | Silt deposit | | Rom.; Med. (3:4); An. (6) |
| 2 | 1466 | Pond silt | 21 | |
| 2 | 1547 | Deposit | 26 | |
| 2 | 1549 | Clay deposit | 26 | |
| 2 | 1550 | Clay/chalk deposit | 26 | |
| 2 | 1551 | Clay/chalk deposit | 26 | |
| 2 | 1552 | Silt deposit | 26 | |
| 2 | 1553 | Deposit | 26 | |
| 2 | 1554 | Deposit | 26 | |
| 2 | 1556 | Deposit | 26 | |
| 2 | 1558 | Clay/chalk deposit | 26 | |
| 2 | 1569 | Radiocarbon sample | | Wood 5 |
| 2 | 1593 | Clay deposit | 21 | |
| 2 | 1604 | Silt deposit | | An. (1) |
| 2 | 1606 | Clay/silt deposit | 21 | |
| 2 | 1619 | Silt/chalk deposit | | An. (4) |
| 2 | 1620 | Silt deposit | | Rom. |
| 2 | 1636 | Chalk pebble deposit | | Burnt (1); Quern 17; An. (8) |
| 2 | 1637 | | | An. (1) |
| 2.1 | 1299=1473 =1474 | Pond silts | | Med. (1:15) |
| 2.1 | 1303=1574 | Pond base | | |
| 2.1 | 1305=1575 | Clay bank | | |
| 2.1 | 1473=1299 =1474 | Pond silts | | Med. (1:200); Leather 2, 3; Stone A23; Wood 4; An. (1) |
| 2.1 | 1474=1299 =1473 | Pond silts | 15, 17, 20, 21 | PM; Bone 5; Iron 193; Tile A71; An. (75) |
| 2.1 | 1546 | Silt/gravel deposit | 26 | |
| 2.1 | 1555 | Deposit | 26 | |
| 2.1 | 1557 | Clay deposit | 20, 22, 26 | |
| 2.1 | 1567 | Chalk pebble surface | 20, 22 | |
| 2.1 | 1574=1303 | Valley floor | 15, 21 | |

| Phase | Context | Description | Fig. Nos | Artefacts and environmental remains |
|-------|-----------|----------------------|----------------|---|
| 2.1 | 1575=1305 | Clay bank | 15, 20, 21, 22 | Leather 4; Sst. A186; An. (1) |
| 2.1 | 1583 | Channel fill | 21 | |
| 2.1 | 1584 | Channel fill | 21 | Roof. A254 |
| 2.1 | 1585 | Channel | 20, 21, 22 | |
| 2.1 | 1586 | Channel | 20, 21, 22 | |
| 2.1 | 1603 | Channel | 20, 22 | |
| 2.1 | 1621 | Spillway blocking | 20, 22 | Med. (1:4); Iron A341; Leather 5 |
| 2.1 | 1623 | Channel fill | | Nail (1:-) |
| 2.1 | 1633 | Gravel spread | 20 | |
| 2.2 | 621 | Gravel deposit | 15 | |
| 2.2 | 639 | Pond silt | 17 | |
| 2.2 | 640 | Pond silt | 17 | |
| 2.2 | 1054=1056 | Cess-stained soil | 21 | Leather 1 |
| 2.2 | 1055 | Cess-stained soil | 21 | |
| 2.2 | 1056=1054 | Cess-stained soil | | |
| 2.2 | 1057 | Cess-stained soil | 21 | Med. (1:2) |
| 2.2 | 1058 | Cess-stained soil | 21 | |
| 2.2 | 1061 | Cess-stained soil | 21 | Lst. A226 |
| 2.2 | 1291 | Pond silt | 15, 17, 21 | |
| 2.2 | 1292 | Pond silt | 15, 17 | |
| 2.2 | 1293 | Pond silt | 15-17, 21 | |
| 2.2 | 1297 | Cess-stained soil | 15, 17, 21, 23 | Rom.; Med. (5:22); Iron A339, A340; Quern A47; Stone A27; An. (9); Slag |
| 2.2 | 1298 | Chalk pebble deposit | 15, 17 | |
| 2.2 | 1302 | Pond silt | 15-17, 21 | |
| 2.2 | 1312 | Pond silt | | Sst. A184 |
| 2.2 | 1313=1471 | Puddled pond base | | |
| 2.2 | 1314=1472 | Loam deposit | | |
| 2.2 | 1376 | Cess-stained soil | 26 | |
| 2.2 | 1383 | Clay/chalk deposit | 12 | |
| 2.2 | 1384 | Channel fill | 12 | |
| 2.2 | 1387 | Silt deposit | 12 | |
| 2.2 | 1389 | Cess-stained soil | 12 | |
| 2.2 | 1413 | Cess-stained soil | 12 | |
| 2.2 | 1414 | Cess-stained soil | 12 | |
| 2.2 | 1415 | Cess-stained soil | 12 | |
| 2.2 | 1416 | Cess-stained soil | 21, 23 | Lst. A228; Quern A62; An. (8); Slag |
| 2.2 | 1417 | Cess-stained soil | 21, 23 | |
| 2.2 | 1418 | Cess-stained soil | 21, 23 | Quern A63; An. (3) |
| 2.2 | 1419 | Cess-stained soil | 21 | |
| 2.2 | 1420 | Cess-stained soil | 12 | |
| 2.2 | 1421 | Cess-stained soil | 12 | |
| 2.2 | 1423 | Cess-stained soil | 12 | |
| 2.2 | 1424 | Cess-stained soil | 21 | |
| 2.2 | 1426 | Cess-stained soil | 12 | |
| 2.2 | 1427 | Cess-stained soil | 12 | |
| 2.2 | 1428 | Cess-stained soil | 12 | |
| 2.2 | 1429 | Cess-stained soil | 12 | |
| 2.2 | 1430 | Cess-stained soil | 12 | |
| 2.2 | 1431=1461 | Cess-stained soil | 21 | |
| 2.2 | 1432 | Cess-stained soil | 12 | |
| 2.2 | 1433 | Cess-stained soil | 12 | |
| 2.2 | 1434 | Cess-stained soil | 12 | |
| 2.2 | 1435 | Cess-stained soil | 12 | |
| 2.2 | 1436 | Cess-stained soil | 12 | |
| 2.2 | 1437 | Cess-stained soil | 12 | |
| 2.2 | 1438 | Spillway fill | 21, 23 | |

| Phase | Context | Description | Fig. Nos | Artefacts and environmental remains |
|-------|-----------|--------------------|----------------|--|
| 2.2 | 1440 | Cess-stained soil | 12 | |
| 2.2 | 1441 | Cess-stained soil | 12 | |
| 2.2 | 1442=1464 | Pond silt | | |
| 2.2 | 1443 | Pond silt | 12 | |
| 2.2 | 1444=1465 | Pond silt | | Quern A90 |
| 2.2 | 1446 | Pond silt | 12 | |
| 2.2 | 1448 | Pond silt | 12 | |
| 2.2 | 1457 | Cess-stained soil | | An. (1) |
| 2.2 | 1461=1431 | Cess-stained soil | 12 | |
| 2.2 | 1462 | Cess-stained soil | 21 | |
| 2.2 | 1464=1442 | Pond silt | 21, 23 | |
| 2.2 | 1465=1444 | Pond silt | 21, 23 | |
| 2.2 | 1468 | Pond silt | 21 | |
| 2.2 | 1469 | Cess-stained soil | 21 | |
| 2.2 | 1471=1313 | Pond silt | 15, 17, 21, 22 | An. (3) |
| 2.2 | 1472=1314 | Pond silt | 15 | |
| 2.2 | 1478 | Cess-stained soil | | |
| 2.2 | 1496 | Cess-stained soil | | An. (2) |
| 2.2 | 1515 | Pond silt | 21 | |
| 2.2 | 1516 | Cess-stained soil | 21 | |
| 2.2 | 1517 | Pond silt | 21 | |
| 2.2 | 1518 | Pond silt | 21 | |
| 2.2 | 1519 | Pond silt | 21 | |
| 2.2 | 1520 | Cess-stained soil | 21 | |
| 2.2 | 1521 | Cess-stained soil | 21 | |
| 2.2 | 1528 | Cess-stained soil | | An. (6) |
| 2.2 | 1529 | Cess-stained soil | | An. (1) |
| 2.2 | 1570 | Clay deposit | 21 | |
| 2.2 | 1571 | Clay deposit | 21, 22 | Quern A64; Stone 9 |
| 2.2 | 1572 | Clay deposit | 21 | |
| 2.2 | 1573 | Clay deposit | 15, 21, 22 | |
| 2.2 | 1576 | Silt/chalk deposit | 21 | |
| 2.2 | 1579 | Channel fill | 21 | |
| 2.2 | 1580 | Channel fill | 21 | |
| 2.2 | 1581 | Channel fill | 21 | |
| 2.2 | 1607 | Channel fill | 21 | |
| 2.2 | 1609 | Silt deposit | 21 | |
| 2.2 | 1610 | Silt deposit | 21 | |
| 2.2 | 1611 | Silt deposit | 21 | |
| 2.2 | 1613 | Silt deposit | 21 | |
| 2.2 | 1614 | Silt/clay deposit | 21 | |
| 2.2 | 1615 | Silt deposit | 21 | An. (3) |
| 2.2 | 1616 | Clay deposit | 21 | |
| 2.2 | 1626 | Clay deposit | 21 | An. (1) |
| 2.2 | 1627 | Silt deposit | 21 | Quern A134 |
| 2.2 | 1628 | Silt deposit | 21 | |
| 2.2 | 1629 | Clay deposit | 21 | An. (1) |
| 2.2 | 1630 | Silt deposit | 21 | |
| 3 | 500 | Chalk/clay deposit | 15 | Med. (8:193); Bone 8; Glass; Iron 5, A270, A282, A342-A344; Nail (3:-); St. A269, A270; An. (10) |
| 3 | 501 | Chalk/clay deposit | 15 | Med. (4:39); Iron 40; An. (1) |
| 3 | 503 | Chalk deposit | | Med. (7:75); Iron A345; Nail (1:-); Tile A33; An. (1) |
| 3 | 506 | Deposit | | Med. (3:15); An. (1) |
| 3 | 507 | Chalk/clay deposit | 24 | St. A271; An. (3); Slag |
| 3 | 523 | Chalk layer | 24 | |
| 3 | 528 | Chalk deposit | 15 | |
| 3 | 532 | Clay layer | | Med. (1:5) |

| Phase | Context | Description | Fig. Nos | Artefacts and environmental remains |
|-------|------------------|--------------------|----------------|---|
| 3 | 533 | Chalk deposit | | Iron 26 |
| 3 | 540 | Chalk deposit | | Iron A346; Nail (2:1); Stone A259; An. (15); Hum. |
| 3 | 551 | Chalk rubble | 24 | |
| 3 | 552 | Chalk/clay deposit | 24 | Med. (2:5); Iron 31; An. (15); Slag |
| 3 | 553 | Chalk deposit | 24 | Rom. |
| 3 | 554 | Chalk rubble | 24 | An. (12); Slag |
| 3 | 555 | Chalk/clay deposit | 24 | Tile A36; An. (5) |
| 3 | 556 | Chalk deposit | 15 | Med. (10:39); Burnt (8); Copper 2, 24; Glass; Iron 35; Nail (4:-); St. A262; An. (1); Hum.; Slag |
| 3 | 557=1355 | Temporary drain | 24 | Slag |
| 3 | 558 | Chalk/clay deposit | 15, 17, 24 | Rom.; Med. (1:5); Nail (1:-); St. A272; An. (5) |
| 3 | 560=596 =1024 | Chalk/clay deposit | 15, 17, 24, 26 | Med. (11:99); Nail (-:1); An. (13); Slag |
| 3 | 561 | Clay deposit | 24 | Glass; Iron 19; Nail (6:1); An. (4); Hum. |
| 3 | 562 | Chalk rubble | 24 | |
| 3 | 563 | Chalk deposit | | Med. (1:21); An. (1) |
| 3 | 564 | | | Med. (1:6) |
| 3 | 567=1263 | Chalk deposit | 16, 17, 24 | Med. (14:52); Iron A347, A348; Quern A33; An. (6) |
| 3 | 568=1285 | Chalk/clay deposit | 16, 17, 24 | Med. (1:8); An. (2) |
| 3 | 569 | Chalk/clay deposit | 24 | |
| 3 | 596=1024 =560 | Chalk rubble | | Glass |
| 3 | 600 | Chalk/clay deposit | 17, 24 | Med. (2:4) |
| 3 | 615 | Chalk/clay deposit | 15 | Med. (4:32) |
| 3 | 616 | Clay deposit | 15 | |
| 3 | 617 | Gravel deposit | 15 | |
| 3 | 620 | Chalk/clay deposit | 15 | |
| 3 | 624 | Chalk/clay deposit | 16 | Med. (1:6) |
| 3 | 630 | Clay deposit | 17 | |
| 3 | 631 | Clay deposit | 16, 17 | |
| 3 | 632 | Chalk/clay deposit | 17 | |
| 3 | 633 | Clay deposit | 17 | Nail (1:-) |
| 3 | 634 | Chalk/clay deposit | 17 | |
| 3 | 635 | Chalk/clay deposit | 17 | |
| 3 | 637 | Deposit | 17 | |
| 3 | 638 | Clay/chalk deposit | 16, 17 | |
| 3 | 641 | Clay deposit | 17 | |
| 3 | 642 | Clay deposit | 16, 17 | |
| 3 | 1024=560 =596 | Clay/chalk surface | | Quern A35, A71; An. (1) |
| 3 | 1028 | Clay deposit | 30 | |
| 3 | 1029 | Clay/chalk deposit | 30 | |
| 3 | 1030 | Clay/chalk deposit | 30 | |
| 3 | 1031 | Clay/chalk deposit | 30 | |
| 3 | 1032 | Clay/chalk deposit | 30 | |
| 3 | 1033 | Clay/chalk deposit | 30 | |
| 3 | 1034 | Clay/chalk deposit | 30 | |
| 3 | 1035 | Clay/chalk deposit | 30 | |
| 3 | 1036 | Clay/chalk deposit | 30 | |
| 3 | 1037 | Clay/chalk deposit | 30 | |
| 3 | 1040 | Clay/chalk deposit | 30 | |
| 3 | 1041 | Clay/silt deposit | 30 | |
| 3 | 1251 | Chalk rubble | | Med. (3:29); PM; Brick A111, A112; Coin; Glass; Iron 13, 15, 178; Nail (1:-); Tile A67; An. (8); Mortar |
| 3 | 1252 | Chalk/clay deposit | 26 | Iron 48, A281, A349; Nail (3:1); An. (12) |
| 3 | 1253 | Chalk/clay deposit | 24, 26 | Med.; Iron A350; Tile A68; An. (11) |

| Phase | Context | Description | Fig. Nos | Artefacts and environmental remains |
|-------|-----------|------------------------|------------|--|
| 3 | 1254 | Chalk/clay deposit | 24, 26 | Med. (17:197); Copper 11; Iron A351; Nail (2:1); Stone A27; Tile A69, A70; An. (7); Slag |
| 3 | 1256 | Clay/chalk deposit | 26 | Med. |
| 3 | 1257 | Chalk/clay deposit | 26 | Med. (7:143); Nail (1:-); Quern A46, A113, A114, A131; An. (7) |
| 3 | 1258 | Gully fill | 24 | Iron 186; Quern 18 |
| 3 | 1259 | Chalk pebble deposit | 24 | Iron 38 |
| 3 | 1260 | Bottom fill of channel | 26 | Med. (1:11); Leather 7; An. (2) |
| 3 | 1261 | Channel fill | 26 | Med. |
| 3 | 1262 | Channel | 24, 33 | Leather 6; Quern A87 |
| 3 | 1263=567 | Chalk/clay rubble | | |
| 3 | 1264 | Spillway lip | 16, 24, 26 | |
| 3 | 1267 | Chalk/clay rubble | | |
| 3 | 1269 | Chalk/clay deposit | 24, 26 | |
| 3 | 1270 | Post-hole | 24 | |
| 3 | 1271 | Post-hole | 24 | |
| 3 | 1272 | Post-hole | 24 | Sst. A183 |
| 3 | 1273 | Pebble/scree layer | 24 | |
| 3 | 1275 | Clay/chalk deposit | 24 | |
| 3 | 1276 | Post-hole | 24 | |
| 3 | 1280 | Clay deposit | 26 | |
| 3 | 1281 | Chalk/clay deposit | 24, 26 | Med. (4:87); Quern 16, A88 |
| 3 | 1282 | Clay deposit | 26 | |
| 3 | 1283 | Clay/chalk deposit | 26 | |
| 3 | 1285=568 | Chalk/clay deposit | | Med. (1:5) |
| 3 | 1287 | Chalk surface | | Med. (1:28) |
| 3 | 1289 | Chalk/clay deposit | 15, 17 | Nail (-:1) |
| 3 | 1290 | Clay deposit | 15, 17 | Iron 7 |
| 3 | 1306 | Silt deposit | 26 | |
| 3 | 1307 | Clay/chalk deposit | 26 | |
| 3 | 1308 | Silt deposit | | |
| 3 | 1354 | Channel fill | 17 | Med.; Burnt (1); Iron 22; Nail (4:3); Roof. A253; Sst.A222; St. A276; An. (3) |
| 3 | 1355=557 | Temporary drain | | |
| 3 | 1356 | Chalk/clay deposit | 17 | |
| 3 | 1357=1359 | Chalk/clay deposit | 17, 24, 26 | |
| 3 | 1359=1357 | Chalk/clay deposit | | |
| 3 | 1361 | Clay deposit | 17 | |
| 3 | 1365 | Channel fill | 26 | Med.; Nail (2:-); Quern A61; An. (1) |
| 3 | 1366 | Channel fill | 26 | Med. (1:1) |
| 3 | 1367 | Channel fill | 26 | Med. (10:54); Nail (-:2) |
| 3 | 1368 | Channel | 24, 26 | |
| 3 | 1369 | Clay/chalk deposit | 24 | |
| 3 | 1370 | Foundation trench | 24, 26 | |
| 3 | 1371 | Clay deposit | 26 | Med. (1:23) |
| 3 | 1373 | Channel fill | 26 | |
| 3 | 1374 | Channel | 24, 26 | |
| 3 | 1375 | Chalk/clay deposit | 26 | Iron A352; Nail (1:-); St. A277; An. (6); Slag |
| 3 | 1377 | Clay deposit | 24, 26 | Med. (1:1) |
| 3 | 1378 | Revetment wall | 24, 26 | |
| 3 | 1379 | Revetment | 24, 26 | |
| 3 | 1380 | Chalk deposit | 17 | |
| 3 | 1385 | Rubble layer | 12 | |
| 3 | 1387 | Silt deposit | | |
| 3 | 1388 | Clay/chalk deposit | 12 | |
| 3 | 1390 | Chalk deposit | 12 | |
| 3 | 1391 | Silt pebble deposit | 12 | |

| Phase | Context | Description | Fig. Nos | Artefacts and environmental remains |
|-------|-----------|---------------------------|----------|---|
| 3 | 1392 | Dam face | 26 | Med. (2:131); Quern A89; An. (2); Slag |
| 3 | 1393 | Clay deposit | | Med. (1:1) |
| 3 | 1394 | Chalk deposit | 26 | An. (2) |
| 3 | 1395 | Feature cut | 24, 26 | |
| 3 | 1396 | Feature fill | 26 | |
| 3 | 1397 | Channel fill | 24, 26 | Med. (3:14); Nail (-:1); Slag |
| 3 | 1398 | Feature fill | 26 | |
| 3 | 1399 | Feature fill | 26 | |
| 3 | 1400 | Feature fill | 26 | |
| 3 | 1401 | Feature fill | 26 | |
| 3 | 1402 | Feature fill | 26 | |
| 3 | 1403 | Clay/chalk deposit | 26 | Med. (14:114) |
| 3 | 1404 | Feature cut | 24, 26 | |
| 3 | 1406 | Clay deposit | 26 | |
| 3 | 1409 | Bank? | 23, 26 | |
| 3 | 1410 | Post-hole | 24 | |
| 3 | 1411 | Chalk deposit | 26 | |
| 3 | 1412 | Clay/chalk deposit | 26 | Quern A48 |
| 3 | 1413 | Chalk deposit | | Med. (3:25); Nail (2:2); An. (10) |
| 3 | 1414 | Chalk deposit | | |
| 3 | 1415 | Chalk deposit | | |
| 3 | 1451 | Channel | 24 | |
| 3 | 1452 | Channel | 24 | |
| 3 | 1475 | Clay deposit | | Med. (6:106); Nail (1:1); Quern A91-A94, A116; Sst. A185; An. (3) |
| 3 | 1490 | Clay deposit | 26 | |
| 3 | 1511 | Rubble deposit | 26 | Med. |
| 3 | 1512 | Rubble deposit | 26 | Med. (1:6); Quern A95 |
| 3 | 1544 | Clay/silt deposit | | Rom. |
| 4 | 15 | Burnt area | | Quern A51; An. (106) |
| 4 | 17 | Postpit | | An. (2) |
| 4 | 30 | Stone footing | | Clay 8; Nail (-:1) |
| 4 | 31 | Chalk pebble surface | | Med. (13:56); Iron A356, A357; Nail (1:1); An. (5); Slag |
| 4 | 43 | Chalk deposit | 30 | Med. (4:50); Lst. 225; Nail (1:1); Quern A32; An. (1) |
| 4 | 45 | Chalk rubble deposit | 30 | Med. (11:52); Nail (-:4); Quern A99; An. (14); Slag |
| 4 | 56 | | | Med. (1:9) |
| 4 | 58 | Clay/chalk deposit | | Med. (62:671); Nail (9:-2); Tile A86; An. (6); Slag |
| 4 | 1000 | Chalk concrete | 21 | Med. (3:11); Burnt (2); Iron 49-51, 53, 58, 60, 61, 63, 68, 92, A287; Nail (-:1); Quern A52, A100; Sst. A213; An. (2); Mortar |
| 4 | 1001=1045 | Chalk/gravel deposit | 21, 26 | Med. (2:28) |
| 4 | 1002=1005 | Clay lens | | |
| 4 | 1005=1002 | Clay lens | | |
| 4 | 1007 | Chalk pebbles | | Iron A361; Nail (1:1); An. (1) |
| 4 | 1011 | Chalk rubble & silt | | Med. (66:494); Iron 32, A293; Tile A87; An. (26); Slag |
| 4 | 1012=1016 | Chalk/gravel surface | | |
| 4 | 1013 | Clay/chalk rubble | | Med. (3:27) |
| 4 | 1015 | Sandy clay deposit | | |
| 4 | 1016=1012 | Chalk/gravel surface | 21, 26 | Med. (8:112); Iron 47, A362; Roof. A244; An. (10) |
| 4 | 1018=1072 | Clay sand deposit | | |
| 4 | 1022 | Clay/chalk deposit | 26 | Rom.; Med. (2:20); Nail (1:-); Quern A34, A53, A120; An. (3); Slag |
| 4 | 1025 | Clay/chalk deposit | 26 | |
| 4 | 1026 | Chalk gravel deposit | | Rom.; Copper 1 |
| 4 | 1027 | Channel fill | 28 | Med. (1:1) |
| 4 | 1043 | Clay/chalk/gravel deposit | 21 | Med. (14:158); Iron A284; An. (1) |
| 4 | 1045=1001 | Clay/chalk deposit | | |

| Phase | Context | Description | Fig. Nos | Artefacts and environmental remains |
|-------|-----------|---------------------------|----------|---|
| 4 | 1047 | Post-hole | 21 | |
| 4 | 1048 | Clay/chalk deposit | 21 | Med. (1:11) |
| 4 | 1049 | Clay/chalk/gravel deposit | 21 | Slag |
| 4 | 1050 | Clay/chalk/gravel deposit | 21 | |
| 4 | 1052 | Clay/chalk deposit | 21 | |
| 4 | 1053 | Clay/chalk deposit | 21 | |
| 4 | 1059 | | | Med. (8:22); Copper 14; Iron 65; An. (2) |
| 4 | 1063 | Clay/chalk deposit | 28 | |
| 4 | 1065 | Clay/chalk deposit | 28 | |
| 4 | 1067 | Sand/chalk/gravel deposit | 21 | Med. (2:11); An. (1) |
| 4 | 1068 | Sand/chalk/gravel deposit | 21 | |
| 4 | 1069 | Sand/chalk/gravel deposit | 21 | |
| 4 | 1070 | Sand/clay/chalk deposit | 21 | |
| 4 | 1071 | Clay/chalk deposit | 21 | |
| 4 | 1072=1018 | Clay/chalk/gravel deposit | 21 | |
| 4 | 1074 | Chalk concrete | 21 | |
| 4 | 1086 | Chalk rubble | | Med. (40:235); Iron 43, 87, A363; Quern A132; An. (5) |
| 4 | 1087 | Clay/chalk deposit | 28 | Med. (57:349); Iron 54, 99; Lst. A227; Quern A36, A37, A54; Roof. A245; An. (9) |
| 4 | 1088=1100 | Clay/chalk deposit | 28 | Med. (10:60); Iron 16; An. (4) |
| 4 | 1089 | Sandy/clay deposit | | An. (1) |
| 4 | 1098 | Sandy deposit | 28 | Med. (9:24); Quern A40; An. (2) |
| 4 | 1099 | Clay silt | | Med. (2:51); An. (1) |
| 4 | 1100=1088 | Clay/chalk gravel | | Med. (22:126); Nail (-:1); Quern A41, A42; Roof. A246, A247; An. (3) |
| 4 | 1111 | Clay/chalk rubble surface | | Med. (19:281); Nail (2:1); An. (10) |
| 4 | 1112 | Chalk cobble surface | 26 ,28 | Med. (48:379); Iron 78, A364; Quern A43, A56; An. (14) |
| 4 | 1113 | Clay/chalk pebbles | | Med. (6:70); Iron 90, 190; Roof. A248; St. A263; Tile A45; An. (1) |
| 4 | 1114 | Clay/chalk deposit | 29 | Med. (37:222); PM; Glass; Nail (-:3); Stone 1; An. (6); Slag |
| 4 | 1116 | Clay deposit | 28 | Med. (2:0); An. (2) |
| 4 | 1118 | Clay/chalk rubble | | Med. (10:70); PM; An. (2) |
| 4 | 1118/1119 | Clay/chalk rubble | | PM [NB Phase 4+8] |
| 4 | 1121 | Clay/chalk rubble | | Med. (6:13); An. (2) |
| 4 | 1124 | Chalk pebbles | | Med. (8:106); Iron 56, 59; Lst. A235; Nail (-:2); Roof. A249; Sst. A173; An. (4); Slag |
| 4 | 1125 | Chalk rubble spread | | Med. (9:38); Iron 95, 158, A295; Tile A49, A50 |
| 4 | 1126=1127 | Clay/chalk rubble | | Med. (12:64); Nail (-:1); Quern A73-A75; An. (5) |
| 4 | 1127=1126 | Chalk cobbles | | Med. (9:48); An. (3) |
| 4 | 1139 | Clay/chalk pebbles | | Med. (5:66); Glass; Nail (1:-); Quern A133; Mortar |
| 4 | 1140 | Clay loam | | Med. (19:125); Quern A102; Tile A52; An. (5) |
| 4 | 1142 | Clay loam/chalk rubble | | Med. (17:205); Copper 30; An. (14); Slag |
| 4 | 1144 | Silt/chalk blocks | | Med. (18:271); An. (2) |
| 4 | 1163 | Clay loam/chalk rubble | | Med. (1:15); Nail (1:-); An. (1) |
| 4 | 1169 | Silt/chalk deposit | | Med. (16:53); Brick A106; Iron 2, 8; Nail (5:6); Quern A81, A82; Tile A59, A60; An. 30); Slag |
| 4 | 1171 | ?Fenceline | | Med. (4:51); Nail (-:1) |
| 4 | 1175 | Post-hole fill | | Med. (1:11); Nail (1:-) |
| 4 | 1179 | Postpit | | Med. (1:3); Brick A107; St. A273; Tile A61 |
| 4 | 1183 | Clay/chalk rubble | | Med. (41:157); Lst. A236; Nail (-:2); Quern A108, A124, A125; Roof. A250, A251; Sst. A217; Tile A62; An. (6) |
| 4 | 1188 | Grit layer | | Med. (116:689); Brick A108; Iron 75, 85, 98, 100, 101, 109, 112, 114, 126, 162, A287; Nail (1:20); Quern A83, A109; Sst. A177, A218; An. (38) |
| 4 | 1199 | Chalk/silty clay deposit | | Rom.; Med.; Nail (3:1); Quern A127; Stone A26; An. (3); Slag |
| 4 | 1212 | Clay/chalk deposit | 28 | |

| Phase | Context | Description | Fig. Nos | Artefacts and environmental remains |
|-------|--------------------|--------------------------|-----------------|--|
| 4 | 1217=1225 | Cobbles | | Med. (179:1397); Iron 86, 97, A289; Nail (-:2); Quern A57-A59, A85, A112, A129; Sst. A181; Stone A24; An. (28) |
| 4 | 1218 | Clay/chalk deposit | | Med. (1:18) |
| 4 | 1225=1217 | Chalk deposit | | Med. (173:1418); Iron 72, 83, 93, 121, 125, 194, A303; Nail (-:6); Quern A130; An. (43) |
| 4 | 1227 | Sandy clay deposit | | Quern A60 |
| 4 | 1231 | Silty clay/chalk deposit | | Med. (2:11); An. (1) |
| 4 | 1235 | Chalk blocks | | Med. (1:10); Nail (-:1); An. (3) |
| 4 | 1239 | Chalk spread | | Med. (213:1445); Iron 10, 120, A368; Nail (1:9); Quern A86; An. (28); Slag |
| 4 | 1346 | Chalk surface | 26 | |
| 4 | 1347 | Clay/chalk deposit | 26 | |
| 4 | 1348 | Chalk deposit | 26 | |
| 4 | 1349 | Chalk deposit | 26 | |
| 4 | 1350 | Clay/chalk deposit | 26 | |
| 4 | 1351 | Clay/chalk bank | 26 | Quern A115 |
| 4 | 10/15 | Chalk deposit/burnt | | Clay 1 |
| 4.1 | 40 | Clay/chalk deposit | 27 | Med. (6:19); Copper 19; An. (1) |
| 4.1 | 41 | Layer | 27 | Med. (13:189); An. (5) |
| 4.1 | 42 | Layer | 27 | |
| 4.1 | 47=1095 | Chalk/pebble surface | | Med. (8:99); Nail (1:1); Quern 15; An. (1) |
| 4.1 | 51 | Pit | 27, 29 | |
| 4.1 | 53 | Layer | 27 | |
| 4.1 | 64 | Layer | 27 | |
| 4.1 | 65 | Chalk/sandstone blocks | 27 | Iron A327, A331; Lead 48; Nail (1:-) |
| 4.1 | 66 | Chalk deposit | 27 | Med. (2:3); Nail (2:-); Stone 5 |
| 4.1 | 1021=1046 =1051 | Chalk pebble surface | | Med. (1:6) |
| 4.1 | 1042 | Post-hole | 27 | |
| 4.1 | 1046=1021 =1051 | Clay/gravel deposit | 2.8, 2.12, 2.14 | Med. (63:662); Iron 62; Lst. A234; Nail (-:3); Quern 19, A72; Sst. A160-68; St. A214; Stone 12, 2; An. (43); Hum.; Slag |
| 4.1 | 1051=1021 =1046 | Clay deposit | | |
| 4.1 | 1064 | Channel | 27, 28 | |
| 4.1 | 1078 | Pit | 27 | |
| 4.1 | 1090 | Depression | 27 | |
| 4.1 | 1091 | Pit | 27, 28 | |
| 4.1 | 1095=47 | Chalk 'concrete' | 28, 29 | Med. (92:449); Iron 64, 70; Nail (-:3); Quern A55; Sst. A171; An. (8); Slag |
| 4.1 | 1096=1146 | Clay/silt deposit | 28 | Med. (16:282); Quern A39; An. (1) |
| 4.1 | 1097 | Chalk/silt deposit | 28 | |
| 4.1 | 1128a | Chalk 'concrete' | 28 | Med. (19:119); Clay 10; Iron 55, 187, A201, 33, A366; Nail (2:1); An. (9) |
| 4.1 | 1143 | Chalk rubble | | Med. (33:338); Clay 11; Quern A76; Sst. A174-A176; An. (3); Slag |
| 4.1 | 1145 | Pond silt | 28 | Leather 9, 10 |
| 4.1 | 1146=1096 | Clay pond silt | | Med. (49:671); An. (15); Slag |
| 4.1 | 1147 | Chalk/silt debris | 28 | Med. (21:285); Burnt (2); Quern A103; An. (5) |
| 4.1 | 1148 | Post-hole | 27, 28 | Lead 41; Nail (1:-); An. (1) |
| 4.1 | 1149 | Post-hole | 27, 28 | Med. (1:3); Lead 42 |
| 4.1 | 1150 | Post-hole | 27, 28 | |
| 4.1 | 1236 | Pit/depression | 27 | |
| 4.2 | 6=36 | Chalk/sandstone rubble | | Rom.; Med. (46:454); PM; Bone 2; Brick A92; Copper 6; Glass; Iron 3, 36, A330; Nail (17:1); Tile A20, A21; An. (2); Hum.; Slag |
| 4.2 | 12 | Pit cut | | Med. (243:1971); Quern A119; Sst. A152; Stone 10; An. (8) |
| 4.2 | 12a | Pit/depression | 29 | |

| Phase | Context | Description | Fig. Nos | Artefacts and environmental remains |
|-------|----------------|------------------------|----------------|--|
| 4.2 | 13=33 =1094 | Chalk & pebble surface | | Med. (78:556); Brick A99; Copper 25; Iron 57; An. (17); Slag |
| 4.2 | 18 | Feature cut | 29, 31 | Med. (3:3); Copper 26; An. (2); Slag |
| 4.2 | 21 | Chalk/pebble surface | 30 | Med. (9:20); Nail (-:3); Tile A27; An. (2) |
| 4.2 | 22 | Stone footing | 29, 30 | Nail (1:-) |
| 4.2 | 24 | Chalk/gravel surface | 29, 30 | Rom.; Med. (37:216); PM; Iron 1; Nail (6:2); Quern A29; Tile A30; An. (10); Hum.; Slag |
| 4.2 | 25 | Feature cut | 29, 31 | Copper 16; Nail (18:2); Slag |
| 4.2 | 26 | Feature cut | 29 | PM |
| 4.2 | 27 | Feature cut | 29, 31 | PM; Nail (2:-); Slag |
| 4.2 | 29 | Feature cut | 29 | Med. (1:6); Glass; Nail (-:1); An. (1) |
| 4.2 | 30 | Stone footing | 29 | Med. (1:13) |
| 4.2 | 32 | Stone footing | 29 | |
| 4.2 | 33=13 =1094 | Chalk & pebble surface | | Med. (14:85); Copper 17; Nail (1:2); An. (3); Slag |
| 4.2 | 36=6 | Chalk/sandstone rubble | 30 | Rom.; Med. (28:414); Glass; Nail (8:1); Quern A30; Roof. A241; Sst. A154, A155; Tile A31; An. (9); Mortar |
| 4.2 | 39 | Chalk deposit | | Rom.; Med. (2:5); Iron 37, A354, A355; Nail (-:2); Stone 3, 6, A258 |
| 4.2 | 44 | Stone footing | 29, 30 | |
| 4.2 | 46=50 | Clay deposit | | Med. (15:118); An. (123) |
| 4.2 | 48 | Pit/depression | 29, 32 | Nail (-:1) |
| 4.2 | 50=46 | Clay/chalk deposit | 29, 30 | Med. (1:2); An. (1); Hum. |
| 4.2 | 55 | Post-hole | 29 | An. (9) |
| 4.2 | 636 | Chalk rubble/clay | 16, 17 | |
| 4.2 | 1094=13 =33 | Chalk 'concrete' | 28, 29, 30, 32 | Med. (34:300); Nail (2:3); Quern A38, A101, A121; An. (1); Slag |
| 4.2 | 1128 | Post-hole | 29 | |
| 4.2 | 1129 | Post-hole | 29 | |
| 4.2 | 1130 | Post-hole | 29 | |
| 4.2 | 1131 | Post-hole | 29 | |
| 4.2 | 1131a | Post-setting | 29 | |
| 4.2 | 1132 | Post-hole | 29 | |
| 4.2 | 1133 | Post-hole | 29 | |
| 4.2 | 1134 | Post-hole | 29 | |
| 4.2 | 1135 | Post-hole | 29 | |
| 4.2 | 1136 | Post-hole | 29 | |
| 4.2 | 1137 | Post-hole | 29 | Med. (1:34) |
| 4.2 | 1138 | Pit | 29 | Med. (1:51); Brick A105; Iron A296, A326; Tile A51 |
| 4.2 | 1153 | Channel | 28, 29, 32 | Med. (30:158); Copper 8, 15; Iron 29; Nail (1:-); Quern A104; Tile A53; An. (2); Slag |
| 4.2 | 1154 | Channel | 29 | Med. |
| 4.2 | 1164 | Cobbled surface | | Med. (98:850); Glass; Iron 52, 67, 69, 73, 74, 77, 79, 80, 82, 84, 88, 89, 91, 94, 96, 102-4, 106, 108, 110, 115-19, 122-4 127, 151, 152, 154-6, 159, 163, 164, 188, A286, A297-A301; Nail (4:39); Quern A77-A80, A105, A106, A122, A123; Sst. A216; Tile A55, A56; An. (85); Slag |
| 4.2 | 1172 | Post-hole | 29 | Med. (2:17) |
| 4.2 | 1174 | Post-hole | 28, 29 | Med. (3:21); An. (5) |
| 4.2 | 1176 | Post-hole | 29 | |
| 4.2 | 1177 | Post-hole | 29 | Nails (-:1) |
| 4.2 | 1178 | Post-hole | | Med. (3:19) |
| 4.2 | 1182 | Feature cut | 28, 29 | Med. (1:29); An. (1) |
| 4.2 | 1186 | Post-hole | 28 | |
| 4.2 | 1187 | Post-hole | 29 | |
| 4.2 | 1189 | Deep cut channel | 28, 29, 31, 32 | |
| 4.2 | 1194 | Post-hole | 29 | Med. |

| Phase | Context | Description | Fig. Nos | Artefacts and environmental remains |
|-------|---------|----------------------------|------------|---|
| 4.2 | 1197 | Pit | 29 | |
| 4.2 | 1198 | Channel fill | | Med. (25:231); Nail (-:1); An. (1) |
| 4.2 | 1203 | Post-hole | 29 | |
| 4.2 | 1204 | Pit | 29 | Rom.; Med. (1:1); |
| 4.2 | 1205 | Chalk gravel | | Med.; Nail (1:-) |
| 4.2 | 1208 | South end of 1189 | 29, 32 | |
| 4.2 | 1209 | Channel fill | | Med. (8:61); Nail (-:3); St. A274; An. (1) |
| 4.2 | 1211 | Clay/pebble channel lining | 28 | |
| 4.2 | 1213 | Channel fill | 28 | |
| 4.2 | 1214 | Channel fill | 28 | Med. (12:68); Nail (1:2); Sst. A219; St. A275 |
| 4.2 | 1215 | Channel fill | 28 | |
| 4.2 | 1216 | Cobbled surface | 28, 29 | Med. (27:590); Burnt (21); Clay A14; Iron 107, 111, 113; Nail (1:3); Quern A128; An. (24); Mortar |
| 4.2 | 1232 | Stone footing | 29 | Med. (32:180); Nail (-:2); Sst. A220, A221; An. (5) |
| 4.2 | 1233 | Flat stone blocks | 29 | |
| 4.3 | 5=23 | Clay/chalk rubble | | Rom.; Med. (27:184); PM; Brick A91; Copper 18; Glass; Iron 27, 157; Nail (13:1); Quern A96; Roof. A238; St. A266; Tile A19; An. (21) |
| 4.3 | 7 | Chalk pebble surface | 30, 32 | Rom.; Med. (60:551); PM; Brick A93-A96; Burnt (1); Glass; Iron 12; Lead 32; Lst. A233; Nail (7:3); Tile A22-A24, A85; An. (11); Slag |
| 4.3 | 7+8 | Chalk rubble | | PM; Brick A97; Lead 37; Nail (1:-); Roof. A239; Sst. A150; An. (3); Slag |
| 4.3 | 8 | Chalk rubble deposit | 30 | Med. (12:126); PM; Bone 3; Glass; Nail (4:1); An. (2); Slag |
| 4.3 | 9=1093 | Clay deposit | | Med. (48:452); PM; Iron 165, 166; An. (3) |
| 4.3 | 10=1224 | Chalk rubble/clay | | Med. (85:634); PM; Clay A25; Glass; Quern A97; Tile A25; An. (6) |
| 4.3 | 11 | Revetment | 30, 32 | Med. (225:2261); Brick A98; Clay 5, 6; Glass; Nail (2:2); Quern 20, A98; Sst. A151; An. (20) |
| 4.3 | 14 | Clay rubble surface | | |
| 4.3 | 19 | Stone footing | 21, 30-32 | Med. (5:12) |
| 4.3 | 20 | Revetment | 30 | Nail (-:1); An. (1) |
| 4.3 | 23=5 | Chalk/silt deposit | 30 | Rom.; Med. (61:901); PM; Clay 2; Glass; Iron; Copper 13; Iron 12, 23, 28, 104, 153, 160, 161, 191, A286, A349, A350; Lead 31; Lst. A224; Nail (14:16); Roof. 240; Sst. A153; St. A268; Tile A28, A29; An. (104); Slag |
| 4.3 | 37 | Silt/clay deposit | 30 | Med. (32:228); Iron 66, A283, A291; Nail (2:7); Quern A31; Roof. A242; Sst. A156, A157; Stone A25, A257; Tile A32; An. (20); Slag |
| 4.3 | 38 | Clay/chalk deposit | 30 | Med. (2:4); Nail (-:2); An. (3); Slag |
| 4.3 | 1093=9 | Chalk/clay deposit | 28, 30, 32 | Med. (162:852); Glass; Iron 14, 34, 81, A285, A294; Nail (2:2); Sst. A169, A170; Tile A42; An. (19); Slag |
| 4.3 | 1122 | Clay/silt deposit | 32 | Med. (105:1490); Stone 4; An. (1) |
| 4.3 | 1123 | Clay/silt deposit | 32 | Med. (16:150); Iron A365; An. (1); Slag |
| 4.3 | 1167 | Clay/chalk pebbles | | Med.; Iron A367; Nail (3:3); An. (2) |
| 4.3 | 1168 | Chalk deposit | | Med. (25:116); Nail (1:14); Quern A107; Tile A57, A58 |
| 4.3 | 1181 | Chalk pebble spread | 31 | Med. (23:252); Nail (1:-); An. (15) |
| 4.3 | 1185 | Circular feature | 32 | |
| 4.3 | 1190 | Channel fill | 31 | Med. (35:392); Iron 18, A288, A302; Nail (2:-); Quern A110, A126; Roof. A252; Sst. A178; An. (11); Slag |
| 4.3 | 1191 | Channel fill | 28, 31 | Med. (11:278); Quern A44, A111; An. (5); Mortar |
| 4.3 | 1192 | Chalk rubble | 31, 32 | Med. (3:20); Nail (1:-); An. (1) |
| 4.3 | 1193 | Chalk/clay deposit | 32 | Med. (14:37); Quern A84; Sst. A179, A180; Tile A63; An. (1) |
| 4.3 | 1200 | Blocking wall | 32 | Quern A135 |
| 4.3 | 1201 | Post-hole | 29, 32 | |
| 4.3 | 1205 | Channel fill | | |
| 4.3 | 1218 | Post-hole | 31 | |

| Phase | Context | Description | Fig. Nos | Artefacts and environmental remains |
|-------|-----------------|--------------------------|----------|--|
| 4.3 | 1219 | Part of footing 19 | 31, 32 | |
| 4.3 | 1222 | Post-hole | 31, 32 | Med.; Nail (-:1); Tile A64 |
| 4.3 | 1223 | Chalk/pebble surface | 31, 32 | |
| 4.3 | 1224=10 | Chalk rubble surface | 30, 32 | Med. (23:182); Quern A45; An. (36) |
| 4.3 | 1229 | Channel fill | | Rom.; Med. (5:184); Nail (1:-); An. (3); Slag |
| 4.3 | 1234 | Channel fill | | Med.; Lead 49; Nail (3:10); An. (2) |
| 4.3 | 1240 | Channel base | | Med. (1:12); Iron A369 |
| 4.3 | 1241 | Gritty clay deposit | | Med.; Sst. A182 |
| 5 | 2=1092 =1115 | Chalk rubble surface | 30 | Med. (31:399); PM; Glass; Iron 45, 128, 167, A304, 189; Nail (8:-); Tile A18; An. (6); Slag |
| 5 | 3 | Soil deposit | 30 | Med. (3:15); PM |
| 5 | 4 | Chalk/stone rubble | 30 | Med. (4:34); PM; Glass; Iron A305 |
| 5 | 28 | Pit | 32 | Med. (1:24) |
| 5 | 604 | Silt deposit | 15 | Glass; Iron 41; Leather 11; An. (10); Hum. |
| 5 | 605 | Clay deposit | 15 | |
| 5 | 606 | Chalk/clay deposit | 15 | |
| 5 | 607 | Clay deposit | 15 | |
| 5 | 608 | Clay deposit | 15 | |
| 5 | 609 | Gravel deposit | 15 | |
| 5 | 610 | Clay deposit | 15 | Med. (3:64); Wood 3; An. (3) |
| 5 | 611 | Pond silt | 15 | Rom.; Leather 12-14; An. (2) |
| 5 | 613 | Deposit | | |
| 5 | 614 | Deposit | | |
| 5 | 1092=2 =1115 | Clay/chalk soil deposit | 28, 30 | |
| 5 | 1110 | Clay/chalk deposit | 28 | Med. (1:20); Tile A43, A44 |
| 5 | 1115=2 =1092 | Clay/pebble deposit | | Med. (1:171) |
| 5 | 1120 | Clay/chalk rubble spread | | Med. (5:298); PM; Sst. A172; St. A215 |
| 5 | 1157 | Chalk pebble surface | | Copper 20 |
| 5 | 1173 | Post-hole | 32 | |
| 6 | 582 | Wall | 33 | |
| 6 | 588 | Wall | 33 | |
| 6 | 589 | Chalk pebble deposit | 33 | Glass; Iron 20, 42, 185; Nail (2:-) |
| 6 | 591 | Clay/chalk deposit | 33 | Med. (1:24); An. (1); Slag |
| 6 | 592 | Chalk rubble | 33 | |
| 6 | 597 | Oak plank | 33 | |
| 6 | 599=1284 | Clay packing | 33 | Med. (1:54); Bone 9; Iron 24, 179; Stone 7; Tile A40 |
| 6 | 1284=599 | Clay deposit | | Med. |
| 7.1 | 546 | Clay deposit | 33 | Glass; Iron A205, A207, A217, A218, A221, A250, A261, A378, A379; Nail (7:-); An. (1) |
| 7.1 | 548=584 | Brick outflow pipe | 33 | |
| 7.1 | 572 | Chalk rubble | 33 | |
| 7.1 | 573 | Chalk gravel | 33 | |
| 7.1 | 574 | Chalk deposit | 33 | Bone 4 |
| 7.1 | 575 | Chalk deposit | 33 | |
| 7.1 | 576 | Deposit | 33 | |
| 7.1 | 578 | Chalk deposit | 33 | |
| 7.1 | 579 | Chalk/clay deposit | 33 | Copper 7; Glass; Iron A214, A215, A324; Nail (1:-) |
| 7.1 | 580 | Clay/chalk deposit | 33 | |
| 7.1 | 581 | Brick wall | 33 | |
| 7.1 | 583 | Outflow pipe | 33 | |
| 7.1 | 584=548 | Brick outflow pipe | | Coin |
| 7.1 | 585 | Outflow pipe | 33 | |
| 7.1 | 586 | Brick wall | 33 | |
| 7.1 | 590 | Chalk rubble deposit | 33 | |
| 7.1 | 626 | Chalk/clay deposit | 16 | |

| Phase | Context | Description | Fig. Nos | Artefacts and environmental remains |
|-------|------------|-----------------------|-------------------|--|
| 7.1 | 627 | Clay deposit | 16 | |
| 7.2 | 537 | Chalk rubble | | |
| 7.2 | 538 | Chalk deposit | | Med. (2:3); Glass; Iron A204, A213, A220, A222, A239, A249, A257, A333; Nail (8:1); An. (4); Hum. |
| 7.2 | 541 | Deposit | | |
| 7.2 | 543 | Chalk rubble | | Glass; An. (1) |
| 7.2 | 544 | Deposit | | PM; Clay A13; Glass; Tile A34 |
| 7.2 | 545 | Deposit | | Med. (1:7); Bone 11; Glass; Iron A200, A209, A217, A239, A241, A248, A260, A261, A277, A312, A329; Nail (7:-); An. (2) |
| 7.2 | 550 | Rubble | | Med. (1:3); Brick A100, A101; Glass; Nail (1:-); Tile A35 |
| 7.2 | 570 | Chalk rubble | | Med. (1:7); Bone 11; Glass; Iron A201, A209, A217, A239, A241, A248, A260, A261, A277, A312, A329; Nail (7:-); An. (2) |
| 7.2 | 571 | Clay/chalk deposit | | |
| 7.2 | 577 | Chalk gravel | | Iron A212, A380; Tile A37; An. (1) |
| 7.2 | 587 | Chalk rubble | | Copper 4; Glass; Iron A196, A199, A203, A211, A219, A272, A275, A316, A321, A377; Nail (14:3); Tile A38; Wood 1; An. (1); Slag |
| 7.2 | 594 | Gravel/pebble deposit | 15 | Med. (1:6); Brick A102; Iron A206, A273, A274, A313; Nail (2:-); Tile A39 |
| 7.2 | 625 | Humus/chalk deposit | 16 | Med. (2:30) |
| 7.2 | 628 | Humus/chalk deposit | 16 | |
| 8 | 16 | Waterworks trench | 21, 27, 29-30, 32 | Rom.; Med. (66:675); PM; Clay 7; Coin 4; Glass; Iron A195, A235, A241, A306, A381, A382; Nail (3:2); Quern A70; St. A267; Stone A260; Tile A26; An. (17); Hum.; Slag |
| 8 | 1119 | Pit | 28 | Med. (23:471); Clay 9; Glass; Iron 129, A311; Tile A47, A48; An. (9) |
| 8 | 1151 | Pit | 28 | Med. (1:36) |
| 8 | 1155 | Pit | 29, 32 | |
| 8 | 1156 | Pit fill | | Med. (2:2); PM; Copper 21; Glass; Iron A223, A322; Nail (2:3); Tile A54; An. (3) |
| 8 | 1228 | Post-hole | | Med. (8:54); Brick A109 |
| | 1=1101 | Topsoil | | Rom.; Med. (1:26); PM; Bone 1, 7, 10; Brick A89, A90; Burnt (1); Clay 4, A12; Coin 1, 2; Copper 5, 12, 22; Glass; Iron 71, 131, 132, 134, 139-144, 146-150, 169, 171-177, 180, 183, 184, A197, A198, A202, A209, A210, A224-A229, A231-A234, A236, A237, A242-A245, A248, A251, A253-A256, A258, A262-A265, A267, A271, A276, A277, A280, A312, A318, A320, A323, A325, A334-A337, A383, A391; Lead 33, 34, 44-47; Nail (139:40); Quern A49, A50, A65-A69, A117, A118; Roof. A237; Sst. A211, A212; St. A264, A265; Stone 11; Tile A16, A17; An. (150); Hum.; Mortar; Slag |
| | 1044 | Clay/chalk rubble | 21 | |
| | 1101=1117 | Topsoil | | Med. (3:14) |
| | =1=1250 | | | |
| | 1117=1 | Topsoil | 26, 28, 30 | Med. (54:1220); PM; Brick A104; Glass; Iron 130, 133, 136-138, 145, 168, A252, A266, A269, A307-A310; Nail (6:1); Tile A46; An. (38); Hum.; Slag |
| | =1101=1250 | | | |
| | 1250=1 | Topsoil | | Med.; PM; Brick A110; Glass; Iron 135, 181, 182, A230, A279, A319; Leather 15; Nail (16:5); Tile A65, A66; An. (17) |
| | 595 (U/S) | Silt deposit | | PM; Wood 2; An. (5); Hum. |
| | 648 (U/S) | Natural clay | 15, 16, 17 | Nail (7:-) |
| | 1062 (U/S) | | | Med. (4:35); Brick A103; An. (2) |
| | 1247 (U/S) | | | Med. (1:4) |
| | 1513 (U/S) | | | Med. (3:24); An. (1) |
| | 1522 (U/S) | | | An. (1) |

| Phase | Context | Description | Fig. Nos | Artefacts and environmental remains |
|-------|---------|------------------|----------|---|
| | (U/S) | | | PM; Clay 3; Iron A268, 170; Lead 43; Nail (1:-); Roof. A255, A256; St. A278; Tile A72; An. (17) |
| | 1207 | Natural hillwash | 28 | |

Site 67

| | | | | |
|---|----|--|--|-------------------------|
| 3 | 46 | | | Fibres |
| 4 | 40 | | | Lead 36; Tile A73; Slag |

Site 71

| | | | | |
|-----|-----|----------------------|----------------|------------------------------------|
| 1.1 | 44 | Post pad | 14, 20, 22, 24 | |
| 1.1 | 48 | Clay bank | | Med. (2:26) |
| 1.1 | 65 | Channel | 14, 22 | |
| 1.1 | 92 | Post pad | 14, 20, 22, 24 | |
| 1.1 | 105 | Gravel bank | 14, 20, 22 | Med. (3:20) |
| 1.1 | 110 | Natural clay | 14, 20, 22 | |
| 1.1 | 111 | Clay bank | 14, 20, 22 | |
| 1.1 | 116 | Erosion hollow | 14 | |
| 1.1 | 131 | Planks and wattle | 14, 18 | Tile A88; Wood 7-17; An. (7); Slag |
| 1.1 | 144 | Clay/silt deposit | | Lead 38 |
| 1.1 | 175 | Post-hole | 14 | |
| 1.1 | 177 | Channel | 14 | |
| 1.1 | 178 | Rectangular feature | 14 | |
| 1.1 | 238 | Clay bank | 18, 25 | Med. (35:235); An. (3) |
| 1.1 | 242 | Clay/chalk deposit | | An. (2) |
| 1.1 | 245 | Chalk platform | 14, 20, 22, 25 | |
| 1.1 | 253 | Silt/clay deposit | 18 | |
| 1.1 | 257 | Post setting | | Quern 21 |
| 1.1 | 258 | Clay deposit | 14, 20, 22, 25 | |
| 1.1 | 260 | Clay bank | 14, 25 | |
| 1.1 | 263 | Channel | 14, 18, 25 | |
| 1.1 | 270 | Post setting | 14, 20, 22 | |
| 1.1 | 271 | Post setting | 14, 20, 22 | |
| 1.1 | 272 | Post-hole | 14, 20, 22 | |
| 1.1 | 273 | Depression | 14, 20, 22, 24 | |
| 1.2 | 41 | Wall | 20, 22 24 | |
| 1.2 | 45 | Clay surface | 20, 22 | |
| 1.2 | 107 | Pond silt | 20, 22 | |
| 1.2 | 114 | Water-washed pebbles | | |
| 1.2 | 115 | Silt deposit | | Wood 6 |
| 1.2 | 118 | Pebble deposit | | Med. (1:12) |
| 1.2 | 119 | Channel fill | | |
| 1.2 | 136 | Silt deposit | | Copper 10 |
| 1.2 | 156 | Cementstone deposit | | |
| 1.2 | 158 | Silt deposit | | An. (3) |
| 1.2 | 163 | Gravel deposit | | An. (2) |
| 1.2 | 176 | Fill of 175 | | Med. (1:11) |
| 1.2 | 179 | Cementstone deposit | 20, 22 | |
| 1.2 | 243 | Channel fill | 18 | |
| 1.2 | 248 | Channel fill | 18 | |
| 1.2 | 249 | Channel fill | 18 | |
| 1.2 | 250 | Channel fill | 18 | |

| Phase | Context | Description | Fig. Nos | Artefacts and environmental remains |
|---------|---------|----------------------|----------------|---|
| 1.2 | 251 | Channel fill | 18 | |
| 1.2 | 252 | Channel fill | 18 | |
| 1.2 | 254 | Channel fill | 18 | |
| 1.2 | 255 | Channel fill | 18 | |
| 2 | 85 | Silt deposit | | Med. (1:21); An. (4) |
| 2 | 86 | Silt/chalk deposit | | Med. (9:89); An. (3) |
| 2 | 139 | Silt/chalk deposit | | Med. (1:2) |
| 2 | 141 | Silt/chalk deposit | | ?Roman; Sst. A223; Stone 14; An. (5) |
| 2 | 142 | Chalk/gravel deposit | | Med. (2:3) |
| 2 | 151 | Silt/clay deposit | | Iron 4; An. (2) |
| 2 | 152 | Gravel deposit | | An. (1) |
| 2 | 219 | Chalk surface | | |
| 2 | 240 | Gravel deposit | | Med. (15:174) |
| 2.1/1.2 | 112 | Gravel deposit | | |
| 2.1/1.2 | 241 | Channel fill | 18 | |
| 2.1/1.2 | 246 | Channel fill | 18 | Med. (4:46); Nail (-:1); An. (1) |
| 2.1/1.2 | 247 | Channel fill | 18 | Quern A149 |
| 2.1/1.2 | 256 | Channel fill | 18 | |
| 2.1/1.2 | 259 | Clay bank | 20, 22, 25 | |
| 2.1/1.2 | 262 | Channel recut | 18, 22, 25 | |
| 2.1/1.2 | 265 | Channel | 20, 22, 24, 25 | |
| 2.1/1.2 | 268 | Channel recut | 18 | |
| 2.1/1.2 | 269 | Channel recut | 18 | |
| 3 | 9 | Channel fill | | Med. (8:29) |
| 3 | 11 | Gravel deposit | | Med. (3:13) |
| 3 | 12=66 | Gravel deposit | | Med. (1:5); Iron A353; Leather 8 |
| 3 | 14 | Gravel deposit | | Tile A79 |
| 3 | 16 | Gravel deposit | | Med. (1:42) |
| 3 | 66=12 | Pebble deposit | | |
| 3 | 93 | Wall | 24 | |
| 3 | 202 | Wall | 18, 24, 26 | |
| 3 | 209 | Chalk yard surface | 25 | Quern A146 |
| 3 | 214 | Wall | 24 | |
| 3 | 216 | Clay wall packing | 24 | |
| 3 | 217 | Chalk rubble | 24 | |
| 3 | 218 | Wall | 24 | |
| 3 | 219 | Chalk layer | 25 | |
| 3 | 220 | Gravel lens | 25 | Med. (17:123); An. (2) |
| 3 | 221 | Clay/silt deposit | | Nail (1:-) |
| 3 | 225 | Channel fill | | Med. (2:41); Brick A114; Quern A147; Sst. A205-A209; An. (10) |
| 3 | 233 | Clay/silt deposit | 24 | Iron 21; Nail (2:-) |
| 3 | 234 | Channel recut | 25 | |
| 3 | 235 | Clay bank | 24, 25 | Nail (-:1) |
| 3 | 236 | Earth & clay bank | 24 | |
| 3 | 237 | Rubble deposit | | Med. (6:43); Sst. A210; An. (14) |
| 3 | 239 | Chalk layer | 25 | An. (1) |
| 3 | 261 | Channel | 24, 25 | |
| 4 | 3 | Chalk pebbles | | Med. (1:39) |
| 4 | 4 | Chalk rubble | | Med. (2:4) |
| 4 | 27 | Chalk/gravel rubble | | |
| 4 | 29 | Chalk/gravel pebbles | | |
| 4 | 30 | Chalk pebbles | | Clay 8 |
| 4 | 33 | Chalk pebbles | | |
| 4 | 71 | Silt organic deposit | 25, 34, 35 | Med. (2:45); An. (3) |
| 4 | 81 | Silt/chalk deposit | 25, 34 | Med. (2:65); Sst. A189; An. (1) |
| 4 | 102 | Channel recut | 14, 25 | Med. (1:2) |

| Phase | Context | Description | Fig. Nos | Artefacts and environmental remains |
|-------|---------|--------------------------|------------|--|
| 4 | 130 | Wall | 25, 34, 35 | Med. |
| 4 | 132 | Channel recut | 25, 34, 35 | Med. (1:7) |
| 4 | 155 | Chalk surface | 25 | |
| 4 | 191 | Ash/organic deposit | 25, 34, 35 | Glass; An. (9) |
| 4 | 192 | Chalk rubble | 34, 35 | Med. (32:463); Burnt (1); Glass; Iron 39, A370; Nail (2:2); Quern A142; Sst. A190-A194; An. (85); Slag |
| 4 | 193 | Silt/chalk deposit | 25 | Med. (1:7); Nail (1:-); Tile A83; An. (37) |
| 4 | 194 | Ash/rubble deposit | 34, 35 | Med. (3:48); An. (3) |
| 4 | 195 | Ash deposit | 25 | Med. (2:24); An. (1) |
| 4 | 196 | Carbonised grain deposit | 25, 34 | Med. (101:2597); Burnt (9); Iron 17, 192, A328; Lst. A230; Nail (88:9); Quern A136, A143, A144; Sst. A195-A202, A325; Stone 8; Tile A84; An. (289); Slag |
| 4 | 197 | Rubble deposit | 25 | |
| 4 | 200 | Slumpage layer | 14 | Med. (33:860); Clay A15; Iron A329; Lst. A231, A232; Nail (4:-); Quern A145; An. (90) |
| 4 | 206 | Ash deposit | | Med. (10:117); Burnt (1); Iron A371, A372; Nail (11:-); Sst. A203; An. (129) |
| 4 | 208 | Ash deposit | 25 | Med. (11:259); Nail (1:2); An. (52) |
| 4 | 211 | Ash deposit | | Med. (8:103); Burnt (2); Iron 30; Nail (14:1); An. (71) |
| 4 | 213 | Carbonised grain deposit | | Med. (5:138); Burnt (2); Copper 23; Nail (5:-); Sst. A204; An. (81) |
| 4 | 215 | Rubbish dump | | An. (1) |
| 4 | 224 | Carbonised grain deposit | 25 | Med. (1:6); Burnt (4); Nail (2:2); An. (4) |
| 4 | 226 | Clay/silt deposit | 25 | Med. (1:3); Nail (1:-); Quern A148; Stone A28; An. (5) |
| 4 | 227 | Ash/organic deposit | 25 | |
| 4 | 228 | Chalk rubble | 25 | Copper 9 |
| 4 | 229 | Ash deposit | 25 | |
| 4 | 230 | Clay/chalk deposit | 25 | Nail (1:-) |
| 4 | 231 | Ash deposit | 25 | |
| 4 | 236 | Earth & clay bank | | Med. (4:56) |
| 4/5 | 203 | Silt/chalk surface | 25 | Med. (2:61) |
| 4/5 | 204 | Construction surface | 25 | Med. (2:51) |
| 4/5 | 222 | Silt/chalk deposit | 25 | Med. (5:10) |
| 4/5 | 223 | Silt/chalk deposit | 25 | Med. (8:101); An. (1) |
| 5 | 5=6 | Silt/chalk deposit | | Med. (1:15); Iron A373 |
| 5 | 6=5 | Silt/chalk deposit | | Med. (2:190) |
| 5 | 80 | Chalk rubble surface | 25, 35, 36 | Med. (78:860); Bone 12; Nail (1:-); Quern A139, A140; An. (52) |
| 5 | 82 | Ash/rubble deposit | | Med (14:188); Iron 6 |
| 5 | 94 | Channel fill | 25 | Med. (6:194); Copper 27; An. (3) |
| 5 | 95 | Silt surface | 25 | Med. (6:37); Iron A374; Nail (1:-) |
| 5 | 96 | Post-hole | 35 | |
| 5 | 97 | Clay/silt deposit | | Med. (1:1); Nail (1:-) |
| 5 | 98 | Post-hole | 35 | |
| 5 | 100 | Tree hole | 35 | |
| 5 | 121 | Channel fill | | Med. (3:18); An. (1) |
| 5 | 123 | Pit | 25 | |
| 5 | 124 | Post setting | 35 | |
| 5 | 125 | Post-hole | 35 | |
| 5 | 127 | Fence slot | 35 | |
| 5 | 137 | Silt deposit | | Med. (1:34) |
| 5 | 138 | Chalk rubble deposit | | Med. (22:308); Quern A141; An. (13) |
| 5 | 145 | Clay/silt deposit | 25 | Med. (9:61); Iron A375; An. (1) |
| 5 | 146 | Clay/silt deposit | | Med. (1:3); An. (6) |
| 5 | 147 | Chalk rubble deposit | | Med. (60:842); Nail (3:-); An. (41) |
| 5 | 148 | Clay/silt deposit | | Med. (57:635); Iron A376; Nail (1:-); An. (74) |
| 5 | 189 | Ash/chalk pebbles | 25, 35 | Med. (5:70); An. (5) |

| Phase | Context | Description | Fig. Nos | Artefacts and environmental remains |
|-------|-----------|----------------------|----------|--|
| 5 | 201 | Clay/silt deposit | | Med. (4:43); An. (3) |
| 6 | 15 | Occupation surface | 25, 36 | Med. (158:2098); Burnt (1); Copper 35; Glass; Iron 44; Nail (7:-); Quern A137; Sst. A187, A188 |
| 6 | 70 | Post-hole | 36 | Med. (1:3); Quern A138; Tile A81; An. (2) |
| 6 | 74 | Post-hole | 36 | |
| 6 | 77 | Post-hole | 36 | |
| 6 | 83 | Post-hole | 36 | |
| 6 | 84 | Post-hole fill | | Med. (1:7); An. (6) |
| 6 | 91 | Chalk rubble surface | 25 | Lead 39; Nail (2:-); An. (6) |
| 7 | 18 | Post-hole | 36 | |
| 7 | 57 | Post-hole | 25, 36 | |
| 7 | 59 | Post-hole | 36 | |
| 7 | 61 | Wooden stake | 36 | |
| 7 | 62 | Post-hole | 36 | |
| 7 | 68 | Post-hole | 36 | |
| 7 | 264 | Trackway | 25, 36 | |
| 8 | 2 | Topsoil | 25 | Med. (11:24); Copper 28; Iron A246, A314, A317; Lead 40; Nail (1:-); Stone A261; Tile A75, A76 |
| 8 | 7 | Chalk rubble | 25 | Med.; Bone 6; Glass; Lead 35; Nail (1:-); Tile A77, A78 |
| 8 | 8 | Turf line | 25 | Med. (1:6) |
| 8 | 10 | Silt/loam deposit | | Med. (2:40) |
| 8 | 13 | | | Med. (1:4) |
| 8 | 21 | Clay/silt deposit | | Med. (1:29) |
| 8 | 55 | | | Med. (11:89); Glass; Lst. A229; Tile A80 |
| 8 | 64 | Post-hole fill | | Med. (1:1) |
| 8 | 67 | Chalk rubble | 36 | |
| 8 | 78 | Wooden stake | 36 | |
| 8 | 165 | Clay/silt deposit | 25 | Med. (15:266) |
| 8 | 166 | Clay/silt deposit | 25 | |
| 8 | 167 | Chalk rubble | 25 | |
| 8 | 169 | Clay/silt deposit | 25 | |
| 8 | 170 | Topsoil/chalk mix | 25 | |
| 8 | 171 | Post-hole | 25 | |
| 8 | 180 | Post-hole | 25 | Med. (4:127) |
| 8 | 181 | Post-hole | 25 | |
| 8 | 183 | Layer | 25 | |
| 8 | 184 | Layer | 25 | |
| 8 | 185 | Modern debris | 25 | |
| 8 | 186 | Silt/chalk surface | | Med. (1:38) |
| | 1 (U/S) | | | Med. (16:326); Tile A74; Slag |
| | 56 (U/S) | Silt/chalk deposit | | Med. (1:32); Iron A392 |
| | 190 (U/S) | Cleaning layer | | Med. (6:152); Burnt (1); Nail (-:1); Tile A82; An. (19) |
| | 207 (U/S) | Silt/chalk deposit | | Med. (2:40); Burnt (1) |
| | (U/S) | | | Med. (2:24); Copper 29 |

Bibliography

Abbreviations

Cal Charter Rolls, *Calendar of Charter Rolls*
 Cal IPM, *Calendar of Inquisitions Post Mortem*
 Cal PR, *Calendar of Patent Rolls*
 EYC, 1915, Farrer, W. (ed.), *Early Yorkshire Charters II* (privately printed)
 EYC, 1952, Clay, C.T. (ed.), *Early Yorkshire Charters IX*, Yorkshire Archaeol. Soc. Rec. Ser., Extra Ser. VII
 EYC, 1963, Clay, C.T. (ed.), *Early Yorkshire Charters XI*, Yorkshire Archaeol. Soc. Rec. Ser., Extra Ser. IX
 Pipe Roll Soc, *Publications of the Pipe Roll Society*

References

- Albarella, U. and Davis, S.J.M., 1994, *The Saxon and Medieval Animal Bones Excavated 1985-1989 From West Cotton, Northamptonshire*, Ancient Monuments Lab. Rep. 17/94
- Allan, J.P. and Morris, C.A., 1984, 'Wooden objects', in Allan, J.P., *Medieval and Post-Medieval Finds from Exeter, 1971-1980*, Exeter Archaeol. Rep. 3, 305-15
- Andrew, R., 1984, *A Practical Pollen Guide to the British Flora*, Quaternary Res. Assoc. Tech. Guide 1
- Andrews, D.D., 1979, 'Miscellaneous small finds', in *Wharram I*, 124-32
- Armitage, P., 1979, 'Jawbone of a mule from the Roman levels, Billingsgate Buildings (TR 74), City of London', *London Archaeol.* 3, 340-45
- Armstrong, P. and Ayres, B., 1987, *Excavations in High Street and Blackfriars*, East Riding Archaeol. 8, Hull Old Town Rep. Ser. 5
- Arthur, J.R.B., n.d. 'Carbonised grain and seeds from Wharram Percy' Ancient Monuments Lab. Rep. 1751
- Baillie, M.G.L., 1982, *Tree-Ring Dating and Archaeology*
- Bampton, A.H. and Dykes, W., 1845, 'Plans and sections of an intended railway, to be called The East-Riding Junction Railway', manuscript vol. East Riding County Record Office, Beverley: QDP 141
- Barker, B., 2001, 'The gypsy race', *Old Yorkshire* 17, 13-14
- Barrett, J.H., 1997, 'Fish trade in Norse Orkney and Caithness: a zooarchaeological approach', *Antiquity* 71, 616-38
- Barrett, J.H., Locker, A.M. and Roberts, C.M., 2004, "'Dark Age economics" revisited: the English fish bone evidence AD 600-1600', *Antiquity* 78, 618-36
- Beresford, M.W. and Hurst, J.G., 1990, *Wharram Percy: Deserted Medieval Village*
- Beug, H.J., 1961, *Leitfäden der Pollenbestimmung für Mitteleuropa und Angrenzende Gebiete. Leif 1*, Gustav Fischer Verlag (Stuttgart)
- Biddle, M., 1964, 'The excavation of a motte and bailey castle at Therfield, Herts', *J. Br. Archaeol. Assoc.* 27
- Binford, L.R., 1981, *Bones. Ancient Men and Modern Myths*
- Birkinshaw, J.C. and Dickens, A.L., 1845, 'Malton and Driffild Junction Railway', manuscript vol. East Riding County Record Office, Beverley: QDP 142
- Boessneck, J., 1969, 'Osteological difference between sheep (*Ovis aries* Linne) and goats (*Capra hircus* Linne)', in Brothwell, D. and Higgs, E. (eds), *Science in Archaeology*, 331-58
- Bond, E.A. (ed.), 1866, *Chronica Monasterii de Melsa*, I
- Bond, E.A. (ed.), 1867, *Chronica Monasterii de Melsa*, II
- Bond, E.A. (ed.), 1868, *Chronica Monasterii de Melsa*, III
- Bonny, A.P., 1976, 'Recruitment of pollen to the seston and sediment of some Lake District lakes', *J. Ecol.* 64, 859-87
- Bradley, J., 1982, 'A separate-bladed shovel from Moynagh Lough, County Meath', *J. R. Soc. Antiq. Ir.* 112, 117-22
- Bronk Ramsey, C., 1995, 'Radiocarbon calibration and analysis of stratigraphy: the OxCal Program', *Radiocarbon* 37, 425-30
- Bronk Ramsey, C., 1998, 'Probability and dating', *Radiocarbon* 40, 461-74
- Bronk Ramsey, C., 2001, 'Development of the radiocarbon calibration program OxCal', *Radiocarbon* 43, 355-63
- Brown, D.H., 2002, *Pottery in Medieval Southampton, c. 1066-1510*, Southampton Archaeol. Monogr. 8, Counc. Br. Archaeol. Res. Rep. 133
- Buck, C.E., Cavanagh, W.G. and Litton, C.D., 1996, *Bayesian Approach to Interpreting Archaeological Data*
- Bulleid, A. and Gray, H.St G., 1911, *The Glastonbury Lake Village*, Glastonbury Antiq. Soc.
- Bush, M.B., 1986, 'The late quaternary palaeoecological history of the Great Wold Valley', unpubl. Ph.D Thesis, Univ. Hull
- Bush, M.B., 1988, 'Early mesolithic disturbance: a force on the landscape', *J. Archaeol. Sci.* 15, 453-62
- Bush, M.B. and Flenley, J.R., 1987, 'The age of the British chalk grasslands', *Nature* 395, 484-5
- Caratini, S., 1981, *Pre-conference abstracts of the 5th International Conference of Palynology*
- Carruthers, W., 1993, 'Charred plant remains', in Lewis, J.M., 'Excavations at Loughor Castle, West Glamorgan 1969-73', *Archaeol. Cambrensis* 142, 173-7
- Carruthers, W.J., 2005, 'Mineralised plant remains' in Birbeck, V. with Smith, R., Andrews, P. and Stoodley, N., *The Origins of Mid-Saxon Southampton: Excavations at the Friends Provident St Mary's Stadium 1998-2000*, 157-73

- Carruthers (forthcoming), West Heslerton
- Carruthers, W.J., 2000, 'The botanical remains', in *Wharram VIII*, 184-94
- Chapman, A. forthcoming, *West Cotton, Raunds*, Engl. Heritage Archaeol. Rep.
- Childs, W. and Kowaleski, M., 2000, 'Fishing and fisheries in the Middle Ages', in Starkey, D.J., Reid, C. and Ashcroft, N. (eds), *England's Sea Fisheries: The Commercial Sea Fisheries of England and Wales Since 1300*, 19-28
- Christensen, P. and Nielssen, A.R., 1996, 'Norwegian fisheries 1100-1970: main developments', in Holm, P., Starkey, D.J. and Thor, J. (eds), *The North Atlantic Fisheries, 1100-1976: National Perspectives on a Common Resource*, Esbjerg: North Atlantic Fisheries Hist. Assoc., 145-76
- Churcher, C.S. and Richardson, M.L., 1978, 'Equidae', in Maglio, V.J. and Cooke, H.S.B. (eds), *Evolution of African Mammals*, 379-422 (Cambridge, Massachusetts)
- Clark, J. (ed.), 2004, *The Medieval Horse and its Equipment c. 1150-c. 1450*, Medieval Finds from Excavations in London 5
- Clark, J.G.D. and Godwin, H., 1956, 'A Maglemosian site at Brandesburton, Holderness, Yorkshire', *Proc. Prehist. Soc.* 22, 6-22
- Clay, P., 1990, 'Querns and millstones', in Clay and Sallisbury, 295-8
- Clay, P. and Sallisbury, C.R., 1990, 'A Norman mill dam and other sites at Hemington Fields, Castle Donington, Leicestershire', *Archaeol. J.* 147, 276-307
- Cleary, R.M., 1999, 'A vertical-wheeled water-mill at Ardclloyne, Co. Cork', *J. Cork Hist. Archaeol. Soc.* 104, 37-57
- Coles, J.M., Caseldine, A.E. and Morgan R.A., 1982, 'The eclipse track 1980', *Somerset Levels Pap.* 8, 26-39
- Coles, J.M. and Orme, B.J., 1977, 'Rowland's hurdle trackway', *Somerset Levels Pap.* 3, 39-51
- Coles, J.M., Orme, B.J., Caseldine, A.E. and Morgan, R.A., 1985, 'A Neolithic jigsaw: the Honeygore complex', *Somerset Levels Pap.* 11, 51-61
- Coope, G.R. and Osborne, P.J., 1967, 'Report on the Coleopterous fauna of the Roman well at Barnsley Park, Gloucestershire'. *Trans. Bristol Gloucestershire Archaeol. Soc.* 86, 84-7
- Cowgill, J., de Neergaard, M. and Griffiths, N., 1987, *Knives and Scabbards. Medieval Finds from Excavations in London 1*
- Crummy, N., 1988, *The post-Roman Small Finds from Excavations in Colchester 1971-85*, Colchester Archaeol. Rep. 5
- Cunliffe, B., 2001, *The Danebury Environs Roman Project, 5, Fullerton Villa Excavation 2001*, Interim Rep. Inst. Archaeol., Oxford
- Cunningham, W., 1915, *The Growth of English Industry and Commerce*, 570-6
- Curwen, E.C., 1944, 'The problem of early water-mills', *Antiquity* 18, 130-6
- Daniels, R. (ed.), forthcoming, *Hartlepool Synthesis*
- Davis, S.J.M., 1992, *Saxon and Medieval Animal Bones from Burystead and Langham Road, Northants; 1981-1987 Excavations*, Ancient Monuments Lab. Rep. 71/92
- Didsbury, P., forthcoming, 'Medieval pottery', in Daniels forthcoming
- Didsbury, P. and Young, J., forthcoming, *The Pottery from St Peter's Church, Barton-on-Humber*
- Dimbleby, G.W., 1967, *Plants and Archaeology*
- Donisthorpe, H. St J.K., 1939, *A Preliminary List of the Coleoptera of Windsor Forest*
- Donkin, T., 1838, 'A plan of the Manor of Wharram-le-Street in the East Riding of the County of York belonging to Henry Willoughby Esq: made by Thomas Donkin (Westow) - 1838', Borthwick TA 34 M
- Dyer, C., 1988, 'The consumption of fresh-water fish in medieval England', in Aston, M. (ed.), *Medieval Fish, Fisheries and Fishponds in England*, Br. Archaeol. Rep. Br. Ser. 182i, 27-38
- Dykes, W., 1836, 'Plan of an Estate comprising Wharram le Street (sic), Bella and Wharram Grange in the East Riding of the County of York, the Property of Henry Willoughby Esqre', surveyed 1836, Borthwick PR WP 9/5
- Edlin, H.L., 1973, *Woodland Crafts in Britain*
- Edmondson, T., 1857, *History of Fimber: a Treatise on Agricultural Improvements; Memoirs of Remarkable Events and Village Tales*
- Evans, D.H. (ed.), 1993, *Excavations in Hull 1975-76*, East Riding Archaeol. 4, Hull Old Town Rep. Ser. 2
- Evans, J.G. and Dimbleby, G.W., 1976, 'Appendix I: The pre-barrow environment', in Manby, T.G., 'The excavation of Kilham Long Barrow, East Riding of Yorkshire', *Proc. Prehist. Soc.* 42, 150-9
- Everett, R., 1993, *Merrills: The History and Rules of an Ancient Game*
- Faergri, K. and Iversen, J., 1975, *A Textbook of Pollen Analysis* (3rd ed.)
- Faull, M.L. and Stinson, M. (eds), 1986, *Domesday Book: Yorkshire*
- Forestry Commission, 1956, 'Utilisation of hazel coppice', *Forestry Comm. Bull.* 27
- Foster, S.S.D. and Milton, V.A., 1976, *Hydrological Basis for Large-scale Development of Groundwater Storage Capacity in the East Yorkshire Chalk*, Inst. Geol. Sci. Rep. 76/3
- Fox, H., 2001, *The Evolution of the Fishing Village: Landscape and society along the South Devon coast, 1086-1550*
- Girling, M.A., 1981, 'The environmental evidence', in Mellor, J.E. and Pearce, T., *The Austin Friars, Leicester*, Counc. Br. Archaeol. Res. Rep. 35, 169-73
- Girling, M.A. and Robinson, M.A., 1989, 'Insects', in Hayfield, G. and Greig, A. (eds), 'Excavation and salvage work on a moated site at Cowick, South Humberside, 1976', *Yorkshire Archaeol. J.* 61, 41-70
- Godwin, H., 1967, 'The ancient cultivation of hemp', *Antiquity* 41, 42-50

- Goodall, I.H., 1979, 'Iron objects', in *Wharram I*, 115-23
- Goodall, I.H., 1989, 'Iron objects', in *Wharram VI*, 49-53
- Goodchild, J. and Wrathmell, S., 2002, *The King's Mills, Leeds*
- Grant, A., 1978, 'Variation in dental attrition in mammals and its relevance to age estimation', in Brothwell, D.R., Thomas, K.D. and Clutton-Brock, J., *Research Problems in Zooarchaeology*, 103-6
- Grant, A., 1982, 'The use of tooth wear as a guide to the age of domestic ungulates', in Wilson, B., Grigson, C. and Payne, S. (eds), *Ageing and Sexing Animal Bones from Archaeological Sites*, Br. Archaeol. Rep. Br. Ser. 109, 91-108
- Grant, A., 1988, 'Animal resources', in Astill, G. and Grant, A., *The Countryside of Medieval England*, 149-87
- Gray, H.S.B. and Bulleid, A., 1953, *Meare Lake Village*, Glastonbury Antiq. Soc.
- Greenwood, C., 1818, 'Map of the County of Yorkshire', surveyed 1815-17, copies North Yorkshire County Record Office, Northallerton
- Grenstead, L.W., 1939, 'Colonisation of new areas by water beetles', *Entomologists Monthly Magazine* 75, 174-5
- Hall, A.R., Gosden, S.M., Greig, J.R.A. and Fitter, A.H., 1979, 'The history of Askham Bog', in Fitter, A.H. and Smith, C.J. (eds), *A Wood in Askham: A Study in Wetland Conservation*, Sessions: Yorkshire Nat. Trust, 8-21
- Hall, A.R., Kenward, H.K., Williams, D. and Greig, J.R.A., 1983, *Environment and Living Conditions at two Anglo-Scandinavian Sites*, Archaeol. York 14/4, Counc. Br. Archaeol. 14/4
- Hall, R., 1984, *The Excavations at York, The Viking Dig*
- Hall, R., in prep., *Anglo-Scandinavian Urbanism in Coppergate: Defining a Townscape*, Archaeol. York 8/4
- Halstead, P., 1985, 'A study of mandibular teeth from Romano-British contexts at Maxey', in Pryor, F., French, C., Crowther, D., Gurney, D., Simpson, G. and Taylor, M., *Archaeology and Environment in the Lower Welland Valley. Volume 1*, 219-24
- Harland, J.F., Barrett, J.H., Carrott, J., Dobney, K. and Jaques, D., 2003, 'The York system: an integrated zooarchaeological database for research and teaching', *Internet Archaeology* 13:http://intarch.ac.uk/journal/issue13/harland_index.html
- Harris, A., 1959, *The Open Fields of East Yorkshire*, East Yorkshire Local Hist. Ser. 9
- Havinga, A.J., 1967, 'Palynology and pollen preservation', *Rev. Palaeobot. Palynol.* 2, 81-98
- Havinga, A.J., 1971, 'An experimental investigation into the decay of pollen and spores in various soil types', in Brooks, J., Grand, P.R., Muir, M., van Ginkel, P. and Shaw, G. (eds), *Sporopollenin*, 446-7
- Hayfield, C. and Brough, M., 1986-7, 'Dewponds and pondmakers of the Yorkshire Wolds', *Folk Life* 25, 74-91
- Hayfield, C., Pouncett, J. and Wagner, P., 1995, 'Vessey Ponds: a 'prehistoric' water supply in East Yorkshire?', *Proc. Prehist. Soc.* 61, 393-407
- Heege, A., 2002, *Einbeck im Mittelalter. Eine archäologisch-historische Spurensuche*, Studier zur Einbecker Geschichte 17 (Oldenburg)
- Hicks, J.D. (ed.), 1978, *A Victorian Boyhood on the Wolds. The Recollections of J.R. Mortimer*, East Yorkshire Local Hist. Ser. 34
- Hillam, J., 1985, 'Theoretical and applied dendrochronology: how to make a date with a tree', in Phillips, P. (ed.), *The Archaeologist and the Laboratory*, Counc. Br. Archaeol. Res. Rep. 58, 17-23
- Hillman, G.C., 1981, 'Reconstructing crop husbandry practises from charred remains of crops', in Mercer, R. (ed.), *Farming Practice in British Prehistory*, 123-62
- Holm, P., 1996, 'Catches and manpower in the Danish fisheries, c. 1200-1995', in Holm, P., Starkey, D.J. and Thor, J. (eds), *The North Atlantic Fisheries, 1100-1976: National Perspectives on a Common Resource*, Esbjerg: North Atlantic Fisheries Hist. Assoc., 177-206
- Holt, R., 1988, *The Mills of Medieval England*
- Horion, A.D., 1963, *Faunistik der Mitteleuropäischen Käfer* 9
- Hubbard, R.N.L.B., 1975, 'Assessing the botanical component of palaeo-economies', *Bull. Inst. Archaeol.* 12, 197-205
- Hubbard, R.N.L.B., 1976, 'Crops and climate in prehistoric Europe', *World Archaeol.* 8, 159-68
- Huntley, J.P., 1987, *Woodland Management Studies from Carlisle: Castle Street 1981*, Ancient Monuments Lab. Rep. 119/87
- Hurst, J.G., 1979, 'Conclusions', in *Wharram I*, 138-41
- Hurst, J.G., 1984, 'The Wharram Research Project: Results to 1983', *Medieval Archaeol.* 28, 77-111
- Ivens, R.J., 1982, 'Medieval pottery from the 1978 excavations at Temple Farm, Brill', *Rec. Buckinghamshire* 24, 144-70
- Jacomot, S., 1989, *Praehistorische Getreidefunde: a guide to the identification of prehistoric barley and wheat finds*, Botanical Institute of the University, Department of Taxonomy and Geobotany (Basel)
- Jennings, S., 1992, *Medieval Pottery in the Yorkshire Museum*
- Jones, A.K.G., 1982, 'Bulk-sieving and the recovery of fish remains from urban archaeological sites', in Hall, A.R. and Kenward, H. (eds), *Environmental Archaeology in the Urban Context*, Counc. Br. Archaeol. Res. Rep. 43, 79-85
- Jones, A.K.G., 1991, 'The fish remains from excavations at Freswick Links, Caithness', unpubl. D.Phil. Thesis, Univ. York
- Keene, D., 1990, 'Wooden vessels', in Biddle, M., (ed.), *Object and Economy in Medieval Winchester*, Winchester Stud. 7.ii, 959-67
- Kershaw, I., 1973, *Bolton Priory: The Economy of a Northern Monastery, 1286-1325*

- Kilmurray, K., 1980, *The Pottery Industry of Stamford, Lincolnshire. c. A.D. 850-1250*, Br. Archaeol. Rep. Br. Ser. 84
- Kloet, G.S. and Hincks, W.D., 1977, *A Check List of British Insects: Coleoptera and Strepsiptera*, 2nd ed. (rev.), Handbook for the Identification of British Insects 11, pt 3, R. Entomological Soc.
- Kowaleski, M., 2000, 'The expansion of the southwestern fisheries in late medieval England', *Economic Hist. Rev.* 53, 429-54
- Langdon, J., 1986, *Horses, Oxen and Technological Innovation. The Use of Draught Animals in English Farming from 1066 to 1500*
- Langdon, J., 1994, 'Lordship and peasant consumerism in the milling industry of early fourteenth-century England', *Past & Present* 145, 3-46
- Lawrance, N.A.H., 1985, *Fasti Parochiales, V*, Yorkshire Archaeol. Soc. Rec. Ser. 143 for 1983
- Lawson, G., 1995, *Pig Metapodial 'Toggles' and Buzz-discs: Traditional Musical Instruments*, Finds Res. Group AD 700-1700, Datasheet 18
- Le Patourel, J., 1974, 'The use of horses', in Ryder, M.L., 'Animal remains from Wharram Percy', *Yorkshire Archaeol. J.* 46, 51-52
- Le Patourel, H.E.J., 1979a, 'Medieval Pottery' in *Wharram I*, 74-107
- Le Patourel, H.E.J., 1979b, 'Pottery as evidence for social and economic change' in Sawyer, P.H., *English Medieval Settlement*
- Lemkuhl, U., 1982, 'Archäozoologische und typologische Untersuchungen an durchlochten Schweinmetapodien von slawischen Fundplätzen in Mecklenburg', *Bodendenkmalpflege in Mecklenburg* 30, 199-222
- Lindsay, J.M., 1975, 'The history of oak coppice in Scotland', *Scott. Forest* 29, 87-95
- Losco-Bradley, P.M. and Salisbury, C.R., 1988, 'A Saxon and a Norman fish weir at Colwick, Nottinghamshire', in Aston, M. (ed.), *Medieval Fish, Fisheries and Fishponds in England*, Br. Archaeol. Rep. Br. Ser. 182
- Lucas, A.T., 1953, 'The horizontal mill in Ireland', *J. R. Soc. Antiq. Ireland* 83, 1-36
- MacGregor, A., 1985, *Bone, Antler, Ivory and Horn. The Technology of Skeletal Materials since the Roman Period*
- MacGregor, A., 1989a, 'Bone, antler and horn industries in the urban context', in Serjeantson, D. and Waldron, T. (eds), *Diet and Crafts in Towns. The Evidence of Animal Remains from the Roman to the Post-Medieval Periods*, Br. Archaeol. Rep. Br. Ser. 199, 107-28
- MacGregor, A., 1989b, 'Bone and antler objects', in *Wharram VI*, 56
- MacGregor, A., 2000, 'Bone and antler objects', in *Wharram VIII*, 148-54
- MacGregor, A., Mainman, A.J. and Rogers, N.S.H., 1999, *Craft, Industry and Everyday Life: Bone, Antler, Ivory and Horn from Anglo-Scandinavian and Medieval York*, Archaeol. York 17/12
- Margeson, S., 1993, *Norwich Households. Medieval and Post-Medieval Finds from Norwich Survey Excavations 1971-78*, East Anglian Archaeol. 58
- McNamee, C., 1997, *The Wars of the Bruces*
- Moffett, L., 1988, 'The archaeobotanical evidence for Saxon and medieval agriculture in central England circa 500AD to 1500AD', unpubl. M.Phil. Thesis, Univ. Birmingham
- Moffett, L., 1991, *The Archaeobotanical Evidence for Free-threshing Tetraploid Wheat in Britain*, Palaeoethnobotany and Archaeology. International Work-Group for palaeoethnobotany. 8th Symposium, Nitra-Nove Vozokany, 1989. Archaeological Academy of Sciences (Nitra)
- Moore, J.A., 1986, *Charophytes of Great Britain and Ireland*, Botanical Soc. Br. Isles Handbook 5
- Moorhouse, S., 1983, 'Documentary evidence and its potential for understanding the inland movement of medieval pottery', *Medieval Ceram.* 7, 45-87
- Moorhouse, S. and Slowikowski, A.M., 1987, 'The pottery', in Moorhouse and Wrathmell, 59-116
- Moorhouse, S. and Wrathmell, S., 1987, *Kirkstall Abbey. Volume 1. The 1950-64 Excavations: A Reassessment*, Yorkshire Archaeol. 1
- Morgan, R.A., 1985, *Tree-Ring Analysis of Wattling from Lincoln, Brayford Wharf East 1982*, Ancient Monuments Lab. Rep. 4687
- Morgan, R.A., 1988a, 'The case for wattling: what tree-ring studies could reveal', in Murphy, P. and French, C. (eds), *The Exploitation of Wetlands*, Br. Archaeol. Rep. Br. Ser. 186, 77-91
- Morgan, R.A., 1988b, *Tree-Ring Studies of Wood used in Neolithic and Bronze Age Trackways from the Somerset Levels*, Br. Archaeol. Rep. Br. Ser. 184
- Morris, C.A., 1980, 'A group of early medieval spades', *Medieval Archaeol.* 24, 205-10
- Morris, C.A., 1981, 'Early medieval separate-bladed shovels from Ireland', *J. R. Soc. Antiq. Ireland* 111, 50-69
- Morris, C.A., 1984, 'Anglo-Saxon and medieval woodworking crafts: the manufacture and use of domestic and utilitarian wooden artifacts in the British Isles, 400-1500 AD', unpubl. Ph.D Thesis, Univ. Cambridge
- Morris C.A., 1990, 'Recording ancient timbers: the technologist's view', in Coles, J.M., Coles, B.J. and Dobson, M.J. (eds), *Waterlogged Wood. The Recording, Sampling, Conservation and Curation of Structural Timber*, Wetland Archaeol. Res. Proj. Occas. Pap. 3, 9-15
- Morris, C.A., 2000, *Craft, Industry and Everyday Life: Wood and Woodworking in Anglo-Scandinavian and Medieval York*, Archaeol. York 17/13
- Mortimer, J.R., 1905, *Forty Years' Researches in British and Saxon Burial Mounds of East Yorkshire*
- Murphy, P., 1985, 'The cereals and crop weeds' in West, S., 'West Stow: the Anglo-Saxon village', *East Anglian Archaeol.* 24, 100-108

- Murphy, P., 1991, 'Ipswich, Suffolk: plant macrofossils from sites 1AS 3104 (Buttermarket), 1AS 3201 (ABC cinema) and 1AS 5203 (Greyfriars Road)' Ancient Monuments Lab. Rep. 33/91
- Murray, H.K., 1983, *Viking and Early Medieval Buildings in Dublin*, Br. Archaeol. Rep. Br. Ser. 119
- O'Connor, T.P., 1982, *Animal Bones from Flaxengate, Lincoln c. 870-1500*, Archaeol. Lincoln 18/1. Counc. Br. Archaeol.
- O'Connor, T. P., 1991, *Bones from 46-54 Fishergate*, Archaeol. York 15/4, Counc. Br. Archaeol.
- O'Connor, T. P., 2000, *The Archaeology of Animal Bones* (Texas)
- Oschinsky, D., 1971, *Walter of Henley and other Treatises on Estate Management and Accounting*
- Oswald, A., 2004, 'Wharram Percy deserted medieval village, North Yorkshire: archaeological investigation and survey', Engl. Heritage Archaeol. Investigation Report Ser. AI/19/2004
- Otlet, R.L. and Polach, H.A., 1990, 'Improvements in the precision of radiocarbon dating through recent developments in liquid scintillation counters', in Mook, W.G. and Waterbolk, H.T. (eds), *Proceedings of the Second International Symposium 14C and Archaeology*, PACT 29, 225-38
- Otlet, R.L., and Warchal, R.M., 1978, 'Liquid scintillation counting of low-level ^{14}C ', in Crook, M.A. and Johnson, P. (eds), *Liquid Scintillation Counting* 5, 210-18
- Ottaway, P. and Rogers, N.S.H., 2002, *Craft, Industry and Everyday Life: Finds from Medieval York*, Archaeol. York 17/15
- Payne, S., 1969, 'A metrical distinction between sheep and goat metacarpals', in Ucko, P.J. and Dimbleby, D.W. (eds), *The Domestication and Exploitation of Plants and Animals*, 295-305
- Payne, S., 1973, 'Kill-off patterns in sheep and goats: the mandibles from Asvan Kale', *Anatolian Studies* 23, 281-3
- Payne, S., 1985, 'Morphological distinctions between the mandibular teeth of young sheep, *Ovis* and goats, *Capra*', *J. Archaeol. Sci.* 12, 139-47
- Payne, S., 1992, *Some Notes on Sampling and Sieving for Animal Bones*, Ancient Monuments Lab. Rep. 55/92
- Peck, R., 1973, 'Pollen budget studies in a small Yorkshire catchment', in Birks, H.J.B. and West, R.G. (eds), *Quaternary Plant Ecology*
- Pinter-Bellows, S., 1992, 'The vertebrate remains from Sites 94 and 95', in *Wharram VII*, 69-79
- Pinter-Bellows, S., 2000, 'The animal remains', in *Wharram VIII*, 167-84
- Postan, M.M., 1973, *Essays on Medieval Agriculture and General Problems of the Medieval Economy*
- Prummel, W., 1997, 'Evidence of hawking (falconry) from bird and mammal bones', *Int. J. Osteoarchaeology* 7, 333-38
- Prummel, W. and Frisch, H-J., 1986, 'A guide for the distinction of species, sex and body size in bones of sheep and goat', *J. Archaeol. Sci.* 13, 567-77
- Rackham, D.J., 1989, 'Animal remains' in Austin, D., *The Deserted Medieval Village of Thrislington, County Durham. Excavations 1973-1974*, Soc. Medieval Archaeol. Monogr. Ser. 12, 146-58
- Rackham, D.J., 2004, 'Physical remains of medieval horses', in Clark (ed.), 19-22
- Rackham, O., 1980, *Ancient Woodland*
- Rackham, O., 1986, *The History of the Countryside*
- Rackham, O., 1989, *The Last Forest. The Story of Hatfield Forest*
- Rahtz, P. and Meeson, R., 1992, *An Anglo-Saxon Watermill at Tamworth*, Counc. Br. Archaeol. Res. Rep. 83
- Richardson, J., 2004a, 'The animal remains', in *Wharram IX*, 257-72
- Richardson, J., 2004b, 'The animal remains', in *Wharram IX*, 332-39
- Riddler, I.D., Trzaska-Nartowski, N.T.N. and Hatton, S., forthcoming, *An Early Medieval Craft. Antler and Boneworking from Ipswich Excavations 1974-1994*, East Anglian Archaeol.
- Robinson, M., and Straker, V., 1991, 'Silica skeletons of macroscopic plant remains from ash', in Renfrew, J.M. (ed), *New Light on Early Farming. Recent Developments in Palaeoethnobotany*, 3013
- Robinson, M. A., n.d., *Saxon Insect Assemblages from the Palaeochannel and Millpond at West Cotton*, unpubl.
- Robinson, M.A., 1980, 'Waterlogged plant and invertebrate evidence', in Palmer, N.J., 'A Beaker burial and medieval tenements in the Hamel, Oxford', *Oxoniensia* 45, 199-206, fiche F 12-G 06
- Robinson, M.A., 1991, 'The Neolithic and Late Bronze Age insect assemblages', in Needham, S.P., *Excavation and Salvage at Runnymede Bridge, 1978: The Late Bronze Age Waterfront Site*, 277-326
- Rushe, C.M., Smith, H. and Halstead, P., 1988, 'Animal bone', in Hayfield, C., 'Cowlam deserted village: a case study of post-medieval village desertion', *Post-Medieval Archaeol.* 22, 97-101
- Rushe, C.M., Smith, H. and Halstead, P., 1994, 'The animal bone', in Brewster, T.C.M. and Hayfield, C., 'Excavations at Sherburn, East Yorkshire', *Yorkshire Archaeol. J.* 66, 143-46
- Ryder, M.L., 1974, 'Animal remains from Wharram Percy', *Yorkshire Archaeol. J.* 46, 42-52
- Rynne, C., 1988, 'The archaeology and technology of the horizontal-wheeled watermill, with special reference to Ireland', unpubl. Ph.D Thesis, Univ. Coll. Cork
- Rynne, C., 1989, 'The introduction of the vertical watermill into Ireland: some recent archaeological evidence', *Medieval Archaeol.* 33, 21-31
- Salisbury, C., 1981, 'An Anglo-Saxon fish-weir at Colwick, Nottinghamshire', *Trans. Thoroton Soc. Nottinghamshire* 85, 26-36
- Silver, I.A., 1969, 'The ageing of domestic animals', in Brothwell, D. and Higgs, E. (eds), *Science in Archaeology*, 283-302

- Sitch, B., 2004, 'Coins: a review of the Iron Age and Roman coins from Wharham Percy' in *Wharham IX*, 234-40
- Skeat, R.W., 1882, *The Book of Husbandry by Master Fitzherbert*
- Slowikowski, A.M., 1991, 'The archaeological evidence for the character and uses of medieval pottery in the lowlands of West Yorkshire', unpubl. M.Phil Thesis, Univ. Leeds
- Slowikowski, A.M., 2000, 'The Anglo-Saxon and medieval pottery', in *Wharham VIII*, 60-98
- Smith, A.H., 1937, *The Place-names of the East Riding of Yorkshire and York*, Engl. Place-name Soc. 14
- Snape, M.E., 2003, 'A horizontal-wheeled watermill of the Anglo-Saxon period at Corbridge, Northumberland, and its river environment', *Archaeol. Aeliana* 32, 37-72
- Spain, R.J., 1984, 'The second century Romano-British watermill at Ickham, Kent', *Hist. Technol.* 9, 143-80
- Stace, C., 1991, *New Flora of the British Isles*
- Stace, C., 1997, *New Flora of the British Isles*, 2nd ed.
- Stenhouse, M.J. and Baxter, M.S., 1983, '14C dating reproducibility: evidence from routine dating of archaeological samples', *PACT* 8, 147-61
- Stockmarr, J., 1971, 'Tablets with spores used in absolute pollen analysis', *Pollen Spores* 13, 615-21
- Stoertz, C., 1997, *Ancient Landscapes of the Yorkshire Wolds*, R. Comm. Hist. Monuments (England)
- Stuiver, M. and Polach, H.A., 1977, 'Reporting of 14C data', *Radiocarbon* 19, 355-63
- Stuiver, M. and Reimer, P.J., 1986, 'A computer program for radiocarbon age calculation', *Radiocarbon* 28, 1022-30
- Stuiver, M. and Reimer, P.J., 1993, 'Extended 14C data base and revised CALIB 3.0 14C age calibration program', *Radiocarbon* 35(1), 215-30
- Stuiver, M., Reimer, P.J., Bard, E., Beck, J.W., Burr, G.S., Hughen, K.A., Kromer, B., McCormac, F.G., van der Plicht, J. and Spurk, M., 1998, 'INTCAL98 radiocarbon age calibration, 24,000-0 cal BP', *Radiocarbon* 40, 1041-84
- Sweeney, D., 1985, 'Tees Valley Ware a comparative and distributional survey', unpubl. BA dissertation, Univ. Durham
- Tamers, M.A., 1965, 'Routine carbon-14 dating using liquid scintillation techniques', in Chatters, R.M. and Olson, E.A. (eds), *Radiocarbon and tritium dating: proceedings of the sixth international conference on radiocarbon and tritium dating, Washington June 1965*, 53-67 (Washington D.C.)
- Tansley, A.G., 1939, *The British Isles and Their Vegetation*
- Thomas, R. and Locock, M., 2000, 'Food for the dogs? The consumption of horseflesh at Dudley Castle in the eighteenth century', *Environ. Archaeol.* 5, 83-91
- Thornton, J.H., n.d., 'Wharham Percy, Yorks.: leather report', Ancient Monuments Lab. Rep. 1796
- Tomlinson, P., 1984, 'Ultrasonic filtration as an aid in pollen analysis of archaeological deposits', *Circaea* 2, 139-41
- Ulbricht, I., 1984, *Die Verarbeitung von Knochen, Geweih und Horn im mittelalterlichen Schleswig, Ausgrabungen in Schleswig. Berichte und Studien* 3 (Neumünster)
- Volken, M., Volken, S. and Bourgarel, G., 2001, 'A petits pas dans le Moyen Age avec les chaussures du Cribet, Fribourg' *Cahiers d'Archéologie Fribourgeoise/Freiburger Hefte für Archäologie* 3, 41-7
- von den Driesch, A., 1976, *A Guide to the Measurement of Animal Bones from Archaeological Sites*, Peabody Mus. Bull. 1 (Cambridge, Massachusetts)
- von den Driesch, A., 1994, 'Hyperostosis in fish', in Van Neer, W. (ed.), *Fish Exploitation in the Past: Proceedings of the 7th meeting of the ICAZ fish remains working group*, Tervuren: Musée Royal de L'Afrique Centrale, 37-45
- von den Driesch, A. and Boessneck, J., 1974, 'Kritische Anmerkungen zur Widderristhöhenberechnung aus Längenmaßen vor- und frühgeschichtlicher Tierknochen', *Saugetierkundliche Mitteilungen* 22, 325-48
- Walker, J.J., 1916, 'Granary beetles at Cothill, Berks', *Entomologists Monthly Magazine* 52, 16-17
- Walton Rogers, P., 1993, 'Spindle whorls' in Rogers, N.S.H., *Anglian and Other Finds from Fishergate*, *Archaeol. York* 17, 1266-9
- Ward, G.K. and Wilson, S.R., 1978, 'Procedures for comparing and combining radiocarbon age determinations: a critique', *Archaeometry* 20, 19-31
- Watkin, J., 1987, 'Objects of Wood', in Armstrong and Ayers, 209-16
- Watkins, G., 1993, 'The pottery', in Evans (ed.), 75-145
- Watkins, J.G., 1987, 'The pottery', in Armstrong and Ayres, 53-181
- Waton, P.V., 1982, 'A palynological study of the impact of man on the landscape of central southern England with special reference to the Chalklands', unpubl. Ph.D Thesis, Univ. Southampton
- Watt, J.G., 2000, 'Iron Nails' in Goodall, I.H. and Clark, E.A., 'Iron Objects' in *Wharham VIII*, 140-47
- Watt, J.G., 2004, 'Iron Nails' in Goodall, I.H. and Clark, E.A., 'Iron Objects' in *Wharham IX*, 248-251
- Watts, M., 2000, *Water and Wind Power*
- Watts, M., 2002, *The Archaeology of Mills and Milling*
- Watts, S., 2004, 'Querns', in *Wharham IX*, 219-30
- Watts, S.R., 2000, 'Grinding stones', in *Wharham VIII*, 111-15
- Wharham I* (Andrews, D.D. and Milne, G. 1979) *Wharham. A Study of Settlement on the Yorkshire Wolds, I. Domestic Settlement 1: Areas 10 and 6*, Soc. Medieval Archaeol. Monogr. 8
- Wharham III* (Bell, R.D., Beresford, M.W. and others 1987) *Wharham. A Study of Settlement on the Yorkshire Wolds, III. Wharham Percy: The Church of St Martin*, Soc. Medieval Archaeol. Monogr. 11
- Wharham VI* (Wrathmell, S. 1989) *Wharham. A Study of Settlement on the Yorkshire Wolds, VI. Domestic Settlement 2: Medieval Peasant Farmsteads*, York Univ. Archaeol. Publ. 8

- Wharram VII (Milne, G. and Richards, J.D. 1992) *Wharram. A Study of Settlement on the Yorkshire Wolds, VII. Two Anglo-Saxon Buildings and Associated Finds*, York Univ. Archaeol. Publ. 9
- Wharram VIII (Stamper, P.A. and Croft, R.A. 2000) *Wharram. A Study of Settlement on the Yorkshire Wolds, VIII. The South Manor Area*, York Univ. Archaeol. Publ. 10
- Wharram IX (Rahtz, P.A. and Watts, L. 2004) *Wharram. A Study of Settlement on the Yorkshire Wolds, IX. The North Manor Area and North-West Enclosure*, York Univ. Archaeol. Publ. 11
- Wheeler, A. and Jones, A.K.G., 1989, *Fishes*
- Whittingham, M., 2002, 'Land at Wharram le Street, North Yorkshire. Earthwork and Geophysical Survey', Archaeol. Serv. WYAS unpubl. rep.
- Wilkinson, T.J. and Murphy, P., 1986, *The Hullbridge Basin Survey 1985*, Interim Report 6, Essex County Council
- Williams, J.H., 1979, *St Peter's Street, Northampton. Excavations 1973-1976*, Northampton Archaeol. Monogr. 2
- Wilson, B. and Edwards, P., 1993, 'Butchery of horse and dog at Witney Palace, Oxfordshire, and the knacker and feeding of meat to hounds during the post-medieval period', *Post-Medieval Archaeol.* 27, 43-56
- Wilson, D.M. and Hurst, J.G., 1958, 'Medieval Britain in 1957', *Medieval Archaeol.* 2, 183-5
- Woodall, D., 1959, *A Short History of the House of Kent*
- Woolgar, C.M., 2000, "Take this penance now, and afterwards the fare will improve": Seafood and late medieval diet', in Starkey, D.J., Reid, C. and Ashcroft, N. (eds), *England's Sea Fisheries: The Commercial Sea Fisheries of England and Wales since 1300*, 36-44
- Worsfold, F.H., 1943, 'A report on the late Bronze Age site excavated at Minnis Bay, Birchington, Kent, 1938-40', *Proc. Prehist. Soc.* 9, 28-47
- Wright, S.M., 1992, 'Millstones', in Rahtz and Meeson (eds), 70-79

Index

by S. Atkin

Page numbers in italics refer to illustrations

- Aaron the Jew 4
 adze, stone, prehistoric 124, *125*
 agrarian crisis 21, 22
 animal bone: Sites 30, 67 and 71 (Pond and Dam sites)
 26, 61, 153-69, 227, 229, 234, 237, 242
 radiocarbon dating 221, 222, 225
 amphibian 230, 238
 badger 156
 cat 154, 156, 167, 229, 230, 238, 242
 cattle 154-69, 229, 230, 231, 232-7, 238, 240-41, 242
 deer (and venison) 155, 156, 167, 230, 231-2, 238, 242
 dog 154, 156, 167, *167*, 227, 229, 230, 238, 242
 fox 156
 goat 153, 156, 230
 hare 156, 167, 230
 horse (and pony) 154, 155-60, 162, 164, 167, 168, 169, 219, 227, 229, 230, 231, 232-7, 238, 239, 242
 mole 230
 pig 154-69, 229, 230, 231, 232-7, 238, 240-1, 242
 polecat 156
 rabbit 156, 167, 230, 231, 232, 242
 sheep (sheep/goat) 153-69, 230, 231, 232-7, 238, 239, 240-41, 242
 voles (water and field) 156, 230, 238
 weasel 230
 North Manor Area 153, 154, 155, 157, 159, *159*, *161*, 162, *162*, *163*, 164, 167, 168, 229, 232, 234, 236, 242
 Sites 9 and 12 (Areas 10 and 6) 153, 155, 157, 159, *159*, 162, 169, 229-42
 South Manor 153, 157, 159, *159*, *161*, 162, *162*, 164, 167, 232
see also bird bone; fish bone
 animals
 trampling 45
 watering at pond 226
 arable cultivation 175, 176, 199-200, 214, 215, 216-19
 ard ploughs 190
 Ardclloyne, Co. Cork (Ireland), mill 223
 Area 6: perforated pig metapodia 143; *see also* animal bone
 arrowhead, iron 138, *138*
 awl 132
 axe head, stone, prehistoric 124
 bag, leather 145, *146*, 148
 bag hook, iron 132, *133*
 banks 40, 227
 (111) clay 33
 (235) *46-7*, 48, *49*, 70, 226
 (236) earth and clay 48
 (259) clay 38-9, 40, 48, *49*
 (260) clay 33, 38-9, 40, *49*
 (1001) *51*, 54
 (1351) clay 54
 (1575) clay *30-31*, 40, 44
 boundary (Site D) 17
 Phase 1.1: 28-9, 33
 possible dam sites 13, *14*
 Banks Hill 4
 Barkethorpe family 2, 20
 Barkethorpe, William de 4, 7
 'barrel', wooden 68, 68
 barrier(?), timber *42-3*, 44-5
 Barton-on-Humber, pottery 79, 107
 beads, glass lace bobbin, post-medieval 129
 Beeford (E. Yorks), windmill 20
 beetles (Coleoptera) 210-14, 216, 217
 bell clapper, iron 132, *133*
 bird bone 153-4, 155, 156, 167, 230, 231-2, 238, 242
 Birdsall 1, 7
 building materials 5
 Mount Ferrant castle 4
 water-mill 20, 21
 Birdsall Calcareous Grit 128
 black residues 109
 Blackwater Estuary (Essex) 209
 boundary features 33, 45
 bank (259) 40
 bank, post-medieval? (Site D) 17
 pond area 54
 post-holes 71
 boundary walls
 (93) 48
 (130) chalk *49*, 70
 bovine holdings 20, 21
 Brandsby Roadstone 128
 Brayford Pool, hurdling 209
 breast harness (rigid), for horses 164, 169
 brick 129
 bridge abutment 40, 227
 bridle fittings, iron 138, *138*
 Brill/Boarstall kilns (Bucks) 79
 British Library, London
 cartulary (BL Lansdowne 424) 2, 20
 register of abstracts (BL Cotton Vit. C. vi) 2, 4, 5-6, 7, 21
 Bronze Age: hurdling 209
 brooklime 191, 200, 215, 216
 buckets, iron 134
 buckles and buckle-plates

- copper-alloy 129, 130, 131
- iron 133, 134, 228
- Building 1: 229
- Building 5 *see* Manor House
- building ironwork 132, 133, 134
- building stone 128
- Burdale Tunnel 13
- burnt clay 242
- burnt grain mound *see* grain dump
- Burton, Thomas, abbot of Meaux 2, 4, 6, 7
- butchery 155, 167, 168
- buttons
 - bone 143, 226, 228
 - copper-alloy 130
- cabbage 218
- Cannabis sativa* *see* hemp
- carcass processing 164, 167, 229, 237-8
- Carlisle, Roman hurdling 209
- cartulary *see* British Library (BL Lansdowne 424)
- caskheads, wood 140, 142
- caulking 131
- causeway (trackway) 65, 65, 227
- cereals and cultivation 175, 183, 184, 185-90, 194, 195, 196, 199, 200, 214, 216; *see also* crop processing waste; grain deposit; grain dump
- cess staining 45, 45, 48, 226, 243
- chafers 214, 216
- chains
 - copper-alloy 130
 - iron 134
- chalk grasslands 175, 176, 183, 184, 195, 215, 216, 218
- chalk gravel (1251) 68
- 'chalk heath' 195, 215, 218
- chalklands 168
- Chamberlain family 7, 8, 21
- Chamberlain, Henry the 7
- channels
 - (65) exit 33, 34, 40, 40, 227
 - (102, 132) 49, 70
 - (177) 33
 - (262) recut 36, 40, 226
 - (263) 33, 34
 - (268-9) recuts 34, 36, 40
 - (1153) 55, 58, 65, 68
 - (1182) extension 55, 58
 - (1189) deep cut 55, 58, 64, 64, 65, 68
 - (1208) deep cut 58, 64, 65
 - (1262) spillway 46-7, 50, 226
 - (1368) 46-7, 51, 54
 - (1374) 46-7, 51, 54
 - (1451/1452) 54
 - (1578) bypass 34, 44
 - (1585/1586) central 38-9, 40, 41, 44
 - (1603) spillway 40, 41, 44, 50
 - from erosion hollow (116) 223
 - Phase 1.1: 26, 33
 - Phase 6: 68
 - see also* ditches; spillways
- charcoal 191, 206, 214, 242
- chisel blade tip, iron 132
- church *see* St Martin's church
- churchyard
 - boundary 33
 - stone bearing reused in wall 224
 - trees 176
- chutes, timber 224
- circular feature (1185) 64-5
- Clay, Sir Charles 6
- clay *see* burnt clay
- clay objects 128-9
- clay tobacco pipes 68, 129, 228
- clip, iron 139
- coal 242
- cobbled area (1164; resurfacing of 1216) 58, 68, 126, 157
- coins 129, 228
 - Iron Age 129
 - 18th-century 129
- Colchester (Essex), knife handle 143
- Coleoptera 210-14, 216, 217
- collars, iron 132, 133, 134
- collection tank 69
- Colwick, hurdling 209, 226
- containers, wooden 227
 - for water (timber staining) 42-3, 44-5, 226
- cooking vessel, copper-alloy 130
- copper-alloy objects 130
- coppicing 200, 208, 215
- Corbridge (Northumb), mill 223, 224
- Corieltauvi tribe, coin 129
- cornmills 8, 21
- Coteclyf* 21
- counters
 - clay discs 128
 - pebbles used as? 123
 - pottery 75, 83
- Coventry, shovel blade 142
- Cowlam
 - horse bones 242
 - windmill 20
- Crandale 1
- crofts 15
- crop processing waste 200, 214, 218, 225, 227
- crop rotation system 199
- Cruciferae vegetable 217
- cured fish 169, 170, 175
- curia* wall 16-17, 17, 18-19, 18, 21
- cursus, Rudston 1
- cuts
 - (18, 25, 26) rectangular slots 60, 61, 61
 - (27) rectangular 61
 - (29) 61
 - (48) 58
 - (1064) 54, 55
 - (1404) 54
 - see also* channels

- dams 4, 6, 15-16, 225
 - experimental 23, 23
 - possible sites 9, 13, 14, 19
 - radiocarbon dating 222
 - reconstruction 9, 12
 - Site D 17-18, 18, 21
 - Phase 1.1 26-34, 28-9, 183, 223
 - Phase 2.1 clay (first) 25, 38-9, 40, 44, 126, 222, 223-4, 225
 - plant remains from silts 185, 190-91
 - Phase 2.2 modification: clay deposits (1572-3) at rear 42-3, 44-5, 215
 - base of puddled clay 30-1, 35, 44
 - chalk 'shingle' 45, 45
 - clay (1571) added 41, 44
 - timber barrier (stain) 42-3, 44-5
 - Phase 3 chalk and earth 25, 45-54, 215, 226
 - channel (1357) 50
 - clay base (1290) 50
 - construction 48, 50, 126
 - development 50, 54
 - drain (557) 50
 - modified by Phase 6 wall (582) 66-7, 68
 - plant remains from silts 191
 - pottery 226
 - Site 71 Phase 3: 45, 46-7, 48
 - spillway (1262) 50, 226
 - top surface (558) 46-7, 50
- daub 26
- demesne mills 19-20, 21
- depressions
 - (273) 33, 34, 40, 45, 48, 226
 - plant remains 191, 195, 200, 214, 215, 216, 217
 - (1090) 52-3, 54, 58
 - (1182) (water-mill?) 225
 - (1236) 52-3, 58, 61, 64
 - Phase 3: 35, 54
- dewponds, artificial 1
- discs
 - clay 128
 - copper-alloy 130
 - lead 131
 - pottery 105
 - tin or pewter manufacture 131
- ditches 227
 - (261) drainage 46-7, 48, 48, 49, 51, 69-70
 - (262) 40, 45, 48, 49
 - (265) channel 38-9, 40, 45, 48, 48
 - (filled by 1258) 46-7, 50
 - Site D, overflow channel? 17, 18, 18
- documentary evidence 1-8, 225
- Domesday Book, mills 2, 19, 21, 225
- drages 217
- drainage ditch *see* ditches
- drains
 - (557), temporary 50
 - Phase 7: 68
- dress fasteners, copper-alloy 130, 131
- dress hook, copper-alloy 130, 131
- Dublin
 - batten 142
 - hurdling 209
 - shovel blade 142
- ductus aque* 2
- Duggleby Howe 1
- dumps 227
 - (11, 12) chalk rubble 48
 - (179) cement-stone 38-9, 48
 - (1046, 1097) silt 54
 - (1095) chalk 'concrete' 54, 55
 - (1096) silt 54, 55
 - Phase 1.1 cement-stone 40
 - Phase 2.2 silt 45
 - Site 71, chalk building rubble 70, 71, 227
- dung 215
- dung beetles 214, 216
- Durham, shovel blade 142
- Dykes, William *see* estate map
- Ebbsfleet (Kent), mill 223
- Eclipse trackway (Somerset) 209
- edgings *see* footings/edgings
- embayment setting (65) 54, 227
- erosion hollow (116) 27, 33, 40, 222, 223
- estate map (1836), by William Dykes 9, 13, 19
- Exeter (Devon), Exe Bridge, cask 142
- Far Cliff field 5, 21
- farmstead, post-Dissolution 21, 228; *see also* Wharram Grange Farm
- fence lines 15
 - (127, 124) 71
 - (1092) 68
 - Phase 7 across dam 68
 - Site 71: 70
- fertiliser *see* manure
- field names 5, 7, 19, 21
- Fimber *xiii*, 1
 - ponds 226, 227
 - windmill 20
- fish bone 153, 167, 168, 169-75, 227-8, 242
 - Sites 9 and 12 (Areas 10 and 6) 169-75
- fishery 8
- fish storage tank 225
- fish traps 222, 226
- flax (*Linum*) 183, 184, 216, 217, 218
- flooding extents 18
- floor tiles 129
 - stone 128
- fodder 199, 200, 217
- footings/edgings 227
 - (19) stone 64, 65, 68, 227
 - (22) 59, 61, 64
 - (30) stone 61
 - (32) 61
 - (44), stone 59, 61, 61
- footpath *see* trackways

- footwear
 - iron 134
 - leather 145, 147, 148-9, 226
- forage crop 219
- ford(?) 13, 19
- fork, iron and bone 143, 144
- Fossard family 2, 19, 20
- Fossard, Joan *see* Turneham, Joan de
- Fossard, Nigel 2
- Fossard, William I 2, 4, 6, 21
- Fossard, William II 2, 4
- Fossard, William (unspecified) 7
- foundation trench (1370) 46-7, 51, 54
- Fridaythorpe *xiii*, 1
- fuel
 - burnt grain from oven/kiln 200, 218, 225, 227
 - hazel wood 200
 - heather 190, 200, 218
- Fullerton (Hants), mill 223
- gaming board, sandstone 123, 124, 128
- garden crops (peas) and plants 199, 200, 217, 218
- gardens (cottage) 175, 184
- garderobe lids 142
- Gerefa* 224
- 'gipseys' 1
- glass, vessel, post-medieval 129; *see also* beads; window glass
- Glastonbury (Somerset), hurdling 209
- grain deposit, charred (Site 71, Phase 4) 69, 195-200, 216, 217-18, 227
- grain drier, South Manor 218
- grain dump (burnt grain mound), carbonised (Site 30, Phase 1.1) 26, 28-9, 32-3, 33, 34, 35, 40, 48, 54, 185-90, 214, 215, 216-17, 225, 242
 - radiocarbon dating 221, 222
- Grange Cliff (field) 4, 5, 21
- gravel
 - (11, 12) dumps 48
 - (220) 48, 49
 - (240) 226
- graveyard 243
 - boundary 71
 - clearance 71
- Greenwood family 21
- Greenwood map (1815-17) 13
- grinding stones *see* millstones and querns
- Gypsy Race *xiii*; *see also* Upper Gipseys Race
- Hallgarth 7
- Haltemprice Priory 8, 227
- Hamwic, plant remains 219
- handles, bone and ivory 143, 144
- handmills 20, 224, 226
- harness pendant, copper-alloy 129, 130, 131
- hazelnuts 191, 199-200, 218, 219
- hearth bottoms and lining 243
- hearths/ovens 200, 217, 219
- heather 190, 195, 197, 200, 215, 218
- hedgerows, fruits and nuts from 218, 219
- heel irons 134
- Helperthorpe, windmill 20
- Hemington Fields (Leics) 127, 222, 223
- hemp (*Cannabis sativa*) 175, 184, 216, 217, 218
- hemp-making 184
- Henry the Chamberlain *see* Chamberlain
- Heslerton, Eufemia 8
- Heslerton, Walter de (d. 1349) 8
- Heslerton, Walter de (d. 1367) 8
- Hickleton, pottery 77
- Hilton family of Hylton Castle 8
- Hilton, Sir William 8
- hinge pivot, iron 134
- hinges and straps, iron 133, 134
- Holkham Bible 142
- hollow (116) *see* erosion hollow
- hollow way 4, 19
- 'holy well' 2
- hones, stone 125, 126
- Honeybee Neolithic track 209
- hopped beers 184
- hops 217
- horse rearing 169
- horsemills 7, 20
- horseshoe nails 139-40, 228
- horseshoes 58, 134-8, 136, 157, 227
- Hospital of St John of Jerusalem 2
- Hull, trenails 143
- human bone 243
- hunting 155, 231
- Hylton Castle, nr Sunderland 8
- Ickham (Kent), mill 223
- insects 215
 - grain infestations 189, 214, 216
 - pond sediments 151, 185, 210-14, 215, 216, 217
- Iron Age
 - coin 129
 - Grey slag 243
 - hurdling 209
 - route 15
- iron objects 132-40
- jet object 123, 125
- John the reeve 20
- Karli 7
- Ketilbjorn 2, 7
- keys, iron 133, 134
- Kilham Long Barrow 175
- Kirkstall Abbey (W. Yorks), pottery 79
- knacker's yard waste 164, 168, 227
- knife handles
 - bone and ivory 143, 144
 - wood 140, 141, 142
- knives, iron 132, 133

- lace bobbin beads, glass, post-medieval 129
 Lagmann 7
Lambclyf 21
 land-drain (Site 67) 71
 Langton 6, 8
 le Gros, William, earl of Albemarle 4
 leather 50, 145-9; *see also* bag; footwear
 limescale, on pottery 109
 Little Island, Co. Cork (Ireland), mill 223
 lock bolt mount, iron 134
 locks, iron 133, 134
 London, shovel blade 142
 loomweights, clay 128, 129
 lord's mill 20
 Lund Wood 4, 5
 Lutheworth 4, 5
 lynchets 15
- mallow 219
 malting 199
 Malton 22
 Manor House (Building 5) 232
 manorial interests 2-8
 manure (fertiliser) 155, 191
 maps, historical 9, 15
 maslin 217
 mason's mark 128
 Mauley, Peter 2, 6
 Mauley, Sir Peter de 2, 6, 20
 Meare Village 209
 Meaux Abbey, Holderness *xiii*, 2, 15
 Birdsall water-mill 20
 grange and grange mills 2, 4-5, 6-7, 9, 20
 see also Site D
 Meaux Chronicle 2, 4, 5, 6, 7, 18, 20
 medicinal plants 219
 meres 1
 Mesolithic 1, 175
 metalworking residues 243
 Michael, eighth abbot 6-7
 mill building (postpads 44 and 92 and post-hole 175) 18,
 33, 34, 40, 222-5
 structural timber (no.7) from? 140, 141, 143, 225
 'Mill Hedge Furlong' 7
 milling, effects on insects in pond 214
 mills 9-22, 10, 222-5
 derelict or damaged 21-2
 manorial interests and 2-8
 see also horsemills; Meaux Abbey; Montfort/Percy
 mill; northern mill; southern mill; windmills; *and*
 Sites A to E
 millstones and querns (grinding stones) 17, 19, 54, 125,
 126-8, 224, 225-6, 227
 Milner family 69
 Minnis Bay (Kent) 209
 mollusca 169
 freshwater 191
 Montfort, Henry de 4, 5, 6, 8, 15-16
 Montfort, Juliana (née Murdac) 6
- Montfort, Robert de 6, 8
 Montfort, Thurstan de 6
 Montfort, Thurstan (son of Henry) 6, 8
 Montfort/Percy mills (Site C) 2, 5-6, 9, 10, 15-16, 17,
 18, 21
 Morett, Co. Laois (Ireland), mill 223
 Mortain, Count of 2
 mortar 242
 mound *see* grain dump
 Mount Ferrant castle, Birdsall 4
 mounts, copper-alloy 130
 Murdac, Geoffrey 6
- nails
 iron 58, 69, 139-40
 horseshoe 139-40, 227, 228
 joinery 139, 140, 228
 Near Cliff field 5, 21
 Neolithic 175
 adze 124, 125
 hurdling 209
 Northampton (Northants), knife handle 143
 northern mill (Site B) 10, 15, 21, 227
 alleged site of 13, 14, 15
 North Manor
 animal bone 153, 154, 155, 157, 159, 159, 161, 162
 162, 163, 164, 167, 168, 229, 232, 234, 236, 242
 horseshoe nails 140
 horseshoes 227
 pottery 75, 77, 79, 83, 107, 227
 North-West Enclosure, horse bones 242
 Norway 175, 224
 Norwich (Norfolk), knife handle 143
 Nut Wood 15, 176
- Old Windsor (Berks), mill 224
 Ordnance Survey maps 9, 13, 19
 ovens/hearths, ash of 217, 219
 ovens/kilns, fuel for 199, 217-18, 225, 227
 oxshoes 138, 139
- padlock bolt and keys, iron 133, 134
 park, Wharram Percy 8
 pasture 157, 176, 216
 patten ring, iron 134
 paved area 64
 peas 199, 218, 219
 peasant buildings, pottery 83
 pebbles, as counters? 123
 peg, wood 140, 141, 143
 pendant *see* harness pendant
 penstocks 224
 Percy family 2, 5-6, 7, 9, 18, 21
 Percy, Eustacia (m. Walter de Heselton) 8
 Percy, Henry de, lord of Spofforth (d. 1368) 8
 Percy, Henry, rector 8
 Percy, Peter (son of Robert) 8
 Percy, Robert de (d. 1321) 6, 8, 18, 21
 Inquisition *post mortem* 8, 21

- Percy, William de 6, 7-8
 perforated pig metapodia 143, 144, 145
 Phase 1 features 26-40, 175, 176, 225, 226
 burnt clay 242
 charcoal 242
 environment and economy 214-15, 216-17
 pottery 225
 radiocarbon dating 221, 222
 Site 71 plant macrofossil remains 191-5, 214-19
 Phase 1.1 milling site and first dam 26-34, 28-9, 224;
 see also grain dump
 Phase 1.2: 34-40, 222, 223
 Phase 2 clay dam and ponds 40-45, 222
 environment (plant remains) and economy 185-9,
 190-91, 215-16, 217
 insects 210-14
 pottery 225
 Site 71 plant macrofossil remains 191-5, 216
 slag 243
 Phase 2.1 first clay dam 25, 38-9, 40, 44, 225
 Phase 2.2 dam modification 42-3, 44-5
 Phase 3 chalk and earth dam 25, 45-54, 46-7, 226-7
 channels (1357) 46-7, 50, 51, 227
 charcoal 242
 plant remains 191
 pottery 225
 Site 71: 45, 46-7, 48, 227
 spillway channel (1262) 46-7, 50, 226
 Phase 4 west end surfaces and features 25, 54-65, 227
 charcoal 242
 environment and economy 216, 217-18
 mortar 242
 pottery 227
 Site 71: 69-70, 69, 191, 195, 227-8
 Phase 4.1 western pond margin 52, 54, 55, 58
 Phase 4.2: 56-7, 58-64, 59, 60
 Phase 4.3: 62-3, 64-5
 Phase 5 post-medieval surfaces and features 62-3, 68,
 228
 Site 71: 70, 71
 Phase 6
 channel 68
 sandstone wall (582) 66-7, 68, 228
 Phase 6-8, Site 71: 70, 71
 Phase 7 sheepwash 66-7, 68-9, 68, 228
 Phase 8 waterworks 69
 Philip, Abbot 4
 pin, copper-alloy 130, 131
 pit-like feature (12a) 61
 pits 58
 Phase 4.1: 54
 Phase 4.2: 58
 Phase 5 post-medieval 68
 Phase 8 modern 69
 Site 67 cattle burial 71
 planks 34
 (597) 68
 plant remains (vegetation), post-Saxon 175-84, 214-19
 medicinal 219
 Site 30 charred 185-91, 214-19
 Site 71 macrofossils 69, 151, 191-200, 214-19
 see also grain deposit; grain dump
 platforms
 artificial chalk (245) 33, 49
 pebble and gravel (612) 26, 30-31
 ploughs
 ard or swing-wing 190
 horse-drawn 168, 169
 pollen *see* plant remains
 pond area boundary 54
 ponds *xiv*, 1, 2, 7, 8, 215, 224
 clearance (Site 67) 71
 depression (273) as? 34, 226
 insects from sediments 210-14, 215, 216, 217
 “Milndam” 8
 modern timber sluice 13
 north 8
 Phase 1.1: 34, 175, 214-15
 Phase 2.2
 first silt (1474) 44, 48
 second clay dam pond 44, 215-16
 upper silts (1297) 30-31, 35, 45
 Phase 3: 216
 Phase 4.3 silts (1122, 1123) 65, 216
 Phase 5 filling up with clay and silt 68
 recreated (1970) 23, 23, 175
 retting in 175, 184
 Site A 9, 10, 11-12, 13
 Site D 17, 21
 storage capacity 224
 vegetation (plant remains) 183, 214-19
 watering animals 226
 Wharram Percy mills 8
 post-holes
 Phase 1.1: 33
 Phase 3: 54
 Phase 3, timber lining of spillway(?) 46-7, 50
 Phase 4.1: 54
 Phase 4.2: 58, 61
 Phase 4.3: 60, 64
 Phase 5: 68
 Phase 6: 68
 Site 71 Phase 5: 71
 Site 71 Phases 6-8: 71
 postpads (44 and 92) *see* mill building
 pottery 73-121, 225, 226
 prehistoric 73
 Roman 73
 A03 gold mica-tempered Anglo-Saxon 73
 A04B sandstone-tempered Anglo-Saxon 73, 94-
 104
 A05 quartz-tempered Anglo-Saxon 73, 94-104
 B04 Torksey-type ware 73, 89-91, 94-104, 108,
 112
 B05 Stamford-type ware 73, 74, 94-104, 106, 107,
 108, 119, 120
 B07 Pimply Ware 75, 84-7, 88, 89-91, 94-104, 108,
 110-21

- B08 Pimply Ware variant 75, 94-104
 B09 Glazed Pimply 75, 94-104, 108
 B10 Splash Glazed (Splashed Pimply) 75, 84-7, 88, 93, 94-104, 107, 108, 110-21, 128
 B11 Pink gritty (Scarborough Gritty; Pink Pimply) 75, 83, 84-7, 88, 94-104, 108, 110-21
 B12 Staxton Ware 74, 75, 84-7, 88, 89-91, 92, 93, 94-104, 105, 106, 107, 108, 109, 110-21
 B13 Glazed Staxton 75, 76, 88, 89-91, 92, 93, 94-104, 106, 108, 110-21
 B14 Reduced Chalky 73, 88, 89-91, 94-104, 107, 110-21
 B16 Beverley 1 75, 94-104, 105, 106, 108, 110-21
 B17 Scarborough 77, 78, 84-7, 89-91, 93, 94-104, 106, 107, 108, 110-21
 B18 York Glazed 75, 76, 77, 84-7, 88, 89-91, 92, 93, 94-104, 106, 107, 108, 110-21
 B18U Unglazed Whiteware 76, 77, 84-7, 88, 89-91, 94-104, 106, 108, 110-21
 B19 Gritty 77, 78, 84-7, 88, 93, 94-104, 105, 106, 107, 108, 110-21
 B20 Brandsby-type 77, 78, 84-7, 89-91, 92, 93, 94-104, 105, 106, 108, 110-21, 128, 226, 228
 B21 Hard Sandy (Hard Brandsby) 77, 89-91, 94-104, 108, 110-21
 B22 Hard Orange Ware (Brandsby/Humber) 77, 78, 79, 84-7, 88, 89-91, 92, 93, 94-104, 105, 106, 107, 108, 109, 110-21, 128, 226
 B23 Yorkshire Red ware 79, 80, 84-7, 88, 89-91, 94-104, 106, 107, 108, 109, 110-21
 B26 Lightly Gritted (Unknown) 79, 80, 93, 94-104, 105, 108, 110-21
 B27 Splashed Glazed Orange 75, 84-7, 92, 93, 94-104, 108, 110-21
 B28 Splashed Glazed Chalky (Beverley 1 type) 75, 88, 93, 108, 110-21
 B30 Fine micaceous 79, 80, 88, 93, 94-104, 106, 107, 108, 110-21
 B31 Coarse Micaceous 79, 88, 89-91, 94-104, 108, 110-21
 B32 Fine Buff 77, 94-104, 108, 110-21
 B33 Saintonge 81, 89-91, 107, 110-21
 B34 Tees Valley 79, 80, 81, 84-7, 88, 93, 94-104, 106, 108, 110-21
 B35 Light Red ware 81, 89-91, 94-104, 106, 107, 108, 110-21
 B36 Brill/Boarstall type 79, 94-104, 108, 110-21
 B37 Unidentified type 81, 82, 94-104, 105, 108, 110-21
 B Unrecognised medieval 81, 82, 83, 84-7, 88, 92, 93, 94-104, 105, 106, 107, 110-21
 C01 Hambleton ware 81, 82, 84-7, 89-91, 92, 94-104, 105, 107, 108, 110-21
 C02 Humber ware 81, 82, 83, 84-7, 88, 89-91, 92, 93, 94-104, 105, 106, 107, 108, 109, 110-21
 C03 Chalky Humber ware 83, 89-91, 93, 94-104, 105, 106, 107, 108, 110-21
 C04 Humber ware Spoutless Jugs ('Skipton-on-Swale') 83, 89-91, 92, 94-104, 105, 108, 110-21
 C05 Purple-glazed Humber ware 83, 94-104, 108
 C08 Cistercian ware 83, 94-104, 105, 108
 C11 Rawmarsh-type ware 83, 84-7, 89-91, 107, 108, 110-21
 C12 Late Medieval Gritty 82, 83, 108
 C Unrecognised medieval 81, 82, 84-7, 89-91, 92, 93-104, 105, 107, 108, 110-21
 pottery forms (*selective*) 107-8
 cisterns 81, 82, 83, 105
 cooking pots 107-8
 cup 83
 curfews 75, 92
 peat pots 75, 107
 salt or condiment 79, 107
 seal jug 75, 92
 urinal 81, 82, 83, 109
 precinct boundary (*curia*) wall 16-17, 17, 18-19, 18, 21
 prehistoric
 barrow reused 20
 monuments 1
 pottery 73
 stone tools 124, 125
 trackway 208
 pumping station 13, 69, 228
 Purbeck Marble 128
 querns *see* millstones and querns
 radiocarbon dating 221-2, 224, 225
 animal bone 221, 222, 225
 carbonised grain 221, 222
 shovel 221, 222
 wattle fragments 200, 221, 222, 225
 rectory 228
 register of abstracts *see* British Library (BL Cotton Vit. C. vi)
 residues
 black 109
 white 109, 227
 retting-ponds 175, 184, 217
 revetments 227
 (1200) 64, 65, 65
 (1378) wall 54
 (1379) chalk rubble 46-7, 51, 54
 wattling (line 2) 34
 Richard I 4, 5
 ridge and furrow *xiv*
 rings, iron 68, 134
 roads, to York 4, 19
 Roger, thirteenth abbot 7
 Roman
 hurdling 209
 pottery 73
 roofing stone 128
 rope-making 184
 Rowland's Track, Neolithic 209
 rubbing stone, cobble 126
 Rudston, cursus 1

- St Leonard's Hospital, York, mills 2, 6-7, 20
- St Martin's church *xiv*, 228
- advowson 8
 - memorial(?) stone 128
 - nave wall 68
 - sandstone from 123
 - window glass 129
- sandals 145, 148
- sandstone
- from church 123
 - in rubble layers 69
 - tips (589, 591, 592) 68
 - tips (Phase 4.1) 54
 - tumble (1193) 65
 - wall 66-7, 68
- saw wrest 132
- Schirreve Mill 7
- scissors blade, iron 132, 133
- Scottish raids 21, 22
- Scrope, Geoffrey le 8
- 'seat of the grange' 21
- shears blade, iron 132, 133
- sheepcote 21
- sheep rearing 157, 176
- sheep shears 132
- sheepwash 9, 15, 66-7, 68-9, 68, 228
- concrete (c. 1927) 68, 228
- Sherburn (N. Yorks) *xiii*, 242
- shoes *see* footwear
- shovel blade, wood 140, 141, 142-3, 226
- radiocarbon dating 221, 222
- silicified chaff 199, 200, 217-18
- Sites 9 and 12
- animal bone 153, 155, 157, 159, 159, 162, 169, 229-42
 - fish bone 169-75
- Site 67: *xiv*, 71
- clay tile 129
 - nails 139
 - pottery 73, 79
- Site 71: *xiv*, 23, 24, 25, 26-34
- Areas 1 and 2: 69
 - brick 129
 - building stone 128
 - burnt clay 242
 - charcoal 242
 - clay tile 129
 - finds 130-49
 - graveyard boundary (Phases 4-8) 69-71
 - millstones and querns 126-8
 - mollusca 169
 - nails 139, 140
 - Phase 1: 26-40, 191-5, 214, 215
 - Phase 2: 40, 191-5, 216
 - Phase 3: 45, 46-7, 48, 48, 227
 - Phase 4: 69-70, 69, 191, 195, 216, 227-8
 - Phase 5: 70, 71
 - Phases 6-8: 70, 71
- plant macrofossil remains 151, 191-200, 215, 216, 217
 - pottery 73, 79, 86-7, 88, 89, 226, 227
 - wattling and posts from graveyard 200-202, 206-10, 215
- Site 82K, animal bone 164, 169, 232
- Site A southern mill and pond 9, 10, 11-12, 13, 21, 225
- Site B northern mill(?) 10, 13, 14, 15, 21, 227
- Site C Montfort/Percy mill and dam 5-6, 9, 10, 15-16, 17, 18, 21
- Site D Meaux Abbey grange mill 10, 15, 16-19, 17, 20-21
- boundary bank, post-medieval? 17
 - dam 17-18, 18, 21
 - ditch (overflow channel?) 17, 18, 18
 - flooding extents 18
 - ford? 19
 - hollow ways 19
 - millrace 18
 - pond 17, 21
 - precinct boundary wall (*curia*) 16-17, 17, 18-19, 18, 21
- Site E *see* Wharram le Street
- Skeldergate, William de 8
- slag 243
- Iron Age Grey 243
- Sledmere *xiii*, 1
- smithy site, South Manor 243
- snails, land and water 191, 194
- soil mark 58, 68
- soils 215, 216, 217, 218, 219
- soke mill (soke monopoly) 20, 21
- Somerset Levels, trackways 200, 209
- South Glebe Terrace
- cereals 218
 - pottery 73
- South Manor
- animal bone 153, 157, 159, 159, 161, 162, 162, 164, 167, 232
 - grain drier 218
 - grinding stones 123
 - horseshoe nails 140
 - horseshoes 227
 - perforated pig metapodia 145
 - plant remains 215, 217, 218, 219
 - pottery 75, 77, 79, 81, 83, 107, 227
 - smithy site 243
- southern mill *see* Site A
- spade-iron 132, 133
- spillways 225
- (1262) 46-7, 50, 68, 226
 - (1578) 33, 44
 - (1603) channel 40, 41, 44, 45
 - lip development 50
 - Phase 2.2: 42-3, 44
 - timber lining(?) 46-7, 50
- spindlewhorls
- bone 236, 237
 - chalk 124, 125

- springs 1, 2, 3, 5, 9, 13, 21, 33, 44, 50, 68, 69, 175, 224, 226, 227, 228
 spur, iron 133, 134, 228
 staples, iron 132, 133
 stirrup, iron 54, 138, 138
 stockfish (dried) 169, 170, 175
 stock metal 243
 stone bearing (WP54/249) 224
 stonework *see* footings/edgings
 stonewort (*Chara*) 200, 216
 storage tank, for fish 225
 straps, iron (buildings or furniture) 133, 134
 stream *see* watercourse
 structural timber (no.7), from mill building? 140, 141, 143, 225
 structural woodwork 140, 142, 143
 structures
 Phase 1.1 (timbers 270, 271 and post-hole 272) 33
 Phase 4.2: 61, 64
see also mill building
 stud/button manufacture 131
 stud head, copper-alloy 130, 131
 Stuteville, Nicholas de 6, 8
 surfaces
 (7) chalk pebble 59, 65, 68
 (50) chalk 59, 61
 (1016) chalk 54
 (1046) chalk pebble 51, 54
 (1093) clay and rubble 65
 (1094) chalk 'concrete' 55, 58, 59, 61
 (1095) chalk 'concrete' 55, 58, 61
 (1167, 1168) chalk 65, 68
 (1223) chalk pebble 56-7, 64, 65
 (1224) clay and rubble 65
 (1346) chalk 54
 (1567) chalk pebble 38-9, 40
 chalk pebble 61
 Site 67 'concrete' chalk 71

 tack, copper-alloy 130
 tailrace (depression 273?) 34, 226
 Tamworth (Staffs) 127, 223
 Thixendale *xiii*
 church 228
 mill 7
 route to 227
 tofts burned by Scots 22
 Thornlund 4, 5, 20
 Thrislington (Co Durham), animal bone 242
 tile, clay 129
 timber linings
 embayment cut 54
 spillway? 46-7, 50
 timber staining (barrier?) 42-3, 44-5, 226
 toe iron 134
 toggle, bone 237
 tool handle(?), wood 140, 141, 142
 tools, wooden 140, 141, 142-3

 tooth-brush, bone 143
 'Town Grange' 5, 7
 trackways 5, 13, 17, 19, 20, 25, 227
 (7) 228
 (264) 71
 footpath (across top of dam) 12, 13, 227
 Phase 4.3 causeway 64, 65, 65, 227
 prehistoric 208
 wattle 202
 tree-ring analysis, of wattling and posts 200-10, 225
 trenail 140, 141, 143
 turf line (8) 71
 Turneham, Isabel (m. de Mauley) 2
 Turneham, Joan de (née Fossard) 2
 Turneham, Robert de 2, 4

 Upper Gipse Race 1
 uric acid (white residue) 109

 Vescy, Eustace de 6
 vessels
 cast-iron 138
 glass 129
 iron 133, 134
 wooden 140, 142
 Vessey Ponds 1
 vicarage house 228

 walls
 (41) 40, 40
 (93) boundary 48
 (130) 71
 (130) chalk boundary 49, 70
 (202, 214, 218) chalk rubble 46-7, 48, 48, 51
 (581) brick 68
 (582) sandstone 66-7, 68, 228
 (1378) revetment 54
 Walter of Henley 168
 Walton Heath track 209
 watercourses (stream) 1-2, 3, 4-6, 5, 7, 13, 15, 19, 21, 68, 224
 field survey of stream 9
 water-mill *see* mill
 water tower, disused 17, 19
 waterworks (1930s) 26, 50, 69, 228
 wattle posts 202
 radiocarbon dating 225
 WP1, WP3, WP5-6, WP17-18 (Phase 1.2) 34, 37, 202
 WP2: 37, 202
 WP4 202
 WP7-10 (Phase 1.1) 33, 37, 204
 WP11: 37, 205
 WP12 205-6
 WP13, WP14 206
 WP16: 37
 wattling 223, 226
 imprints on burnt clay 242

- Line 1: 37, 201, 202
 Line 2 (revetments?): 27, 34, 37, 200, 201, 202, 203, 204, 208, 225
 Line 3: 37, 201, 204
 Line 4: 33, 37, 201, 203, 204-5, 208
 Line 5: 27, 33, 37, 201, 203, 205, 208
 posts and planks (131) 33-4, 34
 radiocarbon dating 221, 222, 225
 Site 30 millpond 200-210, 214, 215, 222, 223
 Site 71 graveyard 200-202, 206-10, 214, 215
 tree-ring analysis 200-210, 225
see also wattle posts
 Weedley (E. Yorks), windmill 20
 weir 222, 226
 welding scale 243
 West Cotton (Northants)
 animal bone 242
 insect pests 214
 mill 223, 224
 millstones and querns 127
 Western Hillside Terrace 227
 Western Hillside Terrace 1: 44
 Western Hillside Terrace 2: 42-3, 44, 45
 Western Hillside Terrace 3: 42-3, 45, 48, 54, 58, 64
 Western Hillside Terrace 4: 50, 54, 58, 61, 64
 western margin watercourse, silting (1474) 44
 western pond margin, Phase 4.1: 52, 54, 55, 58
 West Heslerton *xiii*, 219
 Wetwang *xiii*, 1
 Wharram Grange Farm 4, 5, 19, 20, 21
 Wharram le Street *xiii*
 manorial interests and mills 2-7, 20
 manorial mill(?) and dam (Site E) 10, 19, 20, 226
 pond 1
 watercourse 2, 6
 white residues (limescale and uric acid) 109, 227
 William of Newburgh 1
 Winchester (Hants), batten 142
 windmills 7, 20
 window came and lead 131
 window glass 129
 Windsor Great Park, insects 213
 wire, copper-alloy 130
 Wolds Way 13
 wood fragments 50
 wooden objects 140, 141, 142-3
 structural timber (no.7), from mill building? 140, 141, 143, 225
 structural woodwork 140, 142, 143
 tools 140, 141, 142-3
 vessels 140, 142
 woodland 8, 175, 184, 195, 200, 206-10, 214, 215, 216, 218
 woodworking waste (offcuts and fragments) 140, 143
 Wookey (Somerset), millstone 127
 wool comb teeth 236
 wool production and trade 162, 164, 168
 yard surfaces
 (80, 95) 71
 (155) chalk 49, 70
 York
 caskhead battens 142
 Coppergate 142, 209
 knife handle 143
 pottery 75, 79
 St Mary's Abbey 7
 shovel blade 142
 trenails 143
 see also St Leonard's Hospital
 Yorkgate 5, 10, 21
 'York Gate Lands' 5, 19

