Excavations at Magdalen College, Oxford

Medieval and Later Suburban Tenements and the Cemetery of the Hospital of St John



by Steve Teague, Helen Webb, Louise Loe and Ben M Ford

Oxford Archaeology
Thames Valley Landscapes
Monograph no. 47

ARCHAEOPRESS

Excavations at Magdalen College, Oxford

Medieval and Later Suburban Tenements and the Cemetery of the Hospital of St John

by Steve Teague, Helen Webb, Louise Loe and Ben M Ford

with specialist contributions by
Leigh Allen, Rebecca Allen, Kyriaki Anastasiadou, Eleanor Blakelock, Paul Blinkhorn, Tom Booth, Anni Byard, Chris J Carey, John Cotter, Robin Darwall-Smith, Mike Donnelly, Julie Dunne, Richard P Evershed, Toby Gillard, John Giorgi, Dana Goodburn-Brown, Seren Griffiths, Kevin Hayward, Lynne Keys, Mandy Kingdom, Richard I Macphail, Julia Meen, Julian Munby, Rebecca Nicholson, Cynthia Poole, Iulia Rusu, Ian R Scott, Ruth Shaffrey, Ian Smith, Kirsty Smith and Iain Watt

Illustrated by
Charles Rousseaux and Magdalena Wachnik

Thames Valley Landscapes Monograph No. 47
2026
Archaeopress Archaeology

ARCHAEOPRESS PUBLISHING LTD
13-14 Market Square
Bicester
OX26 6AD
United Kingdom
www.archaeopress.com

Oxford Archaeology
Janus House, Osney Mead
Oxford
OX2 0ES
United Kingdom
www.oxfordarchaeology.com

For sales and distribution enquiries please contact:
ARCHAEOPRESS PUBLISHING LTD
www.archaeopress.com
info@archaeopress.com

Excavations at Magdalen College, Oxford
Medieval and later Suburban Tenements and the Cemetery of the Hospital of St John
by Steve Teague, Helen Webb, Louise Loe and Ben M Ford

978-1-80583-358-1 (Print)
978-1-80583-359-8 (eBook)

© 2026 Oxford Archaeology Ltd

Front cover: Post-medieval Buildings 9 and 10 and boundary wall 3312 during excavation
Rear cover: Glass bottle seal from Magdalen College Common Room dated 1769, from demolition of Building 9; a selection of ceramic wig curlers from the same deposit; amber and jet paternoster beads, lost or discarded in 14th/15th century drain 8077; medieval tuning pegs from Tenement B

The publication and appendices are available on the Oxford Archaeology Knowledge Hub at https://knowledge.oxfordarchaeology.com/12921

All rights reserved. No part of this book may be reproduced, or transmitted, in any form or by any means, electronic, mechanical, photocopying or otherwise, without the prior written permission of the copyright owners.

Typeset by Production Line, Oxford

Contents

List of Figures ..... **ix**
List of Tables ..... **xiii**
Summary ..... **xvii**
Acknowledgements ..... **xix**

Chapter 1: Introduction *by Steve Teague and Julian Munby*

Location, geology and topography **1**
Archaeological and historical background **1**
Overview **1**
Documentary history of the site *by Julian Munby and Robin Darwall-Smith* **6**
Previous archaeological investigations at Magdalen College **12**
Historic building recording **13**
Project methodology **13**
Fieldwork methodology **13**
Phasing **17**
Research aims and objectives **17**
Report structure **20**
Archive **20**

Chapter 2: Archaeological sequence *by Steve Teague*

Phase 1 (10th to mid-11th century) **21**
The southern area **21**
The western area **24**
Phase 2 (late 11th to mid-12th century) **25**
Tenement boundaries **25**
Tenement A **25**
Tenement B **27**
Tenement C **28**
Phase 3 (late 12th to early 13th century) **29**
Tenement A **29**
Tenement B **31**
Tenement C **32**
Cemetery **34**
Phase 4 (13th century) **38**
Tenement A **38**
Tenement B **44**
Tenement C **47**
Site of the cemetery **49**
Phase 5 (14th to early 15th century) **49**
Tenement A **49**
Tenement B **56**
Tenement C **63**
Site of the cemetery **64**

Phase 6 (mid-15th to mid-16th century) . . . 64
Tenement A . . . 64
Tenement B . . . 68
Tenement C . . . 76
Site of the cemetery . . . 77
Phase 7 (late 16th to mid-17th century) . . . 78
Survival of post-medieval levels . . . 78
Tenement A (The Greyhound Inn) . . . 78
Tenement B . . . 78
Tenement C . . . 81
Phases 8 and 9 (late 17th to early 19th century) . . . 81
Tenement A (The Greyhound Inn) . . . 81
Tenement B . . . 83
Tenement C (Magdalen College stables) . . . 85
Phase 10 (mid-19th century and later) . . . 86

Chapter 3: Artefactual evidence

Pottery *by Paul Blinkhorn* . . . 87
Methodology . . . 87
The assemblage . . . 87
Qualitative and quantitative analysis and chronology . . . 87
Occurrence by tenement . . . 90
The assemblage by ceramic phase . . . 92
Overview and discussion . . . 113
Fired clay *by Cynthia Poole* . . . 117
Introduction . . . 117
Methodology . . . 117
Fabrics . . . 117
Forms . . . 118
Conclusion . . . 119
Mortar and plaster *by Cynthia Poole* . . . 120
Ceramic building material *by Kirsty Smith* . . . 120
Introduction . . . 120
Methodology . . . 122
Fabrics . . . 122
Forms . . . 124
Distribution and discussion . . . 129
Stone roofing material *by Kevin Hayward* . . . 132
Introduction . . . 132
Previous work . . . 132
Geological setting . . . 132
Methodology . . . 133
Results . . . 133
Summary: quarrying and supply of roofing tile to medieval ecclesiastical buildings in Oxford . . . 136
Architectural freestone and paving materials *by Kevin Hayward* . . . 136
Introduction . . . 136
Previous work . . . 136
Geological setting . . . 137

Methodology . . . 137
Petrology . . . 138
Moulding form . . . 140
Summary . . . 141
Stone objects *by Ruth Shaffrey* . . . 141
Sharpening stones . . . 141
Mortars and vessels . . . 143
Other stone objects . . . 150
Glass *by Anni Byard* . . . 153
Introduction . . . 153
The assemblage . . . 154
Conclusions . . . 156
Beads *by Ian R Scott and Anni Byard* . . . 159
Introduction . . . 159
The assemblage . . . 160
Discussion . . . 160
Coins, jettons and tokens *by Ian R Scott and Anni Byard* . . . 160
Introduction . . . 160
The assemblage . . . 160
Metalwork and worked bone *by Leigh Allen* . . . 162
Introduction . . . 162
The assemblage . . . 163
Worked shell objects *by Rebecca Nicholson* . . . 178
Iron slag and related high-temperature debris *by Lynne Keys* . . . 179
Methodology . . . 179
Explanation of terms and discussion of the slag types in the assemblage . . . 179
Discussion of the activity by phase . . . 181
Clay tobacco pipes *by John Cotter* . . . 183
Introduction . . . 183
Methodology . . . 183
The assemblage . . . 184
Wig curlers *by Rebecca Allen, with analysis provided by Dana Goodburn-Brown* . . . 188
Introduction . . . 188
Methodology . . . 188
Forms . . . 188
Manufacture . . . 189
Evidence of use and other materials found on the curlers . . . 189
Discussion . . . 190
Worked flint *by Mike Donnelly* . . . 190

Chapter 4: Environmental evidence

Mammal and bird bone *by Ian Smith* . . . 193
Introduction . . . 193
Taphonomy: bone surface texture and condition . . . 193
Butchery . . . 193
Phase 1: 10th to mid-11th century . . . 193
Phase 2: late 11th to mid-12th century . . . 201
Phase 3: late 12th to early 13th century . . . 203
Phase 4: 13th century . . . 204

Phase 5: 14th to early 15th century . . . 206
Phase 6: mid-15th to mid-16th century . . . 208
Phase 7: late 16th to mid-17th century . . . 210
Phase 8: late 17th to early 18th century . . . 210
Phase 9: mid-18th to early 19th century . . . 211
Discussion . . . 211
Fish bone *by Rebecca Nicholson* . . . 212
Phase 1: 10th to mid-11th century . . . 212
Phase 2: late 11th to mid-12th century . . . 214
Phase 3: late 12th to early 13th century . . . 214
Phase 4: 13th century . . . 214
Phase 5: 14th to early 15th century . . . 214
Phase 6: mid-15th to mid-16th century . . . 215
Fishing the waters around Oxford . . . 216
Fish marketing and consumption . . . 216
Plant remains *by John Giorgi* . . . 217
Phase 1: 10th to mid-11th century . . . 218
Phase 2: late 11th to mid-12th century . . . 221
Phase 3: late 12th to early 13th century . . . 222
Phase 4: 13th century . . . 223
Phase 5: 14th to early 15th century . . . 228
Phase 6: mid-15th to mid-16th century . . . 229
Conclusion . . . 235
Charcoal *by Julia Meen* . . . 236
Introduction . . . 236
Utilisation of wood resources from the Anglo-Saxon period to the mid-16th century . . . 236
Trends in wood species preference . . . 239
Use of wood as an industrial fuel . . . 239
The charcoal assemblage within the context of medieval Oxford . . . 241
Evidence for woodland availability and management . . . 241
Marine shell *by Rebecca Nicholson* . . . 242
Avian eggshell *by Rebecca Nicholson* . . . 242
Soil micromorphology and geochemistry *by Richard I Macphail and Chris J Carey* . . . 242
Introduction . . . 242
Tenement A . . . 242
Tenement B . . . 243
Radiocarbon dating of the cemetery *by Seren Griffiths* . . . 244
Introduction . . . 244
Methodology . . . 244
Bayesian model . . . 246
Conclusions . . . 247

Chapter 5: Human skeletal remains *by Helen Webb and Louise Loe*

Introduction . . . 249
Assemblage composition . . . 250
Methodological bias . . . 252
Excavation bias and burial zonation . . . 253
Cultural and social practices . . . 254
Nature of the buried population – a hospital population . . . 255

Health . . . 256
Non-specific inflammation and specific infection . . . 257
Dietary status . . . 261
Congenital deformity, social perception and care . . . 270
Occupation and activity . . . 272
Trauma and interpersonal violence . . . 273
The population – summary and conclusions . . . 274

Chapter 6: Discussion *by Steve Teague*

The site before the development of the tenements . . . 277
Before the burh . . . 277
The burh hinterland . . . 277
The early development of suburban tenements . . . 279
Origin and organisation of the tenements . . . 279
Early evidence for smithing . . . 280
Buildings and occupants . . . 281
The cemetery and the Hospital of St John . . . 283
A Jewish or hospital cemetery? . . . 283
The origin of the cemetery . . . 284
The cemetery population . . . 285
Later medieval development . . . 286
Buildings and occupants . . . 286
The rebuilding of the tenements (1478–87) and later developments . . . 291
Diet and status in the late 15th and mid-16th centuries . . . 291
The Greyhound (Tenement A) . . . 291
The tenements of William Bryce and Nicholas Kyrke (Tenement B) . . . 292
The tenement of Edward Combes and William Shaw (Tenement B) . . . 295
The tenement of John Broughton (Tenement B) . . . 296
The tenement of Thomas Cooper (Tenement C) . . . 296
Conclusions . . . 296

Bibliography . . . 299

Index . . . 315

List of Figures

Chapter 1

1.1 Site location. . . . 2
1.2 Extract from Agas's map of Oxford (1578) . . . 3
1.3 Extract from Loggan's map of Oxford (1675) . . . 3
1.4 Extract from Taylor's map of Oxford (1750) . . . 4
1.5 Extract from the 1:500 Ordnance Survey Oxford Town plan (surveyed 1874, published 1880) . . . 4
1.6 The new Magdalen College School in 1851 from Longwall Street (Magdalen College Archive, MC: FA1/9/4P/1 fol.12 No.1) . . . 5
1.7 The interior of the New Library following removal of all floors . . . 13
1.8 Trench plan . . . 14
1.9 Excavation areas to the rear of the New Library, viewed from the library roof . . . 15
1.10 Excavation in progress, with the New Library to the left and Longwall Street in the background 15
1.11 View across the medieval cemetery towards the New Library . . . 16
1.12 Excavating late medieval stone-lined drain 9205 in one of the trenches within the interior of the New Library . . . 16
1.13 Simplified plans showing the principal site phases. . . . 18
1.14 Land-use diagram interpreting the excavated evidence . . . 19

Chapter 2

2.1 Phase 1. . . . 22
2.2 Sections 5030, 5031, 5010, 5080 and 5100 . . . 23
2.3 Ditch 7710 (Ditch 1) in Trench 120, view towards east, scale 1m. . . . 24
2.4 Possible track (Ditch Group 2), view towards south, scale 2m . . . 24
2.5 Phase 2. . . . 26
2.6 Postholes 7895 and 7896, Structure 1, view towards west, scale 0.5m . . . 27
2.7 Hearth 7195, showing scorched clay 7188, Structure 4, view towards south, scale 0.5m . . . 29
2.8 Phase 3. . . . 30
2.9 Posthole 6836, Structure 5, view towards north, scale 0.5m . . . 33
2.10 The cemetery . . . 34
2.11 Section 3008 . . . 35
2.12 General view of cemetery, evaluation trench 5, view towards west, scales 2m, 1m and 0.5m . . . 35
2.13 Grave 3128 showing head niche, view towards west, scale 0.5m . . . 38
2.14 Phase 4: Overall plan . . . 39
2.15 Phase 4: Tenement A . . . 40
2.16 Phase 4: rear of Tenement A and former cemetery area . . . 41
2.17 Hearth 7686, Room 1, Building 1, view towards west, scale 0.5m . . . 42
2.18 Well 4073, view towards south, scales 1m and 0.5m . . . 43
2.19 Well 5041, view towards north-east, scale 1m. . . . 43
2.20 Phase 4: Tenement B . . . 45
2.21 Hearth 8739, Room 2, Building 2, view towards east, scale 0.5m . . . 46
2.22 Hearth 4341, Structure 8, view towards east, scale 1m . . . 47
2.23 Phase 4: Tenement C . . . 48
2.24 Phase 5: Overall plan . . . 50
2.25 Phase 5: Tenement A . . . 51
2.26 Furnace/hearth 7832/7833, Room 1, Building 1, view towards east, scale 1m . . . 52
2.27 Furnace/hearth 7832/7833, Room 1, Building 1, view towards west, scale 1m . . . 52
2.28 Hearth 7227, Room 1, Building 1, view towards east, scale 1m. . . . 52
2.29 Drain 8077, Room 1, Building 1, view towards west, scale 1m . . . 52
2.30 Cobbled surface 4743, Building 5, view towards north, scales 2 x 2m . . . 53

2.31 Hearth 21611, Building 5, view towards east, scale 1m. . . . 53
2.32 Phase 5: rear of Tenement A and former cemetery area 54
2.33 Hearth 4582, Building 4, view towards west, scale 2m 55
2.34 Pit 4301, Pit Group 14, view towards west, scale 1m. . . . 56
2.35 Phase 5: Tenement B 57
2.36 Hearth 8711, Room 2, Building 2, view towards east, scale 1m 58
2.37 Hearth 8976, Room 2, Building 2, view towards west, scale 0.5m 58
2.38 Hearth 8990, Room 2, Building 2, view towards north-west, scale 0.5m 58
2.39 Hearth 8708, Room 2, Building 2, view towards south, scale 1m 58
2.40 Wall 9163, Building 6/7, with a large ammonite fossil visible on the upper layer, view towards north-west, scale 2m 59
2.41 Floor 9136, Building 6, view towards south, scale 1m. . . . 60
2.42 Millstone (SF 3150), set into floor of Building 6, view towards south, scale 0.5m 60
2.43 Wall 3785, Building 7, view towards east, scale 2m. . . . 61
2.44 Hearth group 4781, Room 2, Building 7, view towards south-east, scale 1m 61
2.45 Walls 3600/4243 and pit 3901/10202 under excavation, view towards south, scales 1m 61
2.46 Phase 5: Tenement C 62
2.47 Hearth 7122, Room 1, Building 3, view towards south, scale 0.5m. . . . 63
2.48 Street surface 6100, and refacing 6141 of south wall of Building 3 (overlain by late 18th-century college stable foundations), view towards north, scales 1m and 2m 64
2.49 Phase 6: Overall plan 65
2.50 Phase 6: Tenement A 66
2.51 Wall 7207, Building 1, view towards south, scale 1m 67
2.52 Latrine Structure 6, view towards south-east, scale 1m 67
2.53 Stone-lined pit (Structure 13), view towards east, scales 1m and 2m. . . . 68
2.54 Phase 6: rear of Tenement A and former cemetery area 69
2.55 Phase 6: Tenement B 70
2.56 Hearth 8681, Room 3, Building 2, view towards south, scale 0.5m. . . . 71
2.57 Hearth 8650, Room 3, Building 2, view towards south, scale 1m 71
2.58 Fireplace 8232, Room 4, Building 2, view towards east, scale 0.5m 72
2.59 Hearth 9090, Building 6, view towards east, scale 1m. . . . 72
2.60 Drain 9205, view towards south-east, scale 2m 73
2.61 Section 4047 74
2.62 Phase 6: Tenement C 75
2.63 Wall 6035, Building 3, view towards east, scale 1m. . . . 76
2.64 Floor 7113 and hearth 7107, Building 3, view towards south, scale 1m 76
2.65 Pit 3100, view towards east, scales 2m and 1m 77
2.66 Boundary Ditch 5, view towards west, scale 2m 77
2.67 Phase 7. . . . 79
2.68 Phases 8–10. . . . 80
2.69 Wall 6066, Building 12, view towards south, scale 2m 81
2.70 Buildings 9 (Room 1) and 10 and boundary wall 3312 under excavation, view towards north. . . . 82
2.71 Structure 14, view towards south, scale 0.5m. . . . 83
2.72 Detail of Buildings 9 and 10, view towards west, scales 1m and 2m 84
2.73 Interior of well 6135/3313, with detail showing rope marks, view towards south-east, scale 2m. . . . 85
2.74 Well 3968, view towards south-west, scale 1m. . . . 85

Chapter 3

3.1 Medieval pottery Ceramic Phase M1, late 11th–12th century, nos 1–12. . . . 95
3.2 Medieval pottery Ceramic Phase M2, 13th–14th century, nos 13–17 98
3.3 Medieval pottery Ceramic Phase M2, 13th–14th century, nos 18–27 99
3.4 Medieval pottery Ceramic Phase M2, 13th–14th century, nos 28–33 100
3.5 Medieval pottery Ceramic Phase M3, early–late 15th century, nos 34–39 102
3.6 Medieval pottery Ceramic Phase M4, late 15th–mid-16th century, nos 40–46 104
3.7 Medieval pottery Ceramic Phase M4, late 15th–mid-16th century, nos 47–56 105

3.8 Post-medieval pottery Ceramic Phase PM1, mid–late 16th century, nos 57–61 . . . 107
3.9 Post-medieval pottery Ceramic Phase PM2, early–mid-17th century, nos 62–63 . . . 108
3.10 Post-medieval pottery Ceramic Phase PM3, mid–late 17th century, nos 64–65 . . . 108
3.11 Post-medieval pottery Ceramic Phase PM4, early–mid-18th century, nos 66–72 . . . 109
3.12 Post-medieval pottery Ceramic Phase PM6, late 18th century, nos 73–81 . . . 111
3.13 Post-medieval pottery Ceramic Phase PM6, late 18th century, nos 82–83 . . . 112
3.14 Post-medieval pottery Ceramic Phase MOD, early 19th century, no. 84 . . . 113
3.15 Weight (g) of CBM fragments by spot-date and tenement area. . . . 121
3.16 Weight (g) of CBM fragments by spot-date and phase . . . 121
3.17 Ceramic roofing tile and finial. . . . 127
3.18 Ceramic floor tile . . . 128
3.19 Whetstones and grindstones . . . 143
3.20 Stone mortars, nos 5–9 . . . 148
3.21 Stone mortars, nos 10–12 . . . 149
3.22 Other stone artefacts . . . 153
3.23 Glass, nos 1–9 . . . 157
3.24 Glass, nos 10–12 . . . 158
3.25 Beads . . . 159
3.26 Coins, jettons and tokens . . . 161
3.27 Small finds, Phase 2, no. 1 . . . 163
3.28 Small finds, Phase 3, nos 2–8 . . . 164
3.29 Small finds, Phase 4, nos 9–15 . . . 167
3.30 Small finds, Phase 5, nos 16–24 . . . 169
3.31 Small finds, Phase 6, nos 25–37 . . . 172
3.32 Small finds, Phase 6, nos 38–41 . . . 173
3.33 Small finds, Phase 7, nos 42 and 43 . . . 174
3.34 Small finds, Phase 8, nos 44 and 45 . . . 175
3.35 Small finds, Phase 9, nos 46–48 . . . 176
3.36 Small finds, Phase 10, nos 49–57 . . . 177
3.37 Slag distribution by phase . . . 180
3.38 Clay pipes, nos 1–6 . . . 186
3.39 Clay pipes, nos 7 and 8 . . . 187
3.49 Wig curlers . . . 191

Chapter 4

4.1 Sheep age at death in Phase 2 based on mandibular data . . . 201
4.2 Sheep age at death in Phase 3 based on mandibular data . . . 203
4.3 Sheep age at death in Phase 4 based on mandibular data . . . 205
4.4 Relative proportions of main domesticates and birds from sieved samples by phase (NISP 673) 206
4.5 Sheep age at death in Phase 5 based on mandibular data . . . 207
4.6 Sheep age at death in Phase 6 based on mandibular data . . . 208
4.7 Phase 6 Galliforme bone relative frequency (NISP 196) . . . 209
4.8 Phases 1 to 3: proportion of grain to chaff to other plants in a selection of samples with 100+ quantified items . . . 221
4.9 Phase 4: proportion of grain to chaff to other plants in samples with 100+ quantified items . . . 224
4.10 Phase 5: proportion of grain to chaff to other plants in samples with 100+ quantified items . . . 228
4.11 Phase 6: proportion of grain to chaff to other plants in samples with 100+ quantified items . . . 229
4.12 Proportions of wood taxa by phase . . . 239
4.13 Proportions of wood taxa in ‘domestic’ samples . . . 240
4.14 Proportions of wood taxa in ‘industrial’ samples . . . 240
4.15 The stratigraphic relationships applied in the model presented in 4.16. . . . 245
4.16 Bayesian model for the cemetery . . . 245
4.17 The duration over which people buried in the cemetery are estimated to have died, based on the model shown in Fig. 4.16 . . . 246
4.18 Output from the preferred model with parameters generated from the same model shown in Fig. 4.16 with different reservoir estimates (see text) and compared with key events in 1177 and 1290 . . . 247

Chapter 5

5.1 Age-at-death distribution of the total assemblage (N=115) 252
5.2 Comparative proportional mortality curves 253
5.3 Dental decay consistent with bottle-feeding caries in the upper dentition of young child skeleton 4643 255
5.4 Examples of tuberculosis lesions: a) prime adult female skeleton 3238 (spinal TB, Pott's deformity); b) middle adult female skeleton 3549 (TB lesion in second lumbar vertebra, top, and probable TB lesion in right sacroiliac joint, bottom. Unaffected left side shown for comparison) 260-1
5.5 Rib lesions (periosteal new bone formation and erosive lesions) possibly resulting from tuberculosis: a) older child skeleton 4798; b) mature adult male skeleton 4811 (note multiple layers of periosteal new bone visible in cross-section on the original bone surface, white arrow). 262
5.6 Multifocal lesions of infection in young child skeleton 3045: a) large space-occupying lesion in left mandibular body; b) lesions of infection in proximal and distal portions of right ulna (left shown for comparison); c) infection in distal portion of right tibia (left shown for comparison). 263
5.7 Heavy, uneven dental wear and enamel chipping, mature adult male skeleton 4205. 269
5.8 Unilateral cleft anterior palate, adolescent skeleton 3254 (superior, anterior and inferior views) 270
5.9 a) Skeletal dysplasia, probably achondroplastic dwarfism, young child skeleton 3159 (estimated age 1.5–2.5 years, based on dental development); b) selected long bones from skeleton 3159 are shown in comparison with those from other young juveniles from the same assemblage (estimated ages of the comparative material also based on dental development) 270-1
5.10 Dental modification, possibly occupational: a) middle adult female skeleton 3055, shallow notches through incisal surfaces of the maxillary central incisors; b) middle adult female skeleton 3409, marked grooves through the occlusal surfaces of first maxillary premolars, with notable rotation of these teeth visible in the inferior view; c) adult (unspecified) male skeleton 4849, marked groove through incisal edge of maxillary central incisor (loose tooth, labial and lingual surfaces shown) 273
5.11 Healed bilateral Colles fractures, middle adult skeleton 4745, medial view of left and right ulnae and radii (note posterior angulation of the distal radii and secondary joint changes at the distal radio-ulnar joints). 274
5.12 Probable perimortem fractures: a) middle adult female skeleton 3409 (fracture through right zygomatic bone, note the separate sliver of bone, bordered by the fracture and the zygomaxillary suture, and fracture through left mandibular ramus; b) middle adult female skeleton 4473 (fracture through left zygomatic bone and left mandibular ramus) 275

Chapter 6

6.1 The site and surrounds between the 10th and 13th centuries with suggested locations of cemeteries and roads 278
6.2 Blacksmith depicted in the Gorleston Psalter manuscript, early 14th century (British Library, MS 49622.154v) 288
6.3 Blacksmith depicted in *The House Books of the Nuremberg Twelve Brothers Foundation*, 1426 (Stadtbibliothek im Bildungscampus Nürnberg, Amb. 317.2°. Folio 47 recto. 98) 289
6.4 John Buckler, views of Greyhound Inn yard looking south, 1827 (a) and Gravel Walk looking west, 1822 (b) (Bodleian Library, Buckler: MS.Don.a.2, 55 and 56). 293
6.5 Extract of Edward Holdsworth's c 1728 plan for the proposed rebuilding of Magdalen College, showing detail of the existing tenements on Gravel Walk (Magdalen College Archive, MC: FA14/2AD/1) 294
6.6 William Turner of Oxford, Perspective view of the Greyhound Inn, after 1844 (Magdalen College Archive, MC: FA1/9/4P/1 fol.29 No. 1) 295

List of Tables

Chapter 1

1.1 Properties on Gravel Walk. Sources: *Cartulary of the Hospital of St John (Salter 1914), 1772 Survey of Oxford* (Salter 1912) and *Surveys and Tokens* (Salter 1960, 67) . . . 10
1.2 Sequence of excavation trenches within the New Library . . . 17
1.3 Summary of minor trenches . . . 17
1.4 Site phasing . . . 17

Chapter 2

2.1 Radiocarbon determinations from non-cemetery contexts . . . 24

Chapter 3

3.1 Pottery types and quantifications . . . 88
3.2 Ceramic Phase chronology, occurrence and defining wares . . . 89
3.3 Pottery occurrence per ceramic phase by fabric type, expressed as a percentage of the total weight per phase, major fabrics only . . . 89
3.4 Number of sherds per context, expressed as a percentage of the phase assemblage . . . 90
3.5 Medieval vessel occurrence by EVE, expressed as a percentage of the CP assemblage . . . 90
3.6 Pottery occurrence per ceramic phase by tenement . . . 91
3.7 Pottery occurrence by major fabric type per tenement per CP, expressed as a percentage of the tenement CP assemblage, by weight . . . 91
3.8 Medieval vessel occurrence per tenement by EVE, expressed as a percentage of each tenement CP assemblage . . . 91
3.9 Medieval Oxford ware jar rim diameter data per tenement, CP M1 and M2 . . . 92
3.10 Fired clay quantification of forms . . . 118
3.11 Quantification of ceramic building material by spot-date and tenement . . . 120
3.12 Quantification of ceramic and stone roofing tile by stratigraphic phase . . . 121
3.13 Ceramic building material forms . . . 124
3.14 Forms of stone roofing tile . . . 135
3.15 Lithotypes of freestone . . . 138
3.16 Summary of stone artefacts . . . 141
3.17 Stone mortars from Oxford . . . 145
3.18 Summary of the lithologies of some urban mortars . . . 147
3.19 Stone lamps from Oxford . . . 152
3.20 Quantification of glass assemblage by phase . . . 154
3.21 Quantification of identifiable metal and worked-bone objects by phase . . . 162
3.22 Quantification of smithing hearth bottoms . . . 179
3.23 Clay tobacco pipe bowls by type and date . . . 184
3.24 Quantification of complete wig curlers . . . 190

Chapter 4

4.1 Summary of proportions of counted bones and teeth from hand collection and sieving . . . 193
4.2 Hand-collected taxa by phase and tenement or other area . . . 194
4.3 Taxa from the sieved soil samples by phase and tenement or other area . . . 197
4.4 Surface texture of the bone by phase . . . 201
4.5 Pre-depositional taphonomic evidence by phase . . . 201
4.6 Phase 4 cattle epiphyseal fusion evidence . . . 204
4.7 Phase 5 cattle epiphyseal fusion evidence . . . 206
4.8 Phase 6 cattle epiphyseal fusion evidence . . . 208

4.9 Quantification of hand-collected fish remains (NISP) . . . 212
4.10 Quantification of fish bones and scales (NISP) from sieved soil samples . . . 213
4.11 Phases 1 to 3: proportion of grain to chaff to other plants in samples with 100+ quantified items . . . 218
4.12 Phase 4: proportion of grain to chaff to other plants in samples with 100+ quantified items . . . 224
4.13 Phase 5: proportion of grain to chaff to other plants in samples with 100+ quantified items . . . 226
4.14 Waterlogged plant remains . . . 230
4.15 Phase 6: proportion of grain to chaff to other plants in samples with 100+ quantified items . . . 232
4.16 Presence/absence of wood taxa by phase . . . 238
4.17 Radiocarbon measurements from human burials and from pit 3698 that stratigraphically predated burials within the cemetery . . . 244
4.18 Impacts on the radiocarbon measurements of the different reservoir effects on the outputs (95% confidence or probability) . . . 245

Chapter 5

5.1 Comparative assemblages . . . 250
5.2 Age and sex distribution of the total assemblage . . . 252
5.3 Crude prevalence rates (CPR) of skeletal pathologies . . . 256
5.4 Comparative maxillary sinusitis rates . . . 257
5.5 Comparative endocranial lesions rates . . . 257
5.6 Comparative periosteal new bone formation rates . . . 258
5.7 Comparative crude prevalence rates of tuberculosis . . . 259
5.8 Comparison of stature data . . . 264
5.9 Comparative dental enamel hypoplasia rates . . . 266
5.10 Comparative scurvy rates . . . 266
5.11 Comparative rickets/residual rickets rates . . . 267
5.12 Comparative cribra orbitalia rates . . . 267
5.13 Comparative dental calculus rates . . . 268
5.14 Comparative dental caries rates . . . 269

Digital Appendices

(https://knowledge.oxfordarchaeology.com/12921)

1 Mortar and plaster, *by Cynthia Poole*
2 Petrology of stone mortars and lamp, *by Kevin Hayward*
3 Organic residue analysis from stone lamp, *by Julie Dunne, Toby Gillard and Richard P Evershed*
4 Analysis of a possible iron bloom fragment, *by Eleanor Blakelock*
5 Worked flint, *by Mike Donnelly*
6 Mammal and bird bone, *by Ian Smith*
7 Fish remains, *by Rebecca Nicholson*
8 Plant remains, *by John Giorgi*
9 Charcoal, *by Julia Meen*
10 Marine shell, *by Rebecca Nicholson*
11 Avian eggshell, *by Rebecca Nicholson*
12 Soil micromorphology and geochemistry, *by Richard I Macphail and Chris J Carey*
13 Radiocarbon dating, *by Seren Griffiths*
14 Human remains: osteology and biomolecular analysis, *by Helen Webb and Louise Loe, with contributions by Iulia Rusu, Mandy Kingdom, Iain Watt, Tom Booth and Kyriaki Anastasiadou*
15 Grave catalogue

Summary

Excavations within the New Library and Longwall Quad of Magdalen College revealed a complex sequence of well-preserved archaeological remains dating from the 10th century to the mid-19th century. The site was located in Oxford's former eastern extramural suburb, and large parts of three tenements dating from the 12th century were revealed, which succeeded late Anglo-Saxon ditches relating to a land boundary and one or more possible trackways. To the north of the tenements was a cemetery that contained at least 112 individuals, including adults, children and infants, in addition to which three neonatal burials were located within the tenements. Bayesian modelling and DNA analysis suggests that the cemetery was in use between the late 12th and early 13th centuries and is likely to belong to the as-yet unlocated first foundation of the Hospital of St John the Baptist. Several buildings, initially in timber and then from the 13th century in stone, were revealed along the High Street frontage and later expanded towards the rear of the tenements that hitherto contained many rubbish and quarry pits. By the 13th century two of the tenements incorporated smithies, and a large quantity of iron-smithing slag was recovered from both the floors and hearths of the buildings and from the fills of pits to the rear. One tenement was under the occupancy of Adam Faber, who was recorded as having a forge there in 1246–7. The animal bone, finds and documentary evidence suggest that the two tenements were also used for the shoeing and caring of horses. From the late 15th century, the tenements were rebuilt and took on a more domestic function, though little evidence beyond this date survived along the frontage area. Demolition deposits associated with a building to the rear of one tenement that dated to the late 17th century contained over 3600 pipeclay wig curlers, believed to be the largest assemblage found on an archaeological site. A date for the deposit was provided by a wine bottle seal marked 1769, when documentary evidence shows that the tenement was under the occupancy of John Broughton, a barber and perukemaker. Evidence for 18th- and early 19th-century buildings was found in an adjacent tenement, which was the site of the Greyhound Inn on the corner of Longwall Street.

Acknowledgements

Oxford Archaeology would like to acknowledge the assistance, patience and understanding offered by all the many Magdalen College staff who have been involved in this project over the past eight years, in particular the current bursar Yong Shen and former bursars Rory Maw and Charles Young, for their support during the various phases of the work. We would also like to thank Dr Christine Ferdinand, former Fellow Librarian, for her interest and enthusiasm during the project, Robert Langley, College Surveyor, for his patience and perseverance throughout all stages of the archaeological site work and reporting, and Dr Robin Darwall-Smith, former College Archivist, for his invaluable support and interest and for the initial thorough review and report on the relevant historic records held in the college archive. Magdalen student Amanda James undertook research into isotopic evidence for the diet of children buried in the medieval cemetery, and we would like to thank her for sharing her results and also thank Dr Zena Kamash, former Director of Studies in Archaeology, for facilitating the study. Thanks are also due to David Radford, Oxford City Archaeologist, who offered a significant amount of time and advice throughout the project.

The project was managed for Oxford Archaeology by Ben M Ford. The various episodes of evaluation trenching and digging of geological test pits in 2011 and 2012 were directed on site by Project Officer Paul Murray, assisted by a team comprising Robin Bashford, Mike Donnelly, Peter Lovett, Kevin Moon, Chris Richardson and Helen Webb. The main excavations were directed in 2012 by Chris Pickard and Dan Sykes and in 2013 and 2014 by Chris Pickard, with Natalie Anderson serving as Site Supervisor and team members James Archer, Ben Attfield, Robin Bashford, Tom Black, Kathryn Blackbourn, Sophie Bojadziev, Benjamin Brown, Martin Campbell, Ian Cook, Sharon Cook, Maria Diaz Tena, Adam Fellingham, Felicia Fricke, Mark Fussey, Mark Gibson, Jack Goodens, Mariusz Gorniak, Lee Grana-Nicolaou, Rose Grant, Victoria Green, James Harriss, Christof Heistermann, Trevor Jose, Lisa Kennard, Richard Kevill, Alex Latham, Rupert Lotherington, Peter Lovett, Javier Martinez-Jimenez, Ben Mcandrew, Claire Mcglenn, Michael Mclean, Julia Meen, Kev Moon, Benn Penny-Mason, Nik Petek, Chris Pickard, Chris Pickard, Emily Plunkett, Meirion Prysor, Chris Richardson, Joanne Robinson, Alice Rose, Thomas Rose-Jones, Charles Rousseaux, Benjamin Slader, Ben Slader, Lee Sparks, Jeremy Stone, Daniel Strachan, Ashley Strutt, Nicholas Swift, Nicholas Taylor, Sian Thomas, Jennifer Thurstan, Helen Webb, Suzanne Westall and Alistair Zochowski. Historic building recording was undertaken by Angela Warner. Copyediting was by Rachel Tyson.

We are also grateful for the on-site help of John Bell, Mike Smith, Cathlin Beaumont and Darren Smyth of Gardiner Theobald, who were construction managers for the Enabling Works and the 2012 excavation, and of Michael Harper, Dave Murphy, Peter McDonald, Tom Wakeford and Paul Grandi of Stepnells Ltd, the main contractor throughout the 2013 and 2014 construction works. The evaluation could not have been completed without the ever-reliable and skilled staff of David Beecrofts Ltd, who supplied the plant and drivers, and thanks are also owed to Dave Sabin and Kerry Donaldson of Archaeological Surveys Ltd, who carried out the geophysical survey of Longwall Quad.

We would like to thank Magdalen College for granting permission to reproduce the images in Figures 1.6, 6.5 and 6.6, the British Library for Figure 6.2 and the Bodleian Library for Figure 6.4.

Chapter 1

Introduction

by Steve Teague and Julian Munby

Modifications to the 19th-century New Library building of Magdalen College and its extension into Longwall Quad for the new Longwall Library (designed by architects Wright & Wright and opened in 2016) led to a programme of archaeological work that uncovered a sequence of occupation spanning the late Anglo-Saxon to post-medieval periods. This presented a rare opportunity to investigate the development of Oxford's eastern suburb as evidenced by a group of tenements on the north side of the main approach to the town's East Gate. Documentary evidence records that these properties were acquired over the course of the 13th century by the Hospital of St John the Baptist, which lay somewhere east of the excavation area until it was relocated to a new site in 1231. The properties passed to the newly founded Magdalen College after the Dissolution and their sequence of development eventually came to an end with their demolition in the 19th century for the construction of Magdalen College School Hall (now the college library). The excavation revealed a sequence of buildings, initially in timber and then from the 13th century in stone, and important artefactual assemblages were recovered from the many rubbish and quarry pits to the rear. A cemetery of at least 112 burials was uncovered in the northern part of the site and produced radiocarbon dates indicating use between the late 12th and early 13th centuries, contemporary with the hospital, and a further three neonatal burials were located within the tenements.

The development included the lowering of the basement floor level within the building by *c* 0.9m and the addition of a new L-shaped building, similarly basemented, that abutted the north side of the existing building and ran along the inside of the boundary wall adjacent to Longwall Street. Associated landscaping and new services also necessitated archaeological work elsewhere within Longwall Quad. The programme of investigations comprised three phases of excavation and watching brief that were undertaken during 2012, 2013 and 2014. These archaeological works followed a geophysical survey and two phases of trial-trench evaluation during 2011 and 2012 (Archaeological Surveys 2011; OA 2011a; 2011b; 2013). Additionally, a building survey of the New Library building was carried out immediately prior to and during its refurbishment in April 2014 and has been reported separately (OA 2018).

LOCATION, GEOLOGY AND TOPOGRAPHY

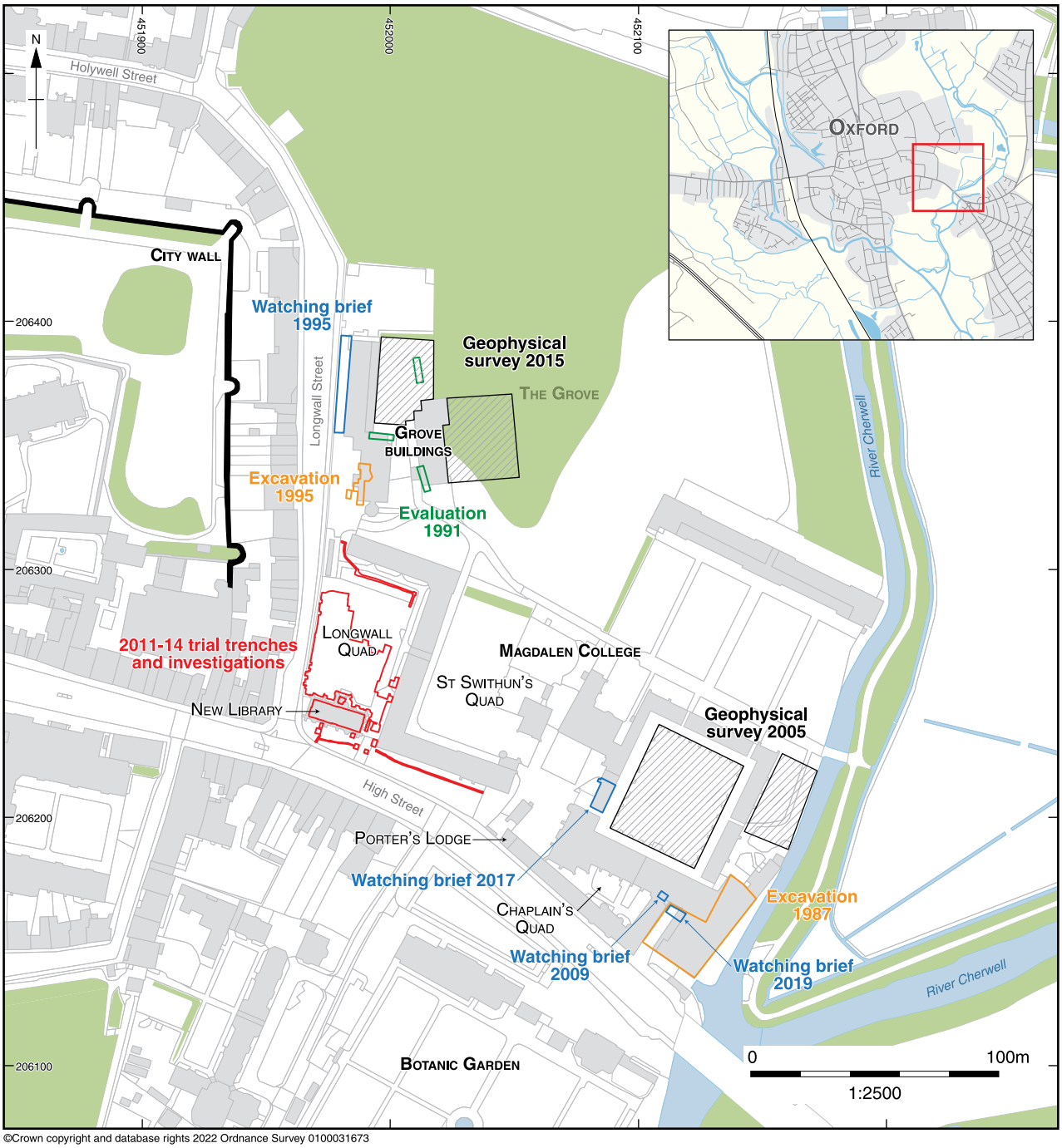
The site is located within the south-western part of Magdalen College, on the north side of High Street, to the west of Magdalen Bridge and the River Cherwell and immediately east of Longwall Street, centred on National Grid Reference SP 5198 0625 (Fig. 1.1). Historically, the area was situated in the eastern, or St Peter's, suburb of medieval Oxford, immediately outside the town's East Gate.

The site occupies relatively level ground which slopes down slightly to the east, from *c* 58m to 59m OD. The underlying geology is first terrace river gravel (BGS n.d.). Topographically, the site is located *c* 150m from the River Cherwell, between the edge of low-lying ground that formed the river's natural floodplain and the eastern edge of the gravel promontory upon which medieval Oxford developed.

ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

Overview

There is no evidence for prehistoric or Roman features within the immediate vicinity of the site. A complex of Neolithic and Bronze Age ceremonial and funerary monuments has been identified within the northern part of central Oxford, extending across the Radcliffe Quarter and University Parks some 1km north of the site (Dodd 2003; Lambrick 2013). Iron Age and Roman settlement is similarly focussed to the north of the city centre in the University Parks and the adjacent Science Area (ibid.; Booth 2021), although Iron Age pottery was recovered from two postholes during an evaluation on the opposite side of the Cherwell at Magdalen College School (OA 2006a).



©Crown copyright and database rights 2022 Ordnance Survey 0100031673

Fig. 1.1 Site location

There has been much debate over the origins of Oxford. It has been suggested that a Mercian bridgehead fortress may have been established at Oxford during the latter part of King Offa's reign (AD 757–96), but at present the evidence for any settlement before the establishment of the fortified borough (burh) around the turn of the 9th and 10th centuries is limited (Durham 1977; Haslam 1987). By the middle of the 9th century there is documentary evidence to suggest that Oxford had fallen under the sphere of influence of the Kingdom of Wessex, although at a local level it may have remained under the control of a Mercian lord. The burh was certainly in existence by the early 10th century, as it is recorded in the Anglo-Saxon Chronicle for 911 and in the Burghal Hidage, and a foundation under Alfred (871–99) or his son Edward the Elder (899–925) is possible (Dodd 2003, 13). There is some evidence that coins were minted at the town during Alfred's reign, but the interpretation of this evidence is disputed (Blair 1994, 100–1; Haslam 2010). It has been suggested that the burh defences originally covered a smaller area than the medieval walled town, only later being



Fig. 1.2 Extract from Agas's map of Oxford (1578)

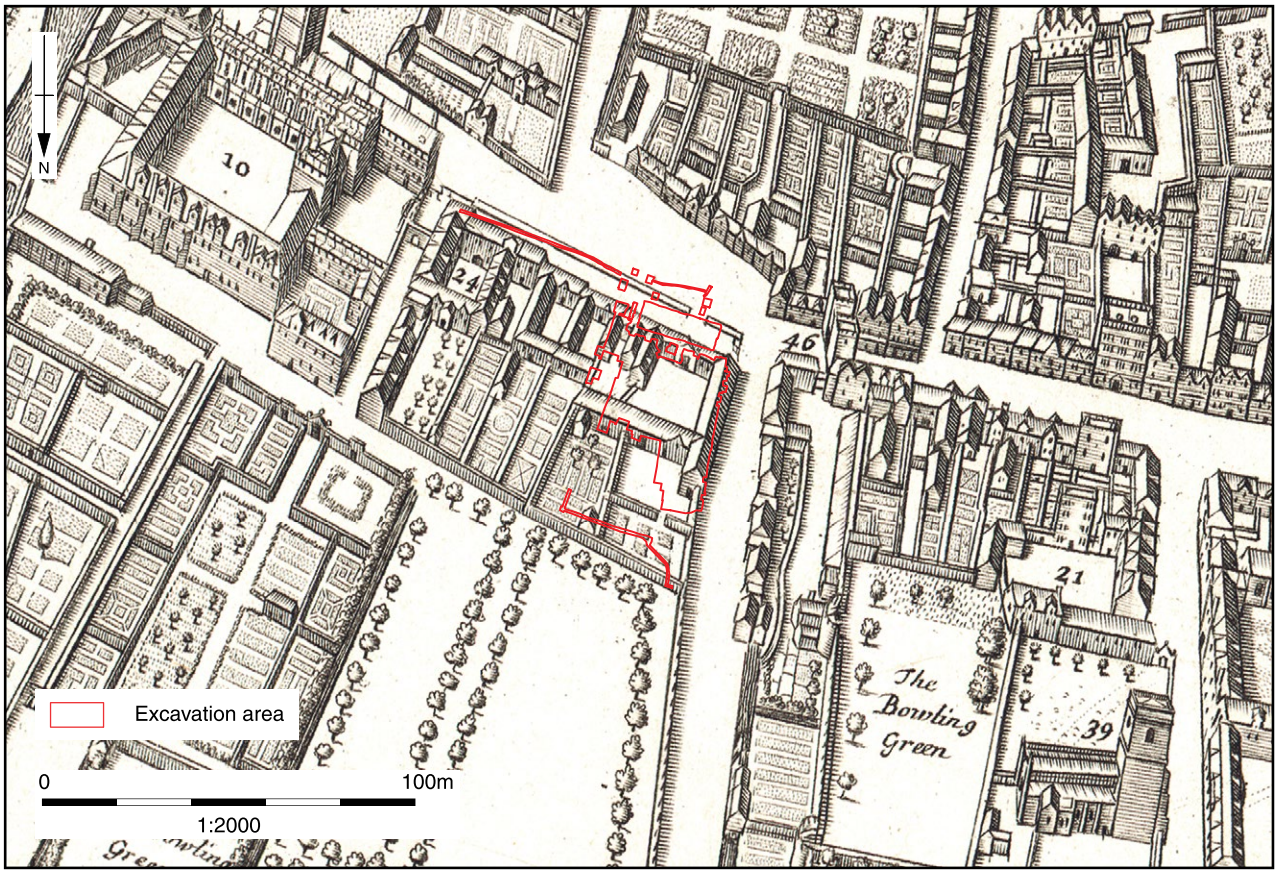


Fig. 1.3 Extract from Loggan's map of Oxford (1675)



Fig. 1.4 Extract from Taylor's map of Oxford (1750)

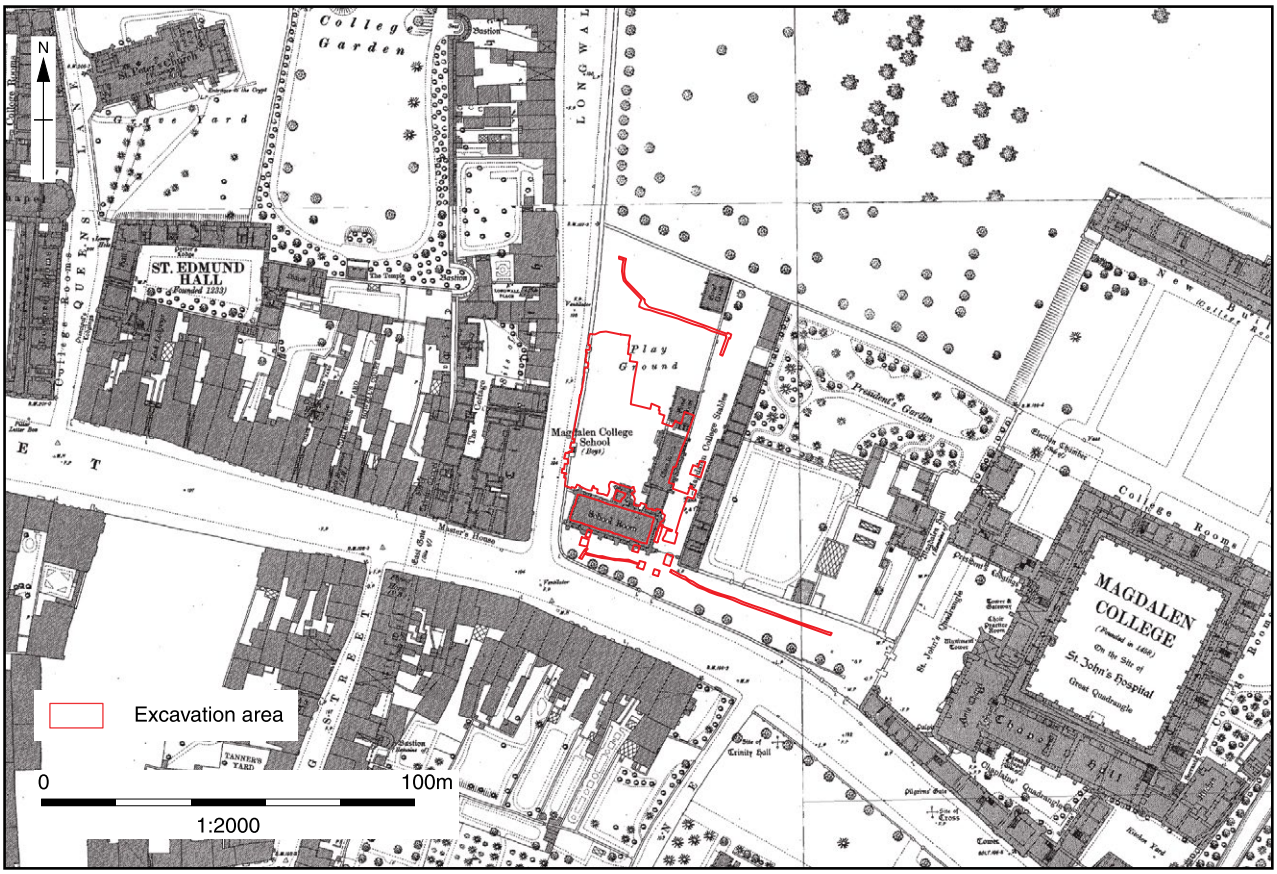
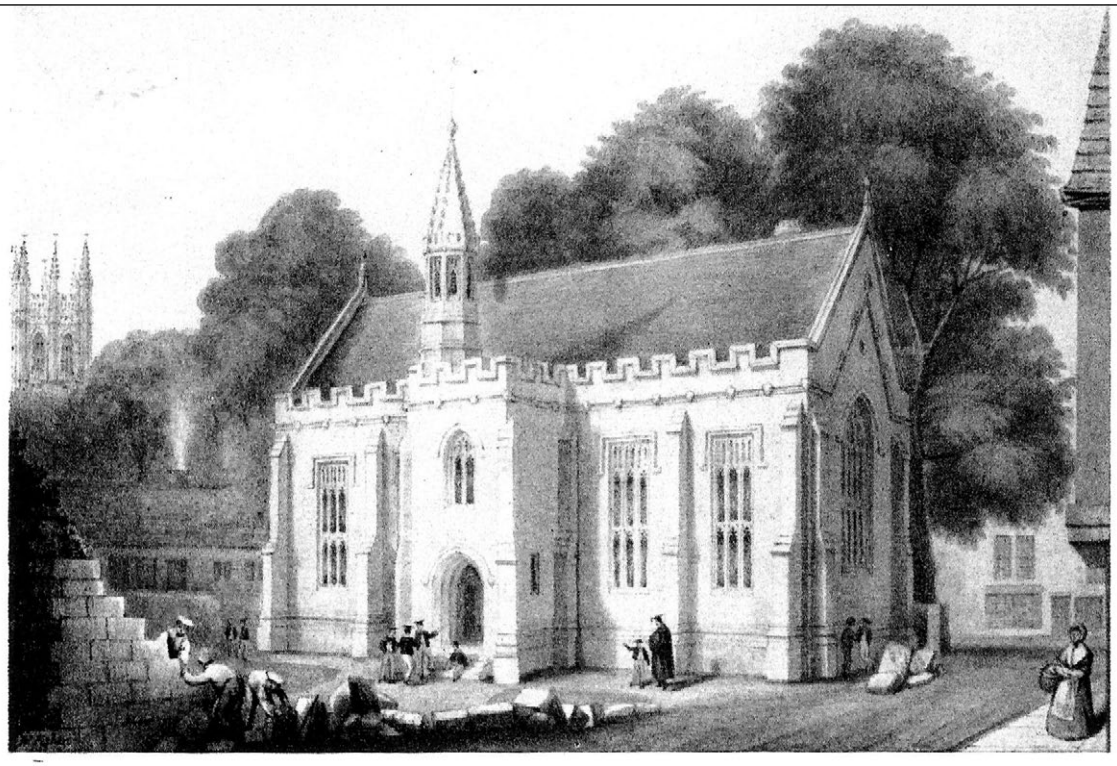


Fig. 1.5 Extract from the 1:500 Ordnance Survey Oxford Town plan (surveyed 1874, published 1880)



THE NEW SCHOOL OF 1851

From a lithograph in the School Dining Hall

Fig. 1.6 The new Magdalen College School in 1851 from Longwall Street (Magdalen College Archive, MC: FA1/9/4P/1 fol.12 No.1)

extended to the east and west, though this is a matter of debate and it is alternatively possible that there was only a single phase of construction (Haslam 2010). The area of the investigation would have lain immediately outside the eastern defences, which were closely followed by the line of the medieval town wall.

The site is situated on the north side of the High Street, the eastern approach road into the burh and the subsequent medieval town. To the east, High Street was probably a raised causeway across the floodplain on its approach to the river. A bridge existed here from at least 1004 and a settlement named *Bruggeset* on the opposite bank may have originated as a Danish garrison in the 11th century (Blair 1994, 161, 170).

The Hospital of St John the Baptist 'at the East Gate' was in existence from the 1180s. The Hospital was refounded by Henry III in 1231 with an enlargement to its site that included the Jewish cemetery on the north side of the High Street. The charter for the refounding of the hospital recognised the 'garden of the Jews' and required provision of a suitable place 'for the Jews of Oxford next to the same garden for the burial of deceased Jews' (Salter 1917, xiv–xv). This was most likely on the south side of the road, and remained in use until the Jews were expelled from England in 1290 by Edward I (Roth 1951, 109). Excavations in 1987 in the south-east corner of the college, by the college kitchen, identified the main infirmary building next to High Street and a range at right-angles along the edge of the river (Durham 1991). A more recent geophysical investigation in the Great Quadrangle has identified the outline of a large feature that may be an early building of the hospital (Stratascan 2005).

In 1457 the hospital was dissolved, and its former lands were granted to William Waynflete, Bishop of Winchester and Lord Chancellor, who founded Magdalen College. All the former hospital buildings were demolished except for the chapel (part of the High Street range) and part of the hall alongside the river, which eventually became a college kitchen. The medieval tenements to the west, including those within the site, were acquired by the college but remained in occupation and were rebuilt in 1481–2 (Lobel and Salter 1954, 193). These tenements, including the Greyhound Inn, which occupied the plot on the corner of Longwall Street, are depicted on historic maps from Agas (1578) onwards (Figs 1.2–1.5). A further useful cartographic image is provided by Edward Holdsworth's plan for a proposed development of the college grounds, drawn in *c* 1728 (Fig. 6.5). The development did not eventually take place, but his illustration includes details of the tenement buildings as they then stood.

The last remaining western tenements, including the Greyhound, were demolished to make way for Magdalen College School Hall and playground, designed by John Chessell Buckler and built in 1849–51 (Fig. 1.6). The late Gothic 'Big School' was later converted into the college's New Library in 1931 as part of more extensive works to complete the college's Longwall Quad by Sir Giles Gilbert Scott, and the removal of the school to a new site (Stanier 1958); it is a Grade II listed building.

Documentary history of the site *by Julian Munby and Robin Darwall-Smith*

The documentary history of the site pertains largely to the known post-medieval arrangement, and its origins are less certain and best explained by archaeological evidence. The historical problems with understanding the early history largely arise from the site's single ownership by Magdalen College in succession to the hospital, and the difficulty of defining internal boundaries from the records. There are title deeds from the 1220s and a long series of rentals running from the 1290s, but there is uncertainty about the precise location of the medieval tenements, which are likely to predate the surviving documentation.

There are three principal parts of the Magdalen College site. First, to the east, is the late medieval college, occupying the site of the former hospital. This lies between the river on the east and a narrow lane on the west that runs northwards from the college entrance gate on Gravel Walk (a former tree-lined path on the northern side of the High Street) between Magdalen College School and Magdalen Hall (west) and the college boundary wall and the President's Lodgings (east).

Second, the western part of the college site consisted of a row of houses facing onto Gravel Walk, variously acquired by the hospital and then Magdalen College, rebuilt in the 15th century alongside the new Grammar School, and then replaced in the 19th century by the new buildings of Magdalen College School and the St Swithun's Quadrangle. These houses are depicted in a number of topographical views (including David Loggan's birds-eye view of 1675; Fig. 1.3); their dimensions are known from the paving survey of 1772, and they are extensively documented in college records. However, what is less certain is the location of the medieval houses prior to their 15th-century rebuilding, with regard both to their width and how far they extended back from the street. The excavations were located at the south-west corner and northwards on Longwall Street.

The third part is The Grove and gardens to the north of the other parts, extending up to the parish boundary with Holywell at the lane leading to the mill on the River Cherwell. It is poorly documented but seems always to have belonged to the hospital and then the college.

The first hospital site and its move

The hospital does not have a certain date of foundation (although it was in existence in the 1180s), or even a certain founder, though a key figure in its establishment was Hugo de Malauney, Lord of Chalgrove (Salter 1917, vi–xii). This manor was part of the Honour of Wallingford and had escheated to the Crown in 1165 on the death of Peter Boterel, and was granted by Prince John to Hugh de Malaunay in *c* 1190 (Townley 2016, 128). His extensive grant of land to the hospital in the 1190s is the first charter in the hospital cartulary, although its language is somewhat vague: 'all my land and tenements inside the borough of Oxford and outside that Peter Boterel held on the day he died' (Salter 1914, 73 [70]). From later records this seems to have comprised not only the site of the hospital, but a small manorial lordship on both sides of the road from the East Gate as far as the east branch of the River Cherwell, including the whole site of the later Magdalen College with its Grove and meadows, though not necessarily the freehold of all this land (Salter 1917, xi–xii) (Fig. 6.1, map A). Properties along the north side of High Street (the later Gravel Walk) were documented from the early 13th century, but their eastern extent is unknown (Fig. 6.1, map B).

One of the earliest documentary references to the actual site of the hospital appears to locate it directly to the east of St Peter-in-the-East church, since one of the charters of a hospital property (now in New College garden) dating between 1210 and 1220 describes it as 'facing on one side [ie west] the cemetery of Saint Peter's and on the other side [east] the city wall next to the hospital of Saint John' (*spectantem secundum unam frontem in cimiterio sancti Petri et secundum aliam frontem ad murum civitatis Oxonie iuxta hospitale sancti Johannis*; Salter 1914, 351 [351]). While this was generally true of the later medieval hospital, taken literally it should imply that the hospital was immediately across the road outside the walls, on Longwall Street. Although this would place it near the Auditorium and Grove Building, to the north of the excavated cemetery and the present Longwall Quadrangle, it may have been further east since no traces of any medieval buildings were found during archaeological monitoring of the construction of the Grove Buildings in the 1990s. It is not impossible that the large rectangular anomaly revealed by geophysical survey in the Great Quadrangle represents a building from the first hospital (Stratascan 2005; see Chapter 6 and Fig. 6.1, map C).

The hospital was effectively refounded by Henry III in 1231 by the grant of a new site, and he was said by a later chronicler to have 'laid the first stone' of the buildings (Lumby 1882, 208). Once again, the wording of the key document is too vague to admit of much certainty: in July 1231 the king granted to the hospital firstly 'our mill in Headington called *Kyngesmelne*', and second 'the garden with appurte-

nances which was the garden of the Jews in the suburb of Oxford outside the Eastgate for the said hospital to build there anew, saving to the Jews of Oxford a suitable place next to this garden for burial of deceased Jews' (*gardinum cum pertinenciis quod fuit gardinum Iudeorum in suburbio Oxonie extra predictam portam orientalem ad hospitale predictum de novo ibidem construendum, salva Iudeis Oxonie placia quadam competenti iuxta idem gardinum ad Iudeorum decedentium sepulturam*; Salter 1914, 77 [73]). This was soon followed by grants of firewood and building timber, including materials for the roof of the St Mary's Chapel 'begun at the new hospital' (Salter 1917, xiv–xvi), and finally in January 1234 confirmed the constitution of the hospital of three chaplains, six lay brethren and six sisters to look after the infirm and poor (ibid., xvii; *Cal Pat Rolls 1232–47*, 38). The contemporary monastic chronicler Matthew Paris reported that the king 'established a noble hospital at Oxford not far from the bridge for the infirm and travellers to receive a remedy for their needs', and even drew a picture of it to illustrate his text (Madden 1866, 263).

There can be little doubt from this sequence of references that the hospital had now been reestablished on the road frontage next to the River Cherwell on the site occupied by the buildings that we know from standing and excavated remains and later occupied by Magdalen College (Durham 1991), and likewise entered from the west. The rentals from 1351 describe the first house as being 'next to our gate' (*proxima porte nostre*) (Salter 1917, 84), while a royal writ of 1321 declared that the hospital was not to be made responsible for the repair of the highway from Pettypont to the cross next to the hospital gate (*regiam viam que ducit a Parvo Ponte usque ad Crucem iuxta portam hospitalis*). This should have been near the entrance at the east end of the Gravel Walk, and not where marked on the OS Town Plan of 1874/80 further east by the supposed 'Pilgrim's Gate', as discussed by Salter (ibid., xlviii). If the first Jewish burial ground (as discussed below) was alongside the road, and the extended line of Gravel Walk represents an older property boundary extending as far as the river, it seems quite possible that the royal grant of 1231 was an enlargement of an existing precinct towards the south, across the cemetery and across the verge of a much wider street as it approached the bridge (Fig. 6.1, map D).

The Jewish and hospital burial grounds

There was at first no burial ground for Oxford's Jewish community, and as late as 1180 the dead were sent to London for burial, but by 1231 their cemetery, 'the garden of the Jews', was in the hands of the king and being given away as the new site for the hospital (Salter 1917, xv). In the somewhat vague terms of this document, the Jews were provided with a sufficient place next to the garden to bury their dead (*placea quadam competenti iuxta idem gardinum*; Salter 1914, 77 [73]). It would seem that, in this case, 'next' meant nearby but on the other side of the road, since not long after the expulsion of the Jews from England in 1290 King Edward I approved the hospital's acquisition of an empty place 300ft long and 90ft wide on the south side of the road, to be enclosed by a low wall and used as the hospital cemetery (ibid., 39 [37]). Although it is not explicitly stated in the following series of documents dealing with neighbours' rights and obtaining a licence from St Peter-in-the-East for burial rights, the simplest explanation of this large empty plot is that it had been until recently the Jewish burial ground that had been assigned to the community in 1231 (ibid., 39–44). Burials, whether from before 1290 or after, were encountered in the 17th century, both in building the Botanic Garden walls and building the Civil War rampart between the gardens and bridge (Roth 1951, 108).

Taken together, the archaeological and historical evidence suggests that the hospital had from the beginning a place of burial next to Longwall Street, retained this after 1231 as it expanded onto its new site, and then moved across High Street by 1300 into the abandoned Jewish burial ground, whereas the Jews' burial ground ('garden') was at first in an unknown location within the hospital site north of the road, and then moved south of the road in 1231 until their expulsion in 1290 (Fig. 6.1, maps C and D).

Medieval houses on Gravel Walk

The abundant documentation of the site in the hospital records preserved by Magdalen College indicates the existence of a row of houses, almost certainly set back from the modern street frontage on Gravel Walk and extending from the corner of Longwall Street just outside the East Gate to the boundary of the hospital/college near the present High Street entrance and Porters' Lodge. After the hospital properties were acquired for the foundation of Magdalen College, the new Grammar School was built at the east end of this row (and later incorporated Magdalen Hall), after which the whole row seems to have been rebuilt, with the Gravel Walk as a separate entranceway beside the High Street. The college entrance between the 15th and 19th century was a gateway facing west onto the Gravel Walk, and only later moved round the corner into the present porters' lodge. Although a general rebuilding of the Gravel Walk properties took place after the foundation of the college, there is no evidence that the houses had been located further south towards the road, and indeed some negative evidence at the west end which indicates that there had never been a more forward frontage.

For the post-medieval period (below) the college leases can be correlated with modern maps and the 1772 paving survey to determine the location of all the properties on the street frontage, while the rear parts had a varied history and do not seem to have maintained the character of regular burgage plots, if

there ever had been any. Prior to the 15th-century rebuilding, the properties can be located relative to each other by correlating the deeds with the hospital rentals; but only for one are measurements given and so in general there is no certainty about their width or depth before they were rebuilt in the 15th century, and if they were laid out as regular burgage plots they may always have been shallow plots in front of the hospital precinct.

In his edition of the hospital cartulary, Salter was able to isolate the histories of some 15 separate properties facing the High Street, situated between the gateway to the hospital and the corner with Longwall Street, although some of them were very small properties like shops, which had once been part of one of the houses here, but then had been leased and administered as a separate unit (Salter 1914, 71–146).

All but one of these properties was acquired by or given to the hospital between the 1230s and the 1370s; the remaining property (which in fact lay pretty much in the middle of the group) was finally sold to the college in 1465. The descriptions of these properties are often not very forthcoming, usually being described as a 'tenement' or 'house', and typically (from the 13th century) given a location as 'my house in the parish of St Peter-in-the-East situated between the house of A.B. and the house of C.D.', but without any measurements.

The one exception is the seventh tenement to the west from the gateway (and so now lying under St Swithun's Quad), which had a large garden at the back, and whose history even Salter described as 'particularly confusing'. In 1347 the garden is described thus:

> *Part of the aforesaid place extends lineally in breadth from the wall of the Master and brothers of the Hospital of St John to the east of the aforesaid place up to the wall of the same Master and brothers to the west and part of that place comprises 4 perches and 15 feet in breadth; and from that wall of the Master and brothers to the north part the said part of the place contains in length towards the north and this also up to the close of the Master and brothers 7 perches and 10 feet.*
>
> [*extendit pars placee predicte in latitudine linealiter a muro magistri et fratrum hospitalis sancti Johannis ex parte orientali placee predicte usque ad murum eorundem magistri & fratrum ex parte occidentali et continet pars placee illius quatuor perticas & quindecim pedes in latitudine & ab illo muro magistri & fratrum versus partem borealem continet dicta pars placee in longitudine versus borealem & hoc usque ad clausum magistri & fratum septem perticas & decem pedes*.] (ibid., 95 [93])

Using the statutory perch of 3½ yards (16ft 6in) Salter states the garden was thus 81ft wide and 125ft long, though local variations were possible, giving a different calculation. Unless this simply refers to neighbouring hospital properties with tenants, the description of this garden suggests that it jutted out to the north of the backsides of the other houses in this row and was bounded on three sides by land of the hospital. In this case it may be that behind the wall of the hospital described as lying to the west of this garden lay that piece of their land which included the newly founded cemetery. It is not known how far back any of the other houses in this row extended, but it is perhaps unlikely they went anything like as far back as this one, if only because the description of the garden suggests that it was bounded on the north, east and west by the hospital, and not someone else's land. The adjacent (eighth) property on the west was described in 1439 as being bounded by the hospital garden on the north (ibid., 108 [108]). Neither is it certain whether these properties extended as far as the High Street, or whether, as with the later properties there, they were placed slightly back from this on the Gravel Walk. No archaeological evidence has been found of buildings forward of the present line (and indeed some negative evidence), and it is also apparent from early maps and views, such as Loggan's view of 1675, that the south side of the High Street outside the East Gate was not built as far forward as the present street frontage until the late 18th century.

A limited amount can be learned about the houses and their occupants from deeds and rentals. There were houses (described as messuage or tenement), cottages and some shops; one hall with an entry, and four shops in front (1333–4; ibid., 99–100 [96–7]), and one shop with a cellar and solar (1274–5; ibid., 112 [113]). In 1285 Lucy the widow of Philip the Notary, who lived towards the western end of the row, seems to have divided the property with a series of separate grants of the solar, a wall, and 'osthous', hall, and garderobe (ibid., 129–30 [132–6]). The last house on the corner opposite the East Gate had four shops or stalls (selds) and a forge, and the tenant was usually a smith (faber, marshall; ibid., 138–40 [145–6]).

The hospital records include a good series of rentals from the 13th and 14th centuries, in which the properties 'outside the Eastgate on the north side' are clearly identified and can provide an indication of the trades followed by the tenants. Many of these, especially the earlier ones, seem related to textiles and clothing: weaver (*Webbe*), dyer, fuller, tailor, hatter, lacemaker, currier; also minor trades such as fletcher, cooper, turner, bolter, cutler, die cutter (*Syneker*), cobbler, shoemaker (*Sowter*) and sheath maker (*Shethere*). Later, in the 15th century, there are building trades such as mason, carpenter, carver and slater, and a miller (*Melewarde*). There were also service trades, including barber, notary, exemplar and cook, and closer to the East Gate on the excavated site were horse-related trades such as smith, marshal and carter (Salter 1917, 33–271). Curiously, a description of the hospital property outside the East Gate in the 1270s states that some servile tenants owed services of cutting and stacking hay, as if they were manorial tenants rather than free tenants in burgages, but no location is given for their holdings (Salter 1914, 75 [71]).

The East Gate forge and Chaucer's 'Miller's Tale'

Thomas Chaucer demonstrates a familiarity with Oxford in the *Canterbury Tales* that has led some to suggest that he may have attended the university (Bennett 1974). In the 'Miller's Tale', the scene is set in the house of John, an Oseney carpenter, and his wife Alison, where she is pursued by the lodger, a student called Nicholas, and also by the parish clerk Absalon, with the comic/indecent denouement in which Nicholas is branded on the backside by Absalon in circumstances that do not need to be further described here. Whether or not the story was complete fiction, there are reasons to suppose that the events in the tale can be located with some certainty.

The building tradesmen were generally to be found at the lower end of High Street (Sturdy 1965), and there was a large Oseney property on the site of the former Eastgate Hotel, so an Oseney carpenter was most likely to be found around there. Moreover, the medieval forges of Oxford were outside the gates, there being certainly one at North Gate and one at East Gate (just like modern petrol stations are to be found on exit roads from towns).

It has always been assumed that the forge at the East Gate was the hospital/Magdalen property on the west side of the Longwall corner, but the discovery of forge material on the east side of the corner during the New Library excavations (Chapters 2 and 3) raises the possibility that there was another one there that could equally have been used by Absalon to heat up his branding iron. But from whichever fire it came, it is pleasing to imagine that this scene was played out close by.

The late 15th-century rebuilding

Bishop William of Waynflete, in establishing Magdalen College in 1470, incorporated the hospital into his foundation, including the site and all its other property, immediately making his college a major landholder in the town (Crossley 2021, map 6). His foundation included a Grammar School outside the college entrance, which expanded to become Magdalen Hall, encroaching on the houses in Gravel Walk. According to Salter (1914, 146–7) 'The rentals of 1478 and 1487 show that between these dates the houses from the college to Long Wall were pulled down and rebuilt.' The new properties were also built standing back from the street, but there is no certainty that what became known as the Gravel Walk was now created by moving the frontage back to the north, and as mentioned above some negative archaeological evidence suggests that it had not done so.

Several rentals from this period survive (from 1478, 1480, 1481, 1482, 1484 and 1487), which identify the college's properties outside the East Gate on the north side of the High Street and always list them starting from east to west. The rental of 29 September 1478 does indeed list 14 houses and also three shops 'next to the spring' (*iuxta fontem*) (Magdalen College Archive ref. EP/48/6), and the rental of 29 September 1480 does likewise (EP/48/2). The rental of 29 September 1481 (EP/48/3) again lists 14 houses and three shops, but two of the tenements are described as vacant, and two more as having no rent (*nihil inde*).

The rental of 29 September 1482 is different. There are now just ten houses and three shops (EP/48/4). The houses are also all numbered, starting from the easternmost house, which is described for the first time as 'next to the Grammar School' (*proximo scole gramaticali* – the previous rentals called the easternmost house 'next to the gate of the college' (*proximo porte Collegij*)). The rental of 29 September 1484 lists the first four houses with the marginal annotation 'nothing in this account because these four were taken for building the Grammar School', then there is a row listed 1–8, a house and three shops *iuxta fontem* 'from which nothing because not built' (*quia non edificat*; EP/48/7).

The rent collector's accounts provide some more information on these events: that for the year 1484–5 repeats that four houses had been taken into the Grammar School, but then the three adjacent houses had stood vacant for half the year and for two this was said to be 'because of the new building', and the next three were also empty 'because of new building there', together with the corner house. The last four had been rebuilt as three properties, while the three shops had 'stood desolate for many years'. This building work must have been paid for by the college, and the account records a total for repairs on the Oxford estate in that year of £30 18s 4d, but no details are given (EP/48/5). The following account for 1485–6 again reports defective rents because of building work and explains that the two newly built tenements (*de novo edificata*) were previously three but are not yet rented and that the three shops are still empty and 'not built', ie derelict. This year there was a total cost of £12 18s 7½d for new building and repairs (EP/47/7). The actual building accounts were given separately 'in a paper book', and one of these survives for 1486–7, preceded by a rental and accounting in great detail for an expenditure of £45 17s on many named properties, but none it would seem referring to major new building work on this site. The works may have ceased for a while, but the rental of 29 September 1487 shows that they were not complete (EP/47/8). As well as recording the first appearance of income from Magdalen Hall, there are now only seven houses and three shops, which are again numbered in sequence, starting from the house next to the Grammar School. However, there is more to this rental than that: the shops are yielding no rent, and of the houses, three are empty, and for two of them it reports that the college received 'nothing because they are not built' (*nihil inde quod non edificatur*).

There follows a gap in the rentals until 1508/9, but the arrangement of this rental does not easily

allow the houses in Gravel Walk to be identified (EP/47/9). There is, however, an undated rental whose handwriting dates it to the late 15th or early 16th century, which is arranged in subgroups again and lists seven houses (EP/48/11).

The rentals and accounts show that there was some major rebuilding activity on these college properties through the 1480s, perhaps begun some time in 1481 or 1482: an interesting moment, because this was just after Magdalen had received its first statutes and had compiled its first proper accounts. Perhaps, now that the college was properly established and its main buildings all completed, the President and Fellows decided that they should improve the approach to the college by rebuilding (and perhaps reconfiguring) the Gravel Walk, which led directly to the college gate.

Post-medieval houses on Gravel Walk

The later history of the site is attested from numerous leases of the college properties (Salter 1914, 146–56; Table 1.1) although they do not necessarily account in detail for the internal arrangements of the site, and in particular for the rear parts of the properties, which are best explained by historical mapping from the 16th century onwards. Neither do they account for all the occupants holding from the lessees, who can often only be discovered from local taxation lists. The houses on Gravel Walk attracted topographical artists, and there are good visual records of the houses that were swept away in the 19th-century rebuilding of the school and college. This is especially true of the Greyhound Inn at the south-west corner, whose exterior and internal arrangements are recorded in a series of drawings by John and John Chessell Buckler and William Turner of Oxford.

It will be useful to start with the evidence of early maps, and both Ralph Agas (1578; Fig. 1.2) and David Loggan (1675; Fig. 1.3), as bird's-eye views from the north, show the Gravel Walk (and also the houses on the other side of the road) set back from a notional street front. Both maps also appear to show a series of long tenements extending from the High Street frontage to the south wall of The Grove, and in the case of the Manciple's tenement (see Table 1.1) the 1748 lease specifically states that it extended 127ft 3in back to The Grove. The 1674 lease for the same property also requires the tenant to 'scale and clean the ditch before the tenement and repair the pavement between the tenement and the said ditch'. This would indicate that the lines shown by Loggan next to the High Street along the front of the Gravel Walk were indeed a wet ditch and not a wall. The Paving Commissioners set up by the Mileways Act of 1771 resolved to reorganise water dispersal in Longwall Street and High Street by creating a new covered culvert in association with the rebuilding of Magdalen Bridge, in place of the open drain (Graham 2023, lix, 65). The original coloured plan by J Gwynn, in the King's Library, shows the route and a section of the drain (Gwynn 1772; the plan but not the section is reproduced in Salter 1923 and Graham 2023). Loggan also shows a series of divisions at approximately midway in the properties, and how these back parts were used is not clear from the leases, though later maps show Magdalen Hall and the President's Garden reaching across this area, while the Greyhound, being the last property facing Longwall Street, is shown by Loggan with a building and substantial backyard extending back to the wall of The Grove.

Table 1.1: Properties on Gravel Walk

	Leases	*1772 occupier*	*1772 dimensions*	
			Separate	*Combined*
Magdalen School Magdalen Hall		Magdalen Hall and School		99ft 9in
Manciple's tenement	Salter 1914, 147–49	Mrs Buckland Mr Cox	17ft 6in 15ft 10in	33ft 4in (127ft deep)
Parrett's tenement	Salter 1914, 149–51	Mr Day Mr Newman	22ft 21ft	43ft
College stables (from *c* 1764)	Salter 1914, 151–2	(first tenement, to 1764) (second tenement, to 1764)		41ft 6in
'Next Greyhound'	Salter 1914, 152–4	Mr Musgrave Mr Broughton	26ft 6in 28ft 4in	54ft 10in
Greyhound Inn	Salter 1914, 154–6	Mr White Mr White on Long Wall	33ft 9in 193ft	33ft 9in

Sources: *Cartulary of the Hospital of St John* (Salter 1914), *Survey of Oxford in 1772* (Salter 1912) and *Surveys and tokens* (Salter 1960, 67)

The houses are depicted shortly before their demolition in a view by Frederick Mackenzie for the *Oxford Almanack* of 1847, and in earlier views by William Turner of Oxford and John and J C Buckler. The large stone house next to the Greyhound could well have been built in the 15th or 16th century, with its prominent embattled bay windows, while the Greyhound was present from around 1700, possibly timber-framed, with six sash windows on the first and second floors (those on the first floor with alternating pointed and rounded pediments) and four attic dormers.

The Greyhound Inn was the 'Cardinal's Hat' in 1526 and was the Greyhound when leased to Guy Pennington, innholder, from 1565, and Adrian Pennington after his death in December 1569. Adrian died in 1589, described as innholder and college servant of Magdalen, and both had wills proved in the Chancellor's court as privileged persons. Guy's will is accompanied by a probate inventory, listing the rooms of a modest-sized inn: hall, chamber, parlour, chamber over the hall, chamber towards the garden, *Cobbard* chamber, *Modill* chamber, parlour chamber, and chamber over the buttery (Oxford University Archives, Bodl. Mfilm 100/6, f.27–32). All later leases are to members of the university or gentry, or citizens as investors, and the innkeeper tenants are not recorded. However, the 1665 Hearth Tax has Thomas Greenwood with 13 hearths outside the East Gate, where he had been in the 1648 Subsidy ('Grimwade'), and again in the 1667 Poll Tax ('Greenwade') with a household consisting of his wife and several servants (Salter 1923, 200, 177, 294). The 1669 will of Thomas Grimwade describes him as an innkeeper (and was proved in the Archdeaconry court rather than the university's). Anthony Wood tells us that the Greyhound's sign was blown down in the Great Storm in February 1662, that Elias Ashmole stayed there in July 1669, and that the elm trees in the Gravel Walk were planted by Magdalen in February 1680. Jacob Bobart, the renowned gardener of the Physic Garden across the road, held the lease of the Greyhound from 1657, and Ashmole made a special point of visiting him to discuss plants (Clark 1891 I, 433; 1892 II, 164, 469). Jacob Bobart I (1596–1689) was clearly not the innkeeper, but his family kept the Greyhound as a property investment throughout the 18th century, including his sons Jacob II (died 1719) and Tilleman (died 1735), and Tilleman's son Jacob III (died 1751). The last of these left the Greyhound lease to his sister, Elizabeth Hodgkinson, with the stipulation that the 'Bobart' name was taken by his nephew, and one of the later descendants, Tilleman Hodgkinson Bobart (1771–1838) was caricatured by Richard Dighton as the 'Classical Almamater Coachman', having attended University College prior to running a coach from Oxford (perhaps the Greyhound) to London, and retiring as Esquire Bedel of the university.

The Window Tax of 1692 was paid by the widow Sheppard on 17 windows (Hobson 1939, 370), and she was likely the wife of Gregory Sheppard, whose will was proved in the Chancellor's court in October 1682, and hers likewise in February 1704, so again they were privileged persons, perhaps with links to Magdalen College. The names of later innkeepers have not been found. Gregory's 1682 inventory is especially instructive and is so different from Pennington's establishment that it may be wondered if it describes the new building, listing a suite of fancy room names of the kind known from other Oxford inns, including numerous rooms with fireplace (indicated with * below). It begins on the ground floor with Kitchen*, Room next the kitchen, Gallery (Linen), In the Generall* [dining room], the new low room*; now perhaps moving upstairs to The Starre*, the garretts, The Sun*, The Bell*, The Lyon, The Swan*, The Anchor*, The Greyhound, the Washhouse chamber, The Chequer*, the Blue Room*, the Green Chamber*, two upper rooms, ostery and wash house, and household plate (Oxford University Archives, Bodl. Mfilm 100/6, f.110–11). This number of rooms, especially those with fireplaces, could certainly be accommodated in the new building, with its two main floors and attics, and the back wings shown on Buckler's drawings. If the inn was rebuilt in *c* 1680 rather than 1700, it would also explain the 17 windows of the 1692 Window Tax and suggest the possible involvement of the immediate landlord, Jacob Bobart the younger, whose father had died in 1680.

The stone house to the east of the Greyhound as far as the college stables was included within the excavation site. It is often uncertain whether the lessees were actually in occupation, and tenants are mentioned in some 16th-century leases, though Dr Gilbert, University Bedell of Arts (1567–97) may well have lived there, and Humphrey Peto, gent., and his widow (1612–53) (Salter 1914, 153), though like the following lessees they do not appear in the subsidies, Hearth or Poll Taxes (Salter 1923). The house was leased to a cook, John Hill, in 1653, widow Brockhurst in 1659, an academic, Richard Witt BCL (Bachelor of Civil Law), in 1675 and Edward Combes, mercer, in 1685, together with William Shaw innholder, implying that it was divided and partly used by the adjacent Greyhound (Salter 1914, 153–4). It was probably inhabited from 1706–34 by the widowed daughters of John Brockhurst, gent., who held the lease; until Dr Digby Cotes, Principal of Magdalen Hall, 1734–48. The next tenancy was John Broughton, barber, whose widow then took on the lease in 1776 (Salter 1917, 154). His death was reported by *Jackson's Oxford Journal* (4 February 1775), where he was described as an eminent barber and peruke maker.

Magdalen College School

As Magdalen College School gradually modernised and expanded in the 19th century it was soon outgrowing its uncomfortable existence next to

Magdalen Hall, a situation not entirely improved by the loss of the Hall buildings by fire in 1820 and the subsequent removal of Magdalen Hall to join Hertford Hall in Catte Street in 1821, and then by the demolition of the founder's school building in 1828 (Stanier 1958, 134–5). Delayed by a lawsuit that attempted to open the school to the citizens of Oxford, a new building was finally agreed for the site of the Greyhound Inn (the boarding houses were located offsite in nearby streets). J C Buckler designed the new school hall in a quiet late medieval style and it opened in 1851 (Stanier 1958, 149–55; Brockliss 2008, 376–9).

Later college buildings

The college was anxious to provide more accommodation for the growing number of junior members in the 1870s, and the result was a new quadrangle designed by Bodley and Garner on the remaining empty site of Magdalen Hall and the college stables, of which only half was built in 1880–4 as the St Swithun's buildings (Brockliss 2008, 531–5). When Magdalen College School migrated across the bridge to Cowley Place in 1928 the college was able to reclaim the school buildings and convert 'Big School' into a library by the insertion of a mezzanine floor. This was undertaken by Sir Giles Gilbert Scott in 1928–31 at the same time that the L-shaped Longwall Quad was added to the west side of St Swithun's, resulting in the demolition of the remaining school buildings (Brockliss 2008, 689).

Previous archaeological investigations at Magdalen College (Fig. 1.1)

Magdalen College Grove

A trial-trench evaluation was undertaken in Magdalen College Grove in 1991, immediately north of the site, in advance of proposals for a new quadrangle, and was followed in 1995 by an excavation and watching brief in advance of the construction of student accommodation and an auditorium (OAU 1991; Roberts 1999). The excavations revealed plough furrows containing 12th- and 13th-century pottery, which were overlain by cultivation soils. The soil was cut by shallow pits, over which was a further cultivation soil associated with mid-13th- to mid-15th-century pottery. The watching brief, alongside Longwall Street, revealed a large N–S orientated ditch containing a single sherd of late 11th–12th-century pottery, overlain by a gravel surface that may be of post-medieval date (Roberts 1999, 275–84). During 2015, Magdalen College Grove was subject to a geophysical survey in the lawn around the Grove Buildings and within The Grove Deer Park. The former area produced no clear evidence for archaeological activity, but linear and curvilinear features were recorded in the deer park, some of which may represent old tracks while others might form part of a former garden layout (GSB 2015).

Great Quadrangle geophysical survey

A detailed magnetometry, resistivity and ground-penetrating radar survey was carried out in 2005, encompassing the central area of the Great Quadrangle and a grassed area between the outer east walls of the cloisters and the River Cherwell (Stratascan 2005). The radar and resistivity data produced a number of anomalies that may be of archaeological origin, including a well-defined area of deep, complex anomalies identified by the radar data in the north part of the quadrangle that may possibly represent an area of structural debris. A possible structure was identified within the quadrangle, which appeared to be rectangular and aligned diagonally across the quad on a NE–SW alignment that was quite different to the orientation of the college complex.

Hospital of St John the Baptist

Significant archaeological works were conducted in 1987 during the refurbishment and construction of the eastern part of the college. These works revealed elements of the hospital, represented by large medieval stone structures on three sides of what was interpreted as a large courtyard. The excavated structures were interpreted as the eastern end of the main infirmary and adjacent hall and were considered to provide evidence of a major building programme that commenced very shortly after the hospital's refounding on this site in 1231 (Durham 1991). The infirmary included an elaborately constructed culvert that provided fresh water from the west near to the north-east corner of the town ditch known as Crowell (ibid., 66 and fig. 2). Steane (1996, 263) has since suggested that the culvert formed part of a *mikveh*, a ritual cleansing place for Jewish mourners, who would be required to wash with clean running water before or after consigning a corpse to the ground. Two later watching briefs – one located in the music room/store and the other to the south-east of the college chapel – also revealed wall foundations that were probably associated with the infirmary (OA 2009; 2019; Fig. 1.1).

The Jewish cemetery and the cemetery of the Hospital of St John the Baptist

Three graves were recorded in 1958 during the installation of cables beneath the High Street 'south-west of Magdalen College lodge' (Case 1958, 136), though the precise location is uncertain (David Radcliffe pers. comm.). The workmen reported that the graves were dug '5ft into clay under 6ft of made ground' and that each contained a skeleton lying with its feet to the east. James Ingram (1834, 4 fn g) noted that human bones were recovered during the rebuilding of the south cloister of the college in 1826, and that skeletons of 'various sizes and sex' had been found between

1632 and 1642 during the construction of the wall for the Botanic Garden, on the south side of the street. These were interpreted as part of the new cemetery granted to the Jews by Henry III.

During building work within Chaplain's Quad in 1976, a number of burials were found that are likely to be associated with the hospital (Hassall 1977, 74). A more recent watching brief within the entrance area of the Old Practice Rooms, immediately north of the chapel, recovered disarticulated human bone from both male and female adults (MOLA 2017). One of the bones was radiocarbon dated by the Natural History Museum on behalf of the Jewish Heritage Committee and returned a date range of cal AD 1265–1301 at 95% confidence (pers. comm. David Radford). This date is too late to form part of the original Jewish cemetery and suggests that the burials pertain to the cemetery of the refounded hospital.

HISTORIC BUILDING RECORDING

A programme of historic building recording was undertaken in April 2014 during removal of the alterations that were made in 1931 to convert Buckler's Victorian school house into a library for the college, as well as construction of an access to the new extension at the western end of the north elevation. This work has been reported separately (OA 2018).



Fig. 1.7 The interior of the New Library following removal of all floors

The removal of the floor of the library allowed Buckler's original school building to be seen in its original open form for the first time since 1931 (Fig. 1.7). It became apparent during the strip out that the original construction had remained ostensibly intact and that other than repairs the roof structure, arguably the most striking feature of the space, was unaltered. The reinstatement of the lower part of the north-easternmost long window carried out by Scott's builders in the 1930s was barely visible.

Other than re-opening the space of the original structure, the work to remove Scott's 1930s alterations from the former schoolroom revealed the methods his builders employed to both construct and accommodate the floor, which cut the Victorian space in half horizontally. The detrimental impact of the new floor structure cutting across the windows was acknowledged by Scott; the windows in the end elevations were altered by raising the sills and blocking the ground floor level opening. However, this modification was not possible along the long elevations as it would cut off the supply of light completely. Although solutions were proposed which involved partially blocking the portion of the window adjacent to the new floor, these were rejected and the windows in the north and south elevations remained unaltered. Internally, this was most visible from the ground floor, whereas on the first floor the radiators installed disguised the gap between the floor and glazing.

PROJECT METHODOLOGY

Fieldwork methodology

The design of the archaeological mitigation work was informed by the results of preliminary investigations comprising two phases of trial-trench evaluation, a geophysical survey and a watching brief. Evaluation trenching in August and September 2011 (Trenches 1–6, Fig. 1.8) and a watching brief during the digging of geotechnical trial pits in December 2011 (Trenches 7–12 and 14) demonstrated that although the site has been subject to relatively dense modern development, medieval and post-medieval remains survived with varying degrees of preservation immediately to the south and north of the New Library, as well as along the inside of Longwall and within the grassed area of Longwall Quad (OA 2011a; 2011b). The remains from the Anglo-Norman and medieval periods had two distinct elements, comprising large pits to the south of the site that attested to the characteristic use of medieval tenement plots, with six graves to the north that represented a previously unknown inhumation cemetery. The burials were dated by pottery to between the mid- to late 12th century and the turn of the 15th century. Parts of two post-medieval basements were partly

revealed on the western side of the site and the external wall foundations of the New Library were confirmed to extend to depths that removed all previous archaeological remains. A comprehensive geophysical survey, consisting of ground-penetrating radar, earth resistance survey and magnetometer survey, was conducted across Longwall Quad immediately after the completion of the evaluation in September 2011 and demonstrated the presence of buried structural remains and features beyond the limits of the evaluation trenches (Archaeological Surveys 2011). An additional evaluation was undertaken in August and September 2012 to investigate archaeological survival within the library building (OA 2013). This comprised two hand-dug trenches and a single geotechnical trial pit (Trenches 15–17), and confirmed the presence of a complex sequence of intercutting medieval and post-medieval pits, walls and floor levels, despite the lowering of the building's floor when it was converted from Magdalen College School Hall to the New Library.

Three main areas of the site were subject to archaeological excavation (Figs 1.8–1.11). In each area the work was undertaken over three separate seasons during 2012 (Enabling Works 1: site code OXMALE12), 2013 (Enabling Works 2: OXMALE13) and 2014 (OXMALE14).

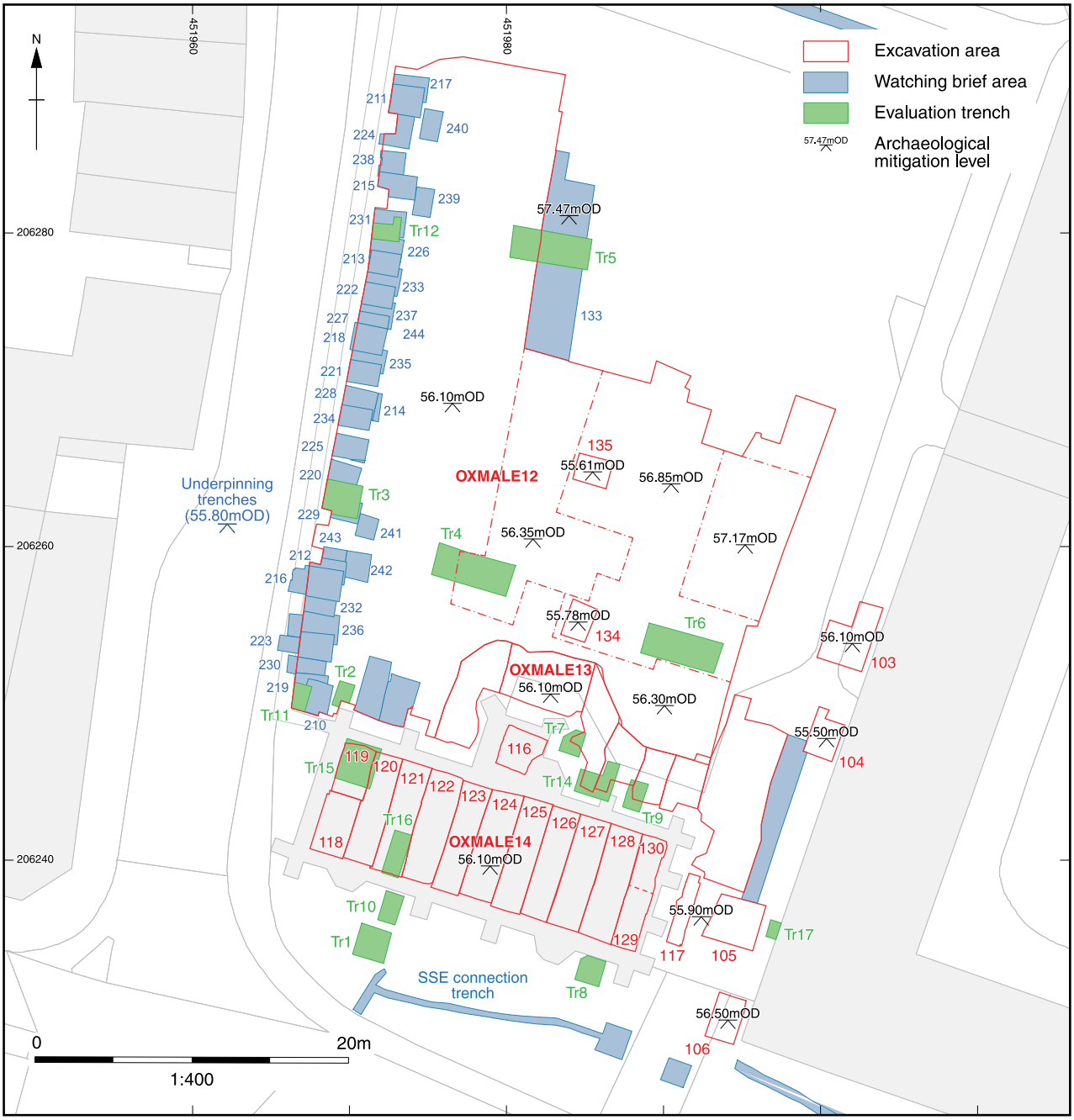


Fig. 1.8 Trench plan



Fig. 1.9 Excavation areas to the rear of the New Library, viewed from the library roof



Fig. 1.10 Excavation in progress, with the New Library to the left and Longwall Street in the background



Fig. 1.11 View across the medieval cemetery towards the New Library

2012

This part of the project comprised an excavation within the footprint of the western wing of the new library extension. The archaeological mitigation level (AML, 0.40m above formation level) of 56.10m OD necessitated the excavation of all horizontal archaeological levels to 'natural' levels and full excavation of all but the deepest pits and wells. To the east, within the existing area of Longwall Quad, the impact levels were higher due to the construction of an access ramp and steps to serve the new extension. Two areas within the footprint of the ramp were excavated to AMLs of 56.35m OD (west) and 56.85m OD (east) respectively. The level of these AMLs resulted in limited excavation of the deeper medieval features on the west side, whereas within the area to the east minimal or no excavation was required. The areas to the east and the north of the ramp were subject only to landscaping for the new development and consequently the AMLs were significantly higher, at 57.15–57.47m OD. As a result, only late post-medieval levels were exposed and recorded in this area.

The construction of the west wing necessitated the underpinning of the existing boundary wall alongside Longwall Street. This was subject to a watching brief, which was undertaken towards the end of the main excavation phase. The underpinning was undertaken in separate strips, *c* 1.0–1.7m wide, extending *c* 2.2m from the wall face and to a depth of 55.80m OD (Trenches 210–42).



Fig. 1.12 Excavating late medieval stone-lined drain 9205 in one of the trenches within the interior of the New Library

2013

This phase encompassed full archaeological excavation within the footprint of the lower ground floor extension north and east of the existing library to an AML of 56.10m OD (0.40m below the formation levels). Due to the engineering requirements for the maintenance of the structural integrity of the new library building, the excavation area that abutted this structure was subdivided into several smaller areas that were excavated and backfilled sequentially.

Trenches excavated for modern services to the east of these extensions were subject to watching briefs except where four new manholes were to be located, as these impacted on archaeological deposits (Trenches 103–6). These four areas were subject to archaeological excavation to their respective formation levels.

2014

The final phase of work included the reduction of the existing basement level within the footprint of the existing library building to an AML of 55.10m OD, 0.40m below formation level (Fig. 1.12). Due

Table 1.2: Sequence of excavation trenches within the New Library

Trench	*Excavation sequence*
118	1
119	4
120	2
121	3
122	1
123	2
124	4
125	1
126	3
127	2
128	1
129	3
130	4

Table 1.3: Summary of minor trenches

Trench	*AML (m OD)*	*Purpose*
116	55.90	Internal tower
117	55.90	Plant room
134	54.78	Pumping chamber
135	55.61	Pumping chamber

to the engineering requirements for the maintenance of the structural integrity of the library, the excavation area which abutted the foundations of this structure was subdivided into 13 smaller trenches (Trenches 118–30). Each trench was then allocated a sequence number (1–4) indicating the order or sequence in which they were excavated (Table 1.2).

Those trenches labelled first in the excavation sequence (1) were subject to full archaeological excavation of all significant archaeological remains. Those labelled 2–4 in the excavation sequence were also subject to full archaeological excavation but with the addition of an iterative review by David Radford (Oxford City Council) to access the potential for any reductions in the level of excavation and recording that was necessary for the significant archaeology. To maintain the integrity and understanding of archaeological levels between trenches, tags making archaeological contexts in section were maintained in position after backfilling so that the contexts in the adjacent trenches could be equated.

In addition to areas within the existing library, four smaller areas were also subject to controlled excavation in mitigation of the new development (Table 1.3). There were also a limited number of watching briefs for service runs and other groundwork undertaken in those areas where archaeological remains had the potential to be impacted.

Table 1.4: Site phasing

Site phase	*Date range*
Phase 1	10th to mid-11th century
Phase 2	Late 11th to mid-12th century
Phase 3	Late 12th to early 13th century
Phase 4	13th century
Phase 5	14th to early 15th century
Phase 6	Mid-15th to mid-16th century
Phase 7	Late 16th to mid-17th century
Phase 8	Late 17th to early 18th century
Phase 9	Mid-18th to early 19th century
Phase 10	Mid-19th century and later

Phasing

The archaeological evidence has been assigned to the phases detailed in Table 1.4 based upon their stratigraphic relationships, as well as artefactual dating, scientific dating (radiocarbon and Bayesian modelling), spatial relationships and documentary evidence.

It was clear from an early stage during the post-excavation assessment that the excavation areas encompassed most of two medieval and later tenements and part of a third tenement (A–C, Figs 1.13 and 1.14). The boundaries between the tenements did not change significantly over time and were in most part well-defined. This enabled the remains and material evidence to be analysed within the context of the individual properties, highlighting any differences between the three tenements and over time. Each distinct building, structure and pit cluster within each tenement was allocated a unique group number (eg Building 1, Structure 3, Pit Group 3). This enabled the analysis of the evidence spatially within each tenement and over time.

Research aims and objectives

The research aims established at the outset of the project were refined during the post-excavation assessment and the extent to which these were addressed is the benchmark against which the success of the excavations, analysis and publication can be measured. During the post-excavation process, the highest priority was given to the foundation and development of the medieval tenements that fronted the High Street and the origin of the cemetery that they backed on to. The limited post-medieval evidence was focussed on a tenement that contained an important assemblage of wig curlers. The overarching research aims are summarised below and revisited in subsequent chapters. They were:

Anglo-Saxon

- What does the evidence tell us about extramural land organisation, and potential use, on the eastern side of the Oxford promontory? How do the boundary features relate to other features of

similar date in and around this part of the settlement? What do the boundary features tell us about the eastern approach to Oxford?

- Can early tenement layouts, later formalised in the stone buildings of the 12th/13th centuries, be discerned?
- What does the *ex situ* evidence for structures (structural wattle and daub) and domestic activity (charred plant remains, animal bone) tell us about the nature of settlement on this part of the Oxford promontory? How does this compare to contemporary evidence in other parts of Oxford?

Norman and medieval

- What was the effect on the development of the site from the Norman invasion, and the early

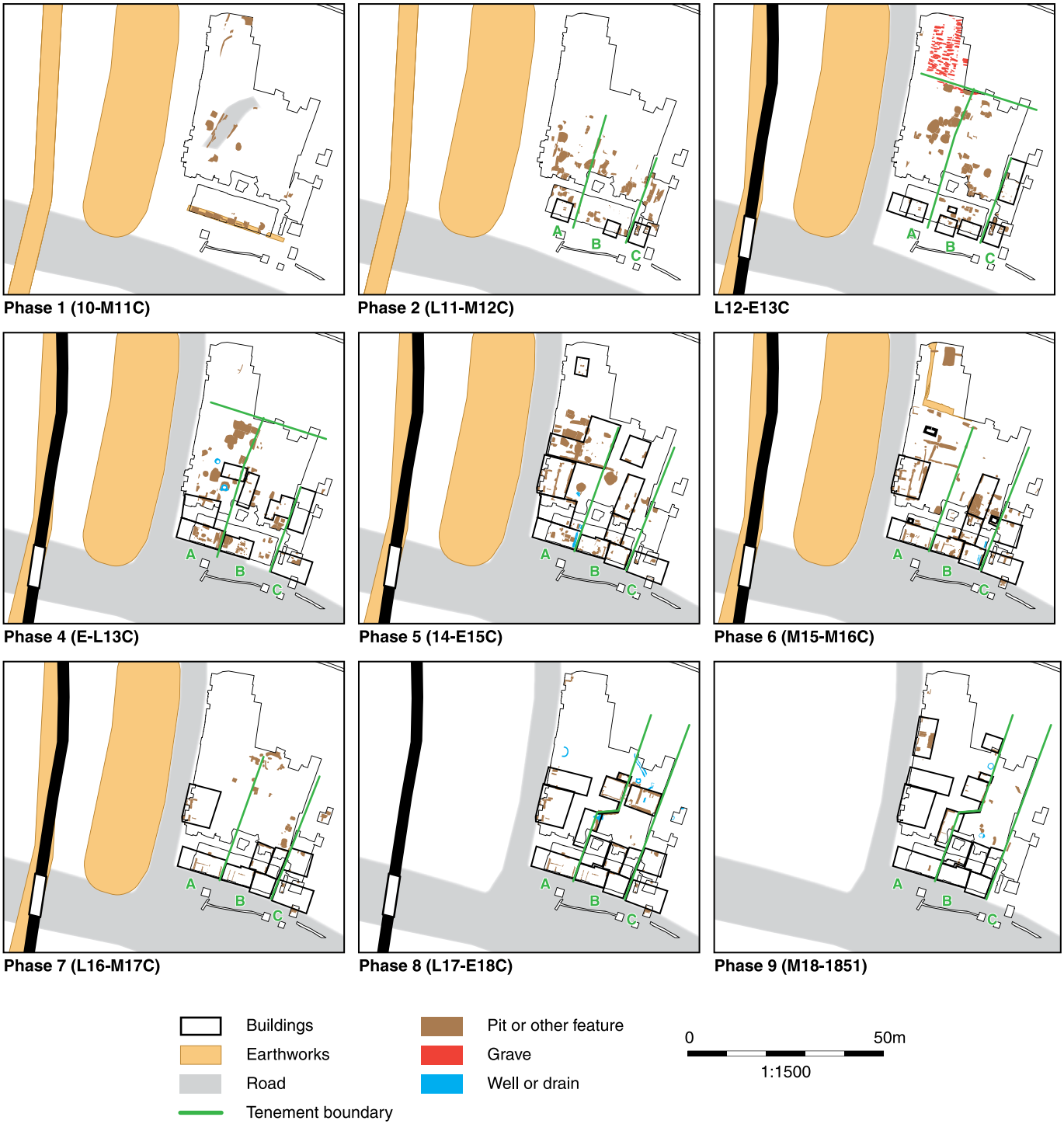


Fig. 1.13 Simplified plans showing the principal site phases

focus on Oxford by the Normans as a castle location and urban/trade centre?

- What does the evidence say about the nature and date of the earliest Norman suburban settlement/development in St Peter's? How does this compare to the other Oxford suburbs, St Giles', St Thomas' and St Aldate's?
- How do the tenement sizes compare to those within the town on the High Street – is there a continuation of the differences noted from St Mary's to the East Gate?
- How did early suburban settlement evolve and what was the nature of the earliest timber buildings?
- When did stone buildings start to be developed on Tenements A–C? What materials were used in their construction and what was their appearance?
- Tenements A and B have significant evidence for metalworking and are thought to be the site of a large suburban blacksmith's workshop. What was the layout and construction of the associated buildings, and the positions of hearths and working areas? How did they develop over time?
- How does the structural evidence, metalworking residues, and metal and worked stone artefact assemblages contribute to the understanding of the character of the metalworking activities?
- What is the nature of the hearths within Tenements A and B; are there specialised hearth forms? Is there a correlation between different types of charred plant remains and hearth types? Is there a correlation between different types and quantities of metalworking residue and different hearth types?
- What comparisons can be made between Tenement A–C in terms of function and the diet and status of their occupants, and did this change over time?
- How were the back-plots used over time? Is there evidence for zonation for different uses?

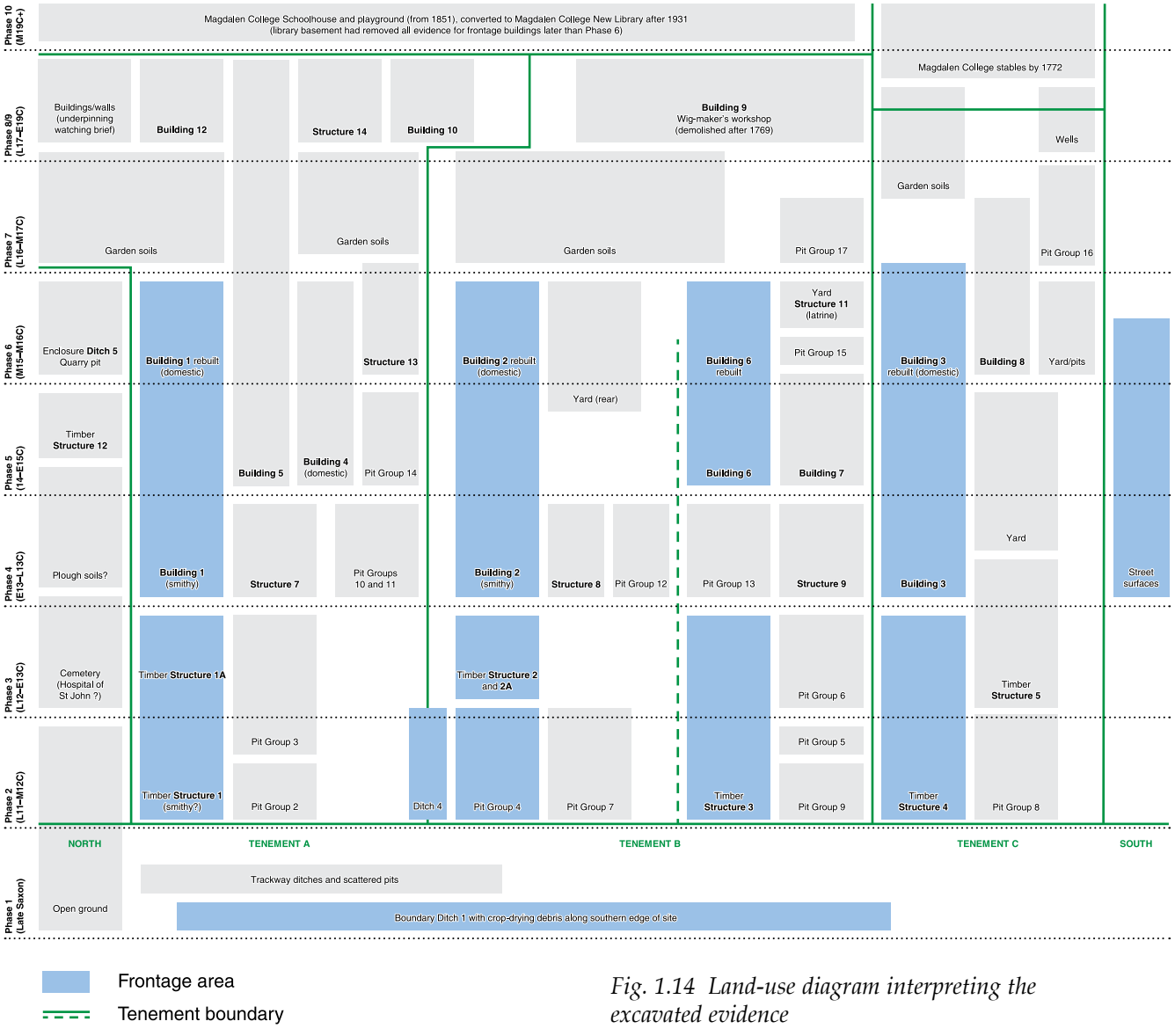


Fig. 1.14 Land-use diagram interpreting the excavated evidence

- What was the dietary status of the individuals buried in the cemetery, and what can this tell us about daily life in medieval Oxford?
- To what extent can the skeletal remains reveal evidence of occupations and activities through study of trauma, joint disease and non-metric traits?

Post-medieval

- A number of undated structural and other remains were recorded during the underpinning watching brief work. Do these pertain to the Greyhound Inn (Tenement A), and do they correlate with cartographic depictions of the area?
- A tankard inscribed 'White at the Greyhound' were recovered. Can documentary records tell us anything more about this individual?
- How does the development of the buildings to the rear of Tenement B correlate with those shown on historic maps and the documentary evidence?
- An important assemblage of wig curlers together with finds directly attributed to Magdalen College were found in Tenement B. Can further research elucidate connections between the occupants of this tenement and the scholars at the college?

REPORT STRUCTURE

The excavations generated large datasets of written, drawn and digital records, along with substantial amounts of artefactual and environmental material and a significant quantity of human bone. For publication, it was decided to present this information using a combination of printed and online digital formats. The printed volume contains an introductory background to the project, the archaeological sequence and specialist contributions, followed by a discussion of the results.

Chapter 1 establishes the background and location of the project. The archaeological background provides the context, as it is presently understood, for human activity in the locality through time. The documentary history summarises the medieval and post-medieval evidence from sources such the rentals from the Cartulary of the Hospital of St John the Baptist, the Window Tax of 1692 and historic maps. Chapter 1 also summarises the methodologies for the fieldwork and post-excavation analysis, the research aims and provides simplified phase illustrations and a land-use diagram.

Chapter 2 contains descriptions of the archaeological sequence by phase and divided into tenements, where appropriate. The descriptions are enhanced by reference to pertinent finds and environmental information and are supported by detailed illustrations.

Chapter 3 contains artefactual reports together with their illustrations. Full versions of a selection of the specialist reports can be found in the Digital Appendix, which can be downloaded from the Oxford Archaeology Knowledge Hub (https://knowledge.oxfordarchaeology.com/12921). Full versions of the remaining reports can be found in the site archive.

Chapter 4 contains the environmental evidence with a selection of illustrations and tables. It also includes a summary of the soil micromorphology report and the Bayesian analysis of the radiocarbon dating from the cemetery. Full versions of the reports can be found in the Digital Appendix.

Chapter 5 summarises and discusses the results of the analysis of the human skeletal remains. Detailed analysis of the human remains, and the grave catalogue are available in the Digital Appendix.

Chapter 6 discusses the results of the excavation and its significance to our understanding of the development of the town's eastern suburb, from agricultural land on the outskirts of the late Anglo-Saxon burh to the tenements that occupied the street frontage during the medieval and post-medieval periods. The excavated sequence is particularly informed by documentary evidence for the tenements and their occupants.

ARCHIVE

The archive will be deposited with Oxfordshire County Museums Service under accession code OXCMS:2011.91.

Chapter 2

Archaeological Sequence

by Steve Teague

PHASE 1 (10TH TO MID-11TH CENTURY)

These were the earliest recorded features on the site and were mainly located along the southern and western sides of the site (Fig. 2.1).

The southern area

Ditch 1

Ditch 1 straddled the southern edge of the site and may have formed a roadside ditch (for the precursor of High Street) and/or a field boundary (Fig. 2.3). Its full width was not revealed within the excavated area but straddled the southern edge of Trenches 118 and 120–6 (7728 and 9834; Fig. 2.2, sections 5030 and 5080). No definitive evidence for the ditch was found to the east of Trench 126, possibly as a result of later truncation or that the ditch had terminated at this point. A truncated 'pit' recorded in section which extended about 1.0m from the southern end of Trench 127 (9196; Fig. 2.2, section 5100) may have represented the eastwards extension of the ditch. It may have been the same feature as pit 9754 in Trench 128, which cut a disturbed natural deposit (9766). If the pit did form part of the ditch, then this suggests that it either terminated or returned to the south. Furthermore, early undated 'pit' 9254 located to the east in Trench 129 could have represented an opposite terminus suggesting a narrow entrance through the ditch, perhaps around 1.2m wide. The ditch was steep sided with a flat base and measured at least *c* 1.33m wide at its most exposed point (Trench 118). It was up to 1.0m deep (Trench 120) and became generally shallower towards the east. The ditch seems to have silted up naturally with weathered natural (7297; Fig. 2.2, section 5010) that contained a smithing hearth bottom and smithing spheres, before being levelled with mid–dark grey silty clay, perhaps deliberate infill (7300 on Fig. 2.2, section 5010). Smithing debris was also found throughout the fills of the ditch section excavated in nearby Trench 121 (fills 7904 and 7906). A relatively small quantity of pottery (24 sherds) was recovered from the ditch and is largely fresh St Neots ware suggesting a 10th- or 11th-century date. Two sherds of medieval Oxford ware and a single small sherd of Kennet Valley ware were present in its upper fill in Trench 121, which if not intrusive suggests that the ditch was being filled from the mid- to late 11th century. A radiocarbon date of cal AD 890–1030 (95.4% confidence; SUERC-80260; Table 2.1) was obtained from a charred nutshell from the lower fill of the same ditch segment in Trench 121. A second date of cal AD 880–1020 (95.4% confidence; SUERC–100272; Table 2.1) was obtained from charred grain from a lower fill in Trench 126. Towards the east end of the ditch, within Trenches 124 and 126, a large quantity of fired clay was recovered from its fills. The material is all of a similar nature and has inter-woven wattle impressions on its reverse face. It is likely to have derived from a discarded oven/hearth, possibly from a crop-drying oven or malting kiln (Poole, this report). A large quantity of fired clay, likely to have derived from the same structure, was also recovered from pit 9196, possibly a terminus of the ditch. No fired clay was retrieved from the possible opposite terminus, though its upper fill was rich in charred plant remains which may have derived from the same structure. The remains comprised rye and free-threshing wheat that had largely been fully processed but there was also some evidence for threshing (sample 5157, Giorgi, Chapter 4). Charcoal from pit 9196 (sample 5157) is dominated by oak heartwood and hazel roundwood suggesting that it either originated from fuel used for the postulated oven/hearth or could be derived from a wooden structure that had been destroyed by fire. The upper fill of the ditch at its west end in Trench 120 (Fig. 2.2, section 5030, 7716) contained fish bone, iron slag and hammerscale, the latter suggestive of nearby ironworking. This was confirmed by soil micromorphological analysis which identified semi-melted sands with evidence of possible liquid latrine waste from its lower fill (7717; Fig. 2.2, section 5030).

Several mainly shallow pits were located along the north edge of the ditch, two of which clipped its northern edge (8512 and 9350) whilst pit 9758

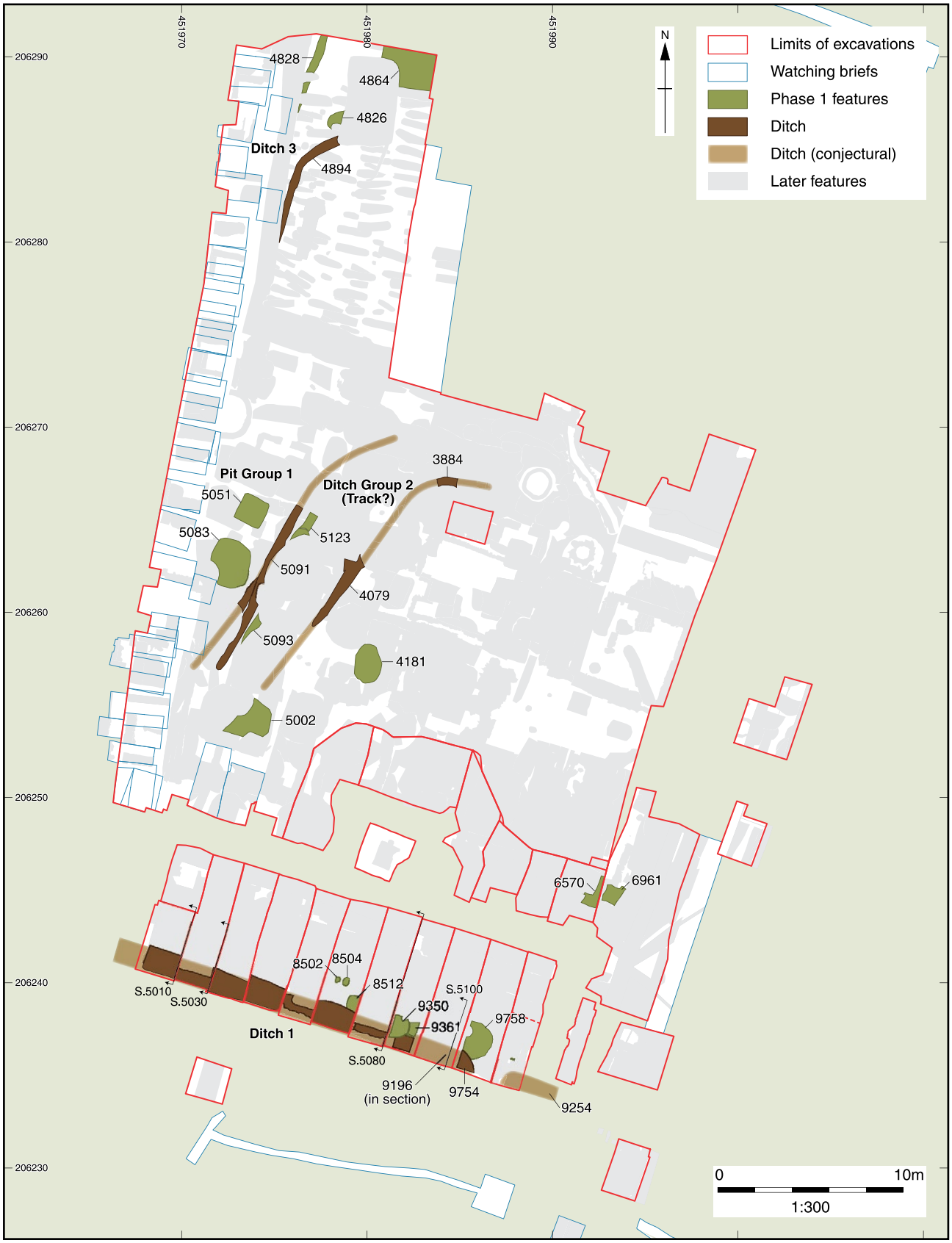


Fig. 2.1 Phase 1

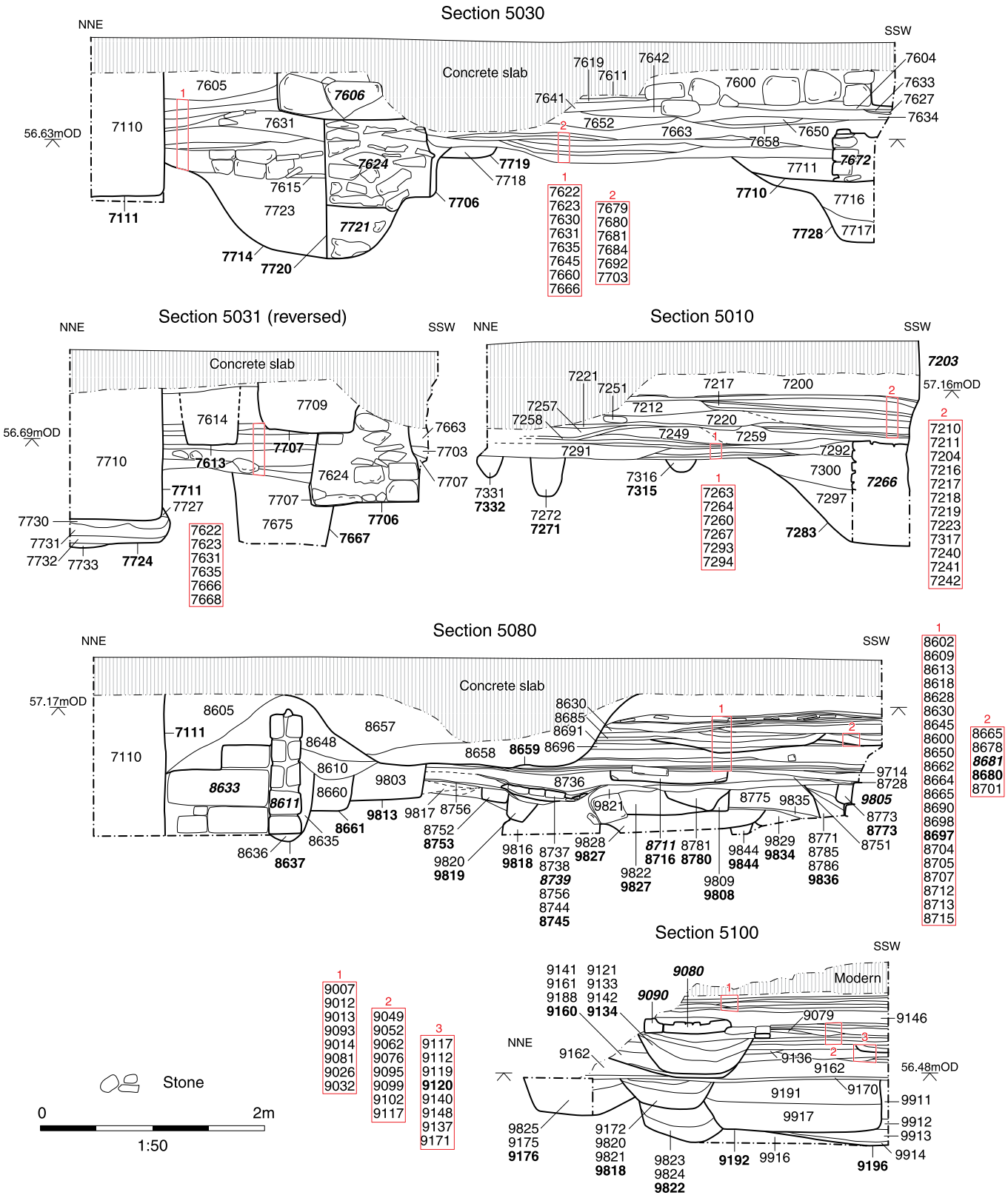


Fig. 2.2 Sections 5030, 5031, 5010, 5080 and 5100



Fig. 2.3 Ditch 7710 (Ditch 1) in Trench 120, view towards east, scale 1m



Fig. 2.4 Possible track (Ditch Group 2), view towards south, scale 2m

was cut by its possible eastern terminus. Sub-circular pit 9758 was at least 0.50m deep and contained three small but fresh sherds of St Neots ware together with a good quantity of animal bone, largely sheep/goat. The remaining pits were no more than 0.26m deep, two of which (9350 and 9361) each contained sherds of St Neots ware, the latter also containing seven smithing hearth bottoms and other slag. It is possible that these two pits belong to the later Pit Group 4 and that the pottery is residual from the ditch that they cut. A pair of early postholes (8502 and 8504), both cutting natural, may also belong to this phase, one of which (8504) contained a worn sherd of St Neots ware.

The western area

Ditch Group 2 (track?)

Running on an approximate NE–SW alignment was a sequence of parallel ditches (Ditch Group 2) that may have defined the edges of a track that was *c* 3.5m wide (Fig. 2.4). Much of the evidence for the ditches had been removed by later pitting, though at least four parallel gullies were apparent, each about 0.4–0.6m wide and surviving up to depth of 0.30m. They have may have been successive recuts of drainage gullies on either side of the track, though no evidence for a track surface survived. It is possible that to the north the trackway turned towards the east, as indicated by gully fragment 3884. Though the only dating evidence was a small sherd of Cotswold-type ware, the alignment of the ditches suggests that they predated the formation of the tenements from Phase 2. A small quantity of smithing debris, including hammerscale flake, smithing spheres and iron shavings, was recovered from 5091 and two smithing hearth bottoms and other smithing debris was found in ditch 5093.

Table 2.1: Radiocarbon determinations from non-cemetery contexts

Laboratory number	*Context*	*Material*	*Age*	$\delta^{13}C$	*95.4% probability (cal AD)*
SUERC-80259	3708	Large mammal bone	913±28	-22.0	1030–1220
SUERC-80260	7906	Charred hazel nutshell	1063±28	-24.5	890–1030
SUERC-99890	6950	Human left femur	819±26	-18.6	1240–1420*
SUERC-100272	9367	Charred grain	1098±26	-22.1	880–1020
SUERC-100273	7260	Charred hazel nutshell	805±26	-22.4	1180–1280
SUERC-100277	7260	Charred oak twig (3 rings, bark and pith)	790±26	-25.9	1220–80

* Allowing for the marine reservoir effect (see Griffiths, Chapter 4)

Pit Group 1

Situated on either side of the possible trackway were two pairs of similar-sized pits that may have been contemporary with it. The pits on its west side (5051 and 5083) both exceeded 1.0m in depth and were filled largely with redeposited natural clay suggesting that they served as quarries. A small quantity of St Neots ware was recovered from both pits together with a few sherds of Cotswold-type ware from pit 5051. The two pits (4181 and 5002) located on the east side of the track also contained similar and largely sterile fills but were only *c* 0.60m deep. A small quantity of similar pottery of late Saxon date was recovered from both pits, though the upper fill of pit 5002 also contained a small sherd of Kennet Valley ware, suggesting a post-Conquest date. Fish bone was recovered from pit 5083, comprising mainly eel and herring with a few bones of perch, small pike, bullhead and burbot (sample 3339). Some of the remains showed evidence for mastication suggesting latrine waste. Pit 5002 was notable for containing two smithing heath bottoms, one of which was almost pure iron, suggesting bloom, the product of iron smelting.

Ditch 3

Located near to the north-west corner of the site were the remains of a possible second trackway formed by two opposing shallow gullies that predated the cemetery and lay to the north of the tenements. The gullies were between 0.2m–0.32m wide and survived to no more than 0.12m deep and were each filled with pale bluish grey clay suggesting that that they served for drainage. One of the gullies contained a worn sherd of St Neots ware. Situated between the two gullies was a poorly defined 'pit' (4826) of similar depth, perhaps the remains of a further gully. This also contained a sherd of St Neots ware along with a sherd of Stamford ware suggesting a late Saxon date.

Other features

Shallow rectangular pit 4864 was partially exposed at the northern edge of the site and predated the cemetery. The pit measured at least 2.0m x 2.5m and was 0.55m deep. It contained a notable group of late Saxon pottery (52 sherds, 552g), largely St Neots ware, but included two sherds of Michelmersh ware and twelve sherds of Cotswold-type ware suggesting a date from the late 10th century. The pit also contained an appreciable quantity of animal bone and a late Saxon type horseshoe, suggesting nearby occupation or activity. Its relationship with the possible trackway (Ditch Group 3) is uncertain. Pit 6961, located towards the south-east of the site, was notable for containing a small number of flatfish (plaice/flounder or dab) bones together with several small perch and gurnard vertebrae (sample 4100).

PHASE 2 (LATE 11TH TO MID-12TH CENTURY)

This phase saw a substantial increase in activity likely to have been associated with newly formed tenements whose boundaries would become increasingly discernible during the later phases of the site. Activity during this phase was confined to the southern half of the site and predominantly comprised pits that were located to the rear of buildings which presumably occupied the High Street frontage to the south and perhaps Longwall Street to the west (Fig. 2.5). Three putative structures, defined mainly by postholes, have been identified in the southern frontage area (Structures 1, 3 and 4).

Tenement boundaries

The clearest indicator of a boundary is indicated by shallow Ditch 4 which closely followed the boundary of two tenements (A and B) that was clearly evident from Phase 4 where it was marked by stone walls. The boundary between Tenements B and C is less discernible, probably as a result of much of this area lying below the extant east wall of the New Library. Nonetheless, the pit clustering and the location of a possible structure (Structure 4) on the frontage suggests a boundary occupying a similar position to that which became more clearly defined from Phase 4. Only the full width of Tenement B was revealed, being *c* 15.2m wide, corresponding to 3 (medieval) perches. No evidence for the existence for a rear boundary of the tenements was found during this phase.

Ditch 4 was more discernible to the north where a length of over 5m survived, revealing a concave profile that was 0.43m wide and 0.26m deep. An earlier ditch on the same alignment survived in a fragmentary state to the south within the New Library and was probably of similar dimensions. Pottery dating to the late 11th to 12th centuries was recovered from both lengths of the ditch. The truncated remains of a gully to the west of the site (5013 and 5036) may have marked an early boundary for Tenement A before encroachment westwards by pits. Alternatively, it may have been the remains of a drainage ditch, perhaps alongside a road (later Longwall Street) to the west.

Tenement A

Structure 1

The northern and western limits of Structure 1 were fairly well defined by lines of circular postholes measuring between 0.20m–0.30m in diameter and surviving up to 0.30m deep (Fig. 2.2, section 5030, 7719). The eastern extent of the structure is uncertain but may have been defined by posthole 8128. Its southern extent lay beyond the excavated area. In all the building may have measured *c* 4.2m (E–W) and extended southwards beyond the excavated area. Contained within the structure and probably

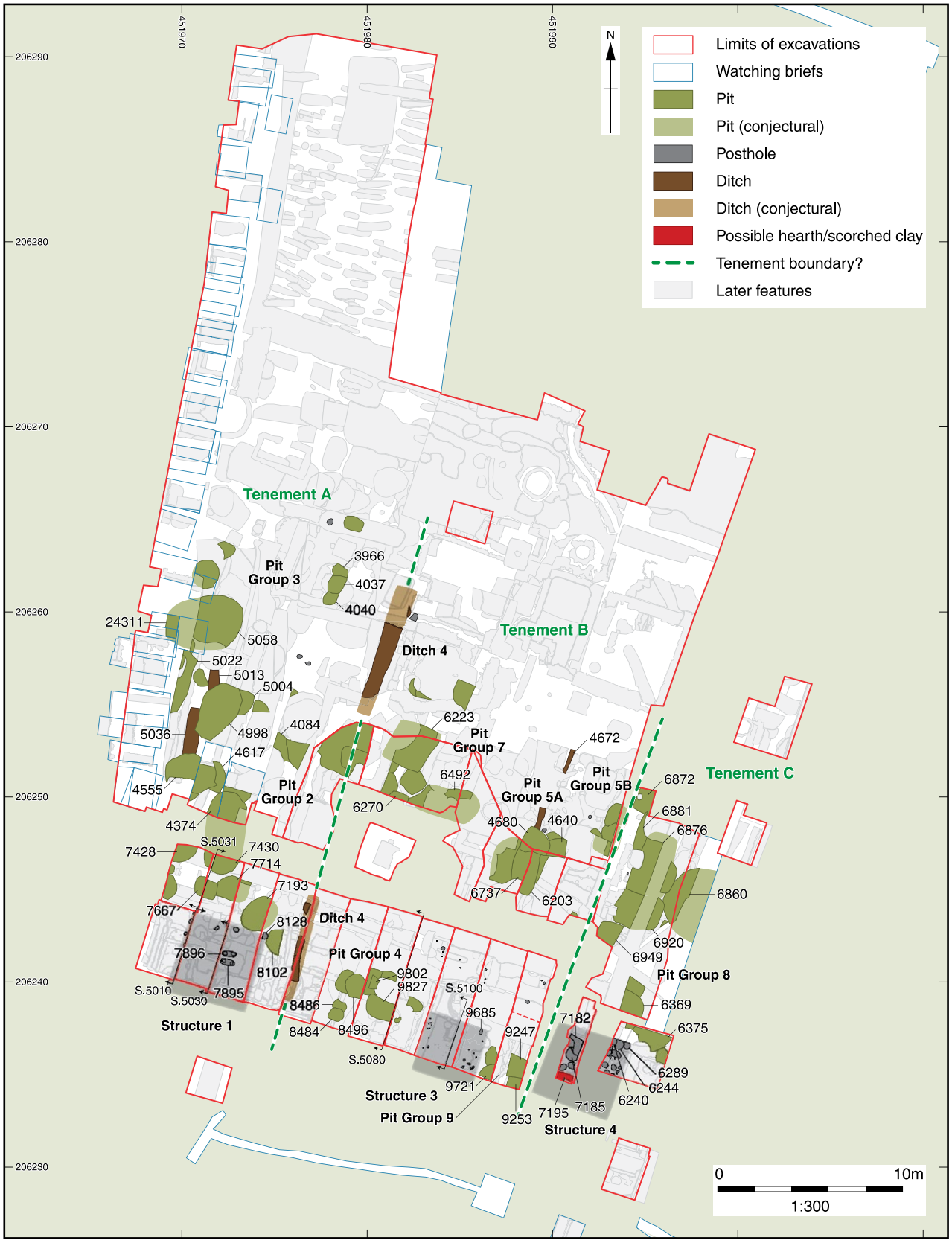


Fig. 2.5 Phase 2



Fig. 2.6 Postholes 7895 and 7896, Structure 1, view towards west, scale 0.5m

contemporary were a pair of sub-rectangular postholes (7895 and 7896) each measuring *c* 0.80m x 0.32m and between 0.35 and 0.50m deep. Each contained an oval posthole located at either end measuring between 0.15m–0.26m in diameter which were sunk into the base of the pit (Fig. 2.6). The postholes may have supported a structural element within the building, possibly the base of a staircase. Posthole 7896 contained a large rim sherd from a cooking jar in medieval Oxford ware together with some fish bone. Charcoal from the posthole (sample 5195) comprised largely oak heartwood derived from mature trees and may have originally derived from hearths within the structure. Both postholes contained hammerscale and smithing spheres, present in appreciable quantities, together with small iron chippings/flakes and ferruginous concretions – together suggestive that smithing was undertaken with the structure. Otherwise, no internal deposits survived within the structure, probably due to terracing for the construction of Building 1 (see Phase 4 below).

Pits

To the north or rear of Structure 1 was a large number of pits which are presumed to have been contemporary from its earliest use given that none were contained within the footprint of the building. The pits were allocated to two groups (Pit Groups 2 and 3), with the largest group to the south clearly post-dating the possible trackway (Phase 1) with a more dispersed group located to the north, possibly an extension of earlier Pit Group 1 to their north.

Pit Group 2

The group consisted of up to 20 individual rounded pits, many of which formed closely spaced but discreet features. The largest pits (7724=4374, 4555, 4998 and 5022), probably gravel quarries, were situated towards the north of the group, and each measured in excess of 2.7m across. The deepest of these pits (4998 and 4555) exceeded 0.80m and 0.92m in depth respectively, their bases being below impact level. Smaller and shallower pits (5004 and 4617), possibly steps, located on the edge of these two pits may have enabled easier access into these deeper pits. The smaller pits to the south, situated adjacent to Structure 1, measured no more than 1.5m across and 0.50m deep (7714, Fig. 2.2, section 5030) and may have been dug as rubbish pits, although only one (8102) contained animal bone and pottery in any quantity.

Pottery from the pits is dominated by cooking pots in medieval Oxford ware with lesser quantities of Cotswold-type ware (Fig. 3.1, no. 7) and probably dates from the late 11th to mid-12th century given the absence of more discernible late 12th-century forms. The majority of the identifiable animal bone was retrieved from pits 4374, 4555, 5022, and 8102 and consists largely of cattle and sheep/goat though horse bones were also present in pits 5022 and 4084. Pit 7428 contained fish bone, largely herring and eel, all in good condition.

Pit Group 3

Pit Group 3 represents the earliest of a cluster of pits to the north of Pit Group 2 which became denser during Phase 3. The largest, oval pit 5058=24311, measured up to 4.2m across and 0.90m deep and was probably a quarry. It contained redeposited natural at its base and was probably rapidly filled. One fill comprised a dump of organic material that contained a large quantity of fish bone (sample 3336) comprising mainly freshwater species including roach, gudgeon, bleak, minnow, dace or juvenile chub, juvenile pike, bullhead and three-spined stickleback as well as possible burbot, ruffe and stone loach. Most of the finds were retrieved from a cluster of small shallow pits (3935, 3966, 4037 and 4040) which included a small quantity of medieval Oxford and Cotswold-type wares (Fig. 3.1, no. 11) together with a few cattle and sheep bones.

Tenement B

During the earliest phase of Tenement B, two group of pits (Pit Groups 4 and 9) occupied the frontage area, between which were a scatter of postholes and stakeholes that may have formed part of one or more buildings (Structure 3). Similarly, towards the north were two further pit clusters (Pit Groups 5 and 7). It is likely that more pits existed further to the north within the 2012 excavations but lay unexcavated below impact level.

Structure 3

The remains of a post-built timber structure were revealed between Pit Groups 4 and 9, within an area not subject to pitting. The eastern and western extents of the structure may have been defined by clusters of stakeholes and small postholes, suggesting it was *c* 3.2m wide. The structure

extended southwards beyond the trench and cut across infilled late Saxon Ditch 1; otherwise it represented the earliest feature in this area. Its northern extent is unclear but may have been denoted by posthole 9685; possibly a corner post given it was larger in diameter at 0.28m compared to those on the east of the structure which were around half its diameter. The asymmetric arrangement of the postholes could imply a number of modifications or rebuilds of the structure had occurred. None of the postholes exceeded 0.10m in depth, suggesting either a lightly built structure of one storey in height or that the area had been subsequently levelled prior to the construction of the stone buildings that later occupied its site.

Further shallow postholes to the north suggest the presence of other structures prior to the area being set aside for pitting during Phase 3 though no coherent arrangement is evident. As with Structure 3, no dating evidence was found in the postholes.

Frontage pits

Pit Group 4

This group comprised up to nine shallow pits that predated and were cut by the postholes of Structure 2 (see Phase 3). The pits were sub-rectangular measuring no more than 1.5m in length and most were no deeper than 0.30m. Only two of the pits (9802 and 9827; Fig. 2.2, section 5080) contained identifiable animal bone, the former including a dog bone, the latter a deer antler. These two pits each contained a smithing hearth bottom, the latter pit also with some iron-rich slag. Similarly, little pottery was recovered and included single sherds of medieval Oxford ware from pit 8486, Cotswold-type ware from pit 9802 and Kennet Valley ware from pit 8484.

Pit Group 9

Located to the east of Structure 3 and clustered against the suggested boundary between Tenements B and C was a second group of largely shallow pits (Pit Group 9). Unlike Pit Group 4, three of the pits (9247, 9253 and 9271) were rich in finds, particularly pottery, which was dominated by medieval Oxford ware and included a cresset lamp from pit 9247 (Fig. 3.1, no. 8). Pit 9271 was also rich in animal bone, largely sheep/goat and cattle but also including goose and pigs. An elongate whetstone of Norwegian Rag that had been used as a point sharpener was found in pit 9253 (Fig. 3.19, no. 1) and a second whetstone of Wealden sandstone was found in pit 9721, potentially the same feature as pit 9253. This pit also contained a spindle whorl made from bone (Fig. 3.27, no. 1).

Rear pits

Two dense pits clusters (Pit Groups 5 and 7) represented the earliest in the sequence of pits located towards the rear of the High Street frontage near to the central area of the site. There may have been further pits to their north that remained unexcavated below impact levels.

Pit Group 7

Pit Group 7, the western group, comprised up to eight medium to large pits, most of which were only partially exposed. The largest, square pit 6223, measured 2.5m across and at least 0.72m deep and may have originally served as a quarry. Most of the other pits also exceeded a depth of 0.60–0.70m. Whatever their original function, pits 6223, 6270 and 6492 contained significant quantities of animal bone and pottery, suggesting that they ultimately were used for the disposal of rubbish. Pottery from the pits exclusively comprised cooking pots in Cotswold and medieval Oxford wares. The animal bone was predominantly sheep/goat and cattle with a few pig and bird bones. A sample (4055) taken from pit 6492 was rich in fully processed rye and oats.

Pit Group 5

Pit Group 5 was formed of two clusters: a group of large intercutting pits to the west (5A), probably quarries, and a group of smaller, probable rubbish pits (5B) to the east that clustered along the putative boundary with Tenement C. The quarries consisted of up to six irregular pits, the largest of which (6203=6737=4680) measured in excess of 3.6m across and 0.60m deep. Their earliest fills comprised redeposited natural before being rapidly levelled with darker fills that contained domestic refuse. The smaller, more rounded pits (5B) measured no more than 1.0m across, and 0.36m deep. Compared with the backfill of the quarries they contained few finds suggesting that they did not serve as rubbish pits. Perhaps they were deliberately placed to the mark the boundary between Tenements B and C. Most of the finds were retrieved from pits 4640 and 4680=6203, comprising fresh sherds from cooking pots in Cotswold and medieval Oxford wares together with freshly deposited animal bone, largely from sheep/goat and cattle. Later pottery was present in the upper fill of pit 6203, suggesting that it remained open or was levelled during Phase 3.

Tenement C

Structure 4

This structure was partially revealed in Trenches 105 and 117, representing the earliest activity in this area along the High Street frontage. A large number of closely spaced postholes suggest the presence of a timber structure, the posts of which had been replaced over an extended period of time. Its northern extent and perhaps its north-eastern corner may have been denoted at one time by posthole 6289 given the presence of pits to the north and east (see Pit Group 8). This posthole seems to have been replaced by posthole 6244 and finally by



Fig. 2.7 Hearth 7195, showing scorched clay 7188, Structure 4, view towards south, scale 0.5m

posthole 6240, suggesting that there were at least two phases of modification or rebuilds. Nonetheless, the high density of postholes in the area is difficult to explain unless they represent the gradual enlargement northwards and eastwards of a timber building. Most of the postholes measured between 0.30m and 0.40m in diameter and around 0.30m in depth suggesting a structure of some substance. The structure extended northwards by least 4.2m from the High Street frontage and was probably longer in length than Structures 1 and 3. It may have been up to 4.3m wide if the boundary between Tenements B and C has been correctly identified. The remains of a possible hearth (7195) were found within the projected structure, indicated by an area of scorched clay (7188) that overlay ash and charcoal (7191) contained in a shallow pit (Fig. 2.7). To the north were the remains of a possible floor or floor repair surviving as two shallow hollows levelled with firm yellowish clay (7182) and charcoal (7185). Pottery from the structure was almost exclusively medieval Oxford ware, with a lesser quantity of Cotswold-type ware (Fig. 3.1, no. 9). An iron bracket from a structural fitting was recovered from posthole 6289.

Pit Group 8

The area to the north of Structure 4 was set aside for pit digging, the largest of which (6876 and 6860) are likely to have been used as gravel/clay quarries and were located to the north. Up to 14 pits were identified, generally less than 0.40m in depth apart from pits 6375, 6860, 6949 and 6872, which each exceeded 0.48m in depth and whose bases remained below impact level. The quarry pits appear to have been rapidly filled and contained few finds. The highest concentrations of animal bone were recovered from smaller pits 6369 and 6375, located adjacent to Structure 4. The pottery was dominated by cooking pots in medieval Oxford ware, though the presence of two small sherds of medieval shelly coarseware in pit 6876 could suggest that this pit had been filled later in the 12th century. Samples taken from pits 6375 and 6860 (samples 4043 and 4088) contained fully processed free-threshing wheat with the addition of charred oats and hazelnut shells from pit 6860. Fish bone including sardine and herring was recovered from pits 6876 (sample 4090) and 6881 (sample 4091) and roe deer and woodcock bones were recovered from pit 6860.

PHASE 3 (LATE 12TH TO EARLY 13TH CENTURY)

Tenement A

It is likely that the timber building (Structure 1) that occupied the High Street frontage continued in use with further structures or additions to its west (Structure 1A) so that the frontage area of this tenement was fully built up (Fig. 2.8). The intense pitting that commenced during the previous phase continued but extended further to the north and into the southern extent of the cemetery (Pit Group 3) that presumably bounded the tenement to the north. Any boundary between the two was probably removed by late medieval enclosure Ditch 5 (Phase 6) that cut through the northern extent of the pits and also the southern edge of the cemetery after it ceased to be used. No physical boundary with Tenement B survived but it probably remained largely unchanged and was delimited by the eastern extent of Pit Group 3. The area between the frontage structures and Pit Group 3 seems to have remained largely open, with only three pits, representing the latest pits that formed part of Pit Group 2.

Structure 1A

Structure 1A may represent a westwards extension of Structure 1 or have been a separate structure. As with Structure 1, it predated the construction of stone Building 1 (see Phase 4). While no stratigraphic relationship with Structure 1 was established, it is assumed to have been constructed later given the presence of later pottery forms and CBM fragments within its postholes. Only a few postholes and shallow features remained, perhaps relating to its north-east corner, and no internal

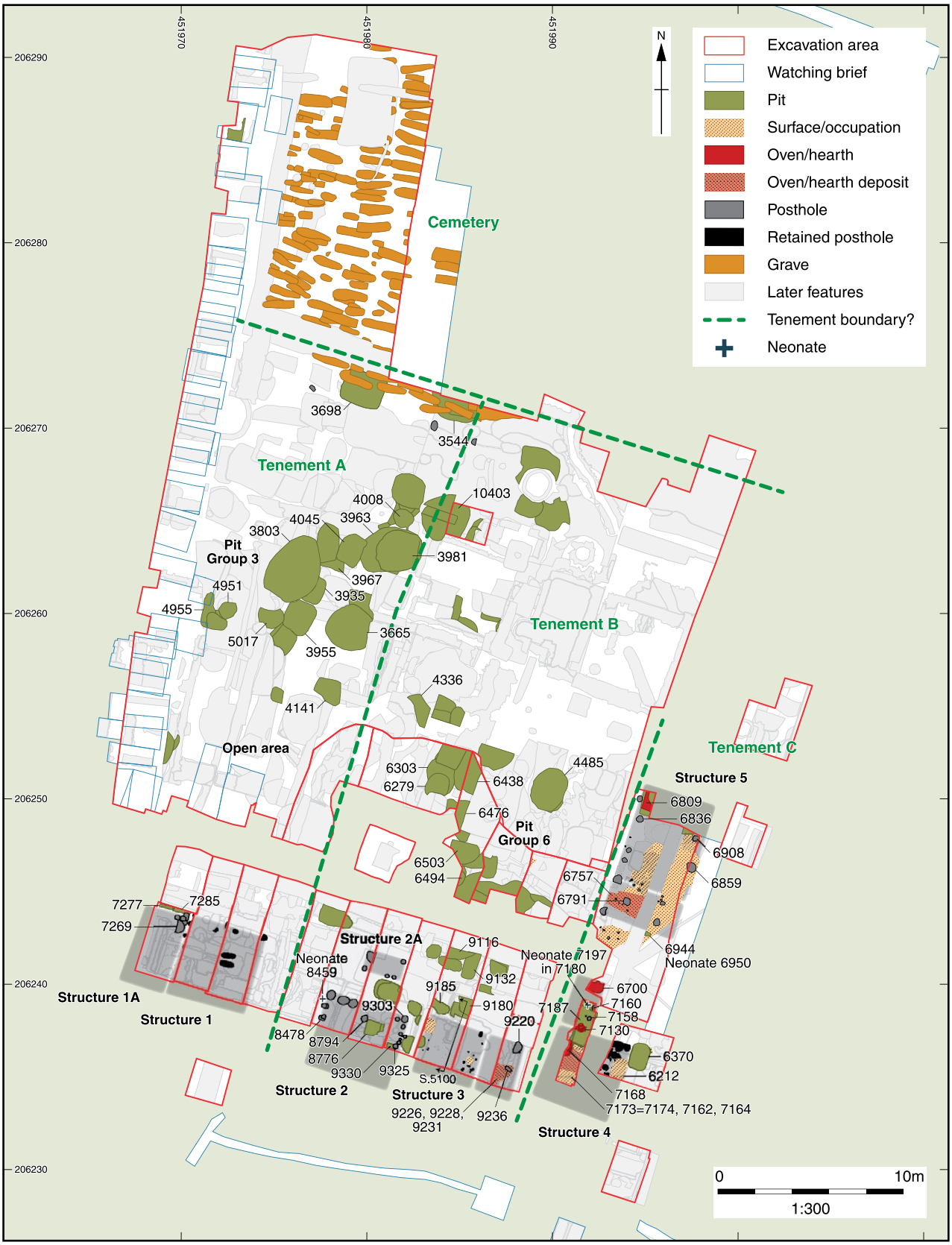


Fig. 2.8 Phase 3

deposits survived. The presence of intercutting postholes suggests that the posts had been replaced on at least one or perhaps two occasions. The largest and earliest posthole (7269) measured 0.64m in diameter and 0.20m deep, suggesting a fairly substantial structure. Two further small pits (7277 and 7285), largely truncated, may have represented similar-sized postholes and were also both 0.20m deep. Most of the pottery from the postholes was medieval Oxford ware, though a sherd of early Brill/Boarstall ware was recovered from posthole 7269 and small fragments of medieval roofing tiles were found in possible postholes 7277 and 7285.

Pit Group 3

This group comprised a cluster of 22 pits that probably served as quarries/rubbish pits or possibly wells. The largest pits were more rounded, such as pit 3803 which measured 3.35m across and exceeded 0.70m in depth and pit 3665 which was 2.2m in diameter and 1.0m deep. The smaller and more rectangular pits measured no more than 1.6m across and tended to be shallower and probably served as rubbish pits from the outset. There were two outlier pits (3544 and 3698) to the north that probably clustered against the northern boundary of the tenement, which was subsequently encroached upon by the cemetery, probably by between 1–2m southwards.

Although pottery from the pits was still dominated by cooking pots in medieval Oxford and to a lesser extent Cotswold-type wares, there was a noticeable increase in the quantity of Kennet Valley ware present including a foot from a tripod pitcher (Fig. 3.3, no. 24) from pit 3698 suggesting a date from the mid- to late 12th century. A mammal bone from the same pit returned a radiocarbon date of cal AD 1030–1220 (95.4% confidence; SUERC-80259; Table 2.1). This pit was cut by graves from the cemetery. A few sherds of Brill/Boarstall ware were also present in pits 3935, 3963 and 3981; the latter pit also contained a fragment of a guttering element of an architectural stone sourced from Taynton, west Oxfordshire, likely to derive from a Saxo-Norman ecclesiastical building in the vicinity. These three pits are considered to be early 13th century in date.

Pit Group 3 also saw for the first time the presence of roofing tile in noticeable quantities, particularly from pits 3803, 3935 and 4951, including some fabrics which can be dated to the 13th century. Several fragments of early ridge tile dated to the late 12th–14th centuries were also present in pits 3967, 4008 and 4045.

Animal bone was particularly prevalent in pits 3665, 3935 and 3955, the majority of which was sheep/goat with smaller quantities of cattle and pig and a red deer bone and fish bone were also present in pit 3955. A sample (3330) taken from a fill of pit 5017 revealed a range of charred remains, including a mix of four types of cereal grain that had been cleaned together with hazelnut shells, some pulses and hearth debris. Mineralised fruit seeds and stone together with possible stabling waste was found in a sample (3335) taken from pit 3955. A horseshoe fragment (Fig. 3.28, no. 2) was found in pit 4955 which also contained horse bone, and pits 4951 and 5017 each contained large lumps of iron slag. A folding balance arm of copper alloy was recovered from pit 3665 (Fig. 3.28, no. 3).

Tenement B

Structures 2 and 2A

A post-built building (Structure 2) was located immediately to the west of Structure 3 and occupied most of the remaining frontage area of the tenement that had formerly been set aside for pits (see Phase 2, Pit Group 4). The building formed two parts, possibly two separate structures, the main southern element of which was clearly defined. The main element (Structure 2), of which its northern extent projected 2.0m into the excavated area, comprised a rectangular arrangement of closely spaced postholes measuring *c* 4.6m wide (E–W). The postholes were quite substantial, those along the north wall measuring up to 0.60m in diameter with smaller postholes along its east and west walls, each measuring around 0.25m in diameter. Most of the postholes were less than 0.22m deep, the deepest being posthole 9303 located on the north-east corner of the structure. Internal posthole 8794 may have formed part of an internal division dividing the structure into two equal parts. Square pit 8776 may have been the remains of a hearth located within the eastern division of the building. Measuring 0.81m across and just 0.08m deep it was filled with limestone rubble, some of which was heat affected together with some charcoal. A shallow scoop (9330), perhaps the remnants of a rake-out pit, was located near to the possible hearth. It contained a total of 1.9kg of micro-slags, largely flake hammerscale together some small iron flake and distorted micro-slags, all indicative of secondary smithing. The charcoal from the pit was dominated by oak heartwood, presumably used as fuel for the hearth (sample 5224). The fills of two of the postholes (8478 and 9325) from the structure also contained micro-slags which was present in some quantity within the former and included spheres indicative of hot welding.

The second element of the structure (Structure 2A) was formed by a rectangular arrangement of postholes located about 1.5m to the north of Structure 2. The surviving postholes suggested a small structure measuring 2.2m in length and 1.2m wide that was perhaps separate from Structure 2. It could have also formed an annex attached to the northern side of Structure 2 given the degree of later disturbance that had occurred in the area between the two structures which may have removed evidence for further postholes.

Sherds of early Brill/Boarstall ware were present in five of the postholes from Structure 2 suggesting that it was demolished by the early 13th century.

Recovered from the upper fill (8459) of an apparent pit (8460), possibly the upper fills or levelling of Phase 2 pit 8496, located immediately to the west of Structure 2 were the articulated remains of a neonate. It is possible that this was in fact interred within a small grave cutting into the upper pit fill, the cut of which could not be observed.

Structure 3

Structure 3 seems to have been extended eastwards by *c* 2.0m, possibility delimited by large posthole 9220 on its north-east corner and by posthole 9236. The putative extension was floored with compacted silty gravel over which was a sequence of charcoal-rich silts (9226, 9228 and 9231), presumably associated with a nearby hearth. A small quantity of pottery was recovered, including early forms of Brill/Boarstall ware suggesting an early 13th-century date, together with a fragment of roofing tile dated to the 13th–14th century.

Pit Group 6

The area to the north of Structure 2A contained dense clusters of up 34 pits that represented the continuation of the pit digging that commenced during Phase 2 (see Pit Groups 5 and 7). The near absence of pits along the west side of the tenement suggests an access route was maintained to the rear and alongside the west side of Structures 2 and 2A. Further pits may have existed further towards the north of the property as demonstrated by a number of pits that were exposed below later medieval structures but remained unexcavated as they were below impact level.

The larger pits were located to the north and measured up to 2.3m across, many of which remained un-bottomed at excavated depths of 0.45–0.80m but probably originally served as quarries. The smaller and shallower pits were located near to Structure 2, most of which were no deeper than 0.20m and were therefore probably dug as rubbish pits (9116, 9118, 9122 and 9192; Fig. 2.2, section 5100).

As with the earlier phase of pits in Tenement B, the pottery was dominated by cooking pots in medieval Oxford ware but with the addition of significant quantities of Kennet Valley ware and medieval shelly coarseware. Pit 9185 contained a large part of a storage vessel in Kennet Valley ware and pit 4485 contained several vessel profiles including a jar in the same ware (Fig. 3.1, no. 1), three bowls (Fig. 3.1, nos 4–6) and a near-complete tripod pitcher in medieval Oxford ware (Fig. 3.1, no. 2), There was a complete absence of Brill/Boarstall ware apart from a few small sherds in several pits, largely those close to Structure 2, suggesting that pit digging had ceased by the early part of the 13th century. This is supported by the low quantity of roofing tile present, most of which is of early type, and was concentrated in pits 9180 and 9185 which were located adjacent to Structure 2. Most of the animal bone was found in pits 4485, 6279, 6303, 6438 and 6476 and is dominated by cattle and sheep/goat with a few pig and horse bones, the latter largely from pit 6303. Pit 4485 was notable for containing a hare tooth. Metal finds were rare but notably included an abraded Ansate or equal-arm brooch dating from the middle to late Saxon period from pit 9132 (Fig. 3.28, no. 5), found in association with a large quantity of Kennet Valley ware. The object is therefore a relic that was presumably incorporated into the pit from elsewhere, perhaps from an earlier deposit into which the pit had cut. Other notable items included copper alloy dress fittings, one each from pits 9185 and 9116 (Fig. 3.28, nos 6 and 8) and a buckle plate from pit 9180 (Fig. 3.28, no. 7). Only a relatively small quantity of iron slag and hammerscale was recovered, almost half of which was found within the smaller shallow pits located adjacent to Structure 2, particularly pits 9116, 9132 and 6494. Samples taken from pits 6279, 6503 and 9185 (samples 4022, 4057 and 5156) revealed largely charred and fully processed cereal grain, including free-threshing wheat together with some hazelnut shells. Pit 6503 also included hearth debris.

Tenement C

Structure 4 continued in use with further hearths and associated occupation deposits. To its north, pit digging had largely ceased and one or more timber structures (Structure 5) were constructed over much of the area and there was a possible northern extension to Structure 4. The western side of Structure 5 also clearly indicated for the first time the boundary between Tenements B and C, at least towards their rear.

Structure 4

The northern extension of Structure 4 may have been delimited to the east by shallow postholes 7158 and 7160. This suggests that the extension may have measured *c* 1.7m wide though its northern extent was not clearly established. It may have been delimited to the north by hearth 6700 which comprised a single slab of heavily burnt limestone over which there was a thin layer of charcoal that contained a cleithrum from a very large eel (sample 4075). Prior to the construction of the putative extension and the hearth, an apparently shallow pit (7187) had been dug, perhaps representing ground preparation as its extents were poorly defined. Its fill contained several sherds of Brill/Boarstall ware, including early forms, suggesting an early 13th-century date. A deeper pit or linear feature (7180) of uncertain purpose, at least 0.48m deep, was then dug through pit 7187. Bones from a neonate were recovered from its lower fill (7179).

The original part of Structure 4 was given a surface of sandy gravel onto which a hearth (7168) was constructed within its north-west corner. The hearth survived as a single course of fire-damaged limestone measuring *c* 0.80m in diameter and was associated with spreads of laminated charcoal; a copper alloy nail cleaner was recovered from one of these (7162) and a fragment of a scale-tang knife handle from another (7173). A second similar small stone-built hearth (7130) was subsequently added against the southern side of the extension to Structure 4 which clearly predated the north wall of stone-built Building 3 (see Phase 4).

A number of samples taken from the occupation and posthole fills contained hammerscale though the quantities were too small to suggest smithing on any appreciable scale. Occupation deposit 7164 contained fish bone, mainly herring and sardine (sample 5007), and a glass bead. A sample (5006) taken from a laminated occupation deposit (7162) within the main part of the structure contained charred processed grain together with hazelnut shells and legumes suggesting food preparation and consumption. A second sample (5009) taken from ash lens 7174 also contained charred barley and oats suggesting the brewing of ale. Charcoal from possible rake-out layer 6212 (sample 4017) was predominantly oak heartwood but also contained significant quantities of hazel, blackthorn/cherry, beech and hawthorn, suggesting mixture of fuel and kindling.

Rectangular pit 6370 was located against the east wall of Structure 4 and was probably contemporary with it. Its regular rectangular shape and straight vertical sides suggest that it was once lined with timber and was perhaps originally a latrine. It was excavated to a depth of 0.50m and contained a large quantity of fired clay, most of which had impressions of wattle on its underside, probably from the structure of an oven or kiln. The pit also contained scorched sherds of medieval Oxford ware and a roofing tile fragment of late 12th–14th-century date. A sample (4103) taken from its fill identified charred cereal grain together with hearth debris and hazelnut shells.

Structure 5

This substantial post-built structure was clearly defined on its west side by a line of large postholes that were up to 0.52m in diameter and were abutted on their east side by possible hearths and internal floor deposits. The east side of the structure may have been delimited by posthole 6859 that was 0.50m in diameter and perhaps by posthole 6908. Posthole 6836 on its west wall contained the remains of a timber post at its base, preserved in the underlying waterlogged conditions (Fig. 2.9). The north-east corner of the structure had been removed by modern services otherwise the remainder of its east and north sides probably lay outside the excavated area. The structure probably measured *c* 4.1m wide and extended beyond 7.2m in length. It may have been subdivided at its southern end at some point by a line of small postholes and stakeholes.

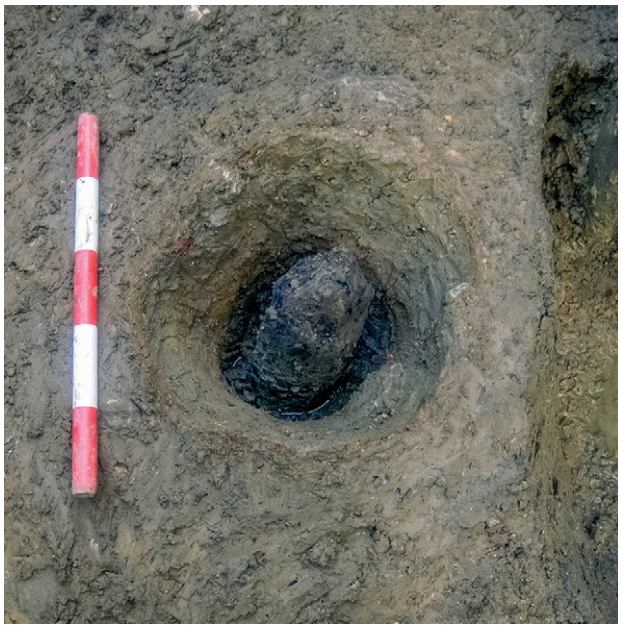


Fig. 2.9 Posthole 6836, Structure 5, view towards north, scale 0.5m

The structure was floored throughout with compacted redeposited natural sandy silt supported on a mottled layer of silty clay that was used to level the underlying pits. The robbed remains of a possible stone-built oven or hearth (6809) were found against its west wall. It survived as a rectangular foundation of mortared limestone rubble over which were remnants of laminated burnt clay and charcoal (6808). A sample (4084) taken from the deposit contains largely charred and fully processed free-threshing wheat and smaller quantities of rye grains. Evidence for the existence for further hearths within the smaller south room of the structure were indicated by the presence of charcoal-rich silts (6757).

Medieval Oxford ware was the predominant pottery type associated with the structure, though the presence of a few sherds of early forms of Brill/Boarstall ware from the floor suggest the structure was in use up to the early 13th century or beyond. A few fragments of early-type roofing tiles recovered from the floors and posthole 6791, all in an identical fabric, may have derived from its roof.

Located immediately to the south of Structure 5 were the truncated remains of a neonate (6950) interred in a small pit (6944), 0.18m in depth. The remains were radiocarbon dated to cal AD 1240–1420 (95.4% confidence; SUERC-99890; Table 2.1). Due to the level of later disturbance in this area the relationship with Structure 5 was not established with any degree of certainty, though it is likely that the infant was interred when the structure was still standing.

Cemetery

The excavations revealed the south-west part of an inhumation cemetery comprising 112 individual skeletons (Fig. 2.10). A further three graves containing three individuals were left *in situ* within the east end of evaluation Trench 5 (Fig. 2.12) as this area lay below impact level. During the watching brief (Trench 133), parts of three further individuals were exposed along the eastern edge of the trench, at least one of which was equated with a skeleton from the main excavation. There were a further four grave-like features (3042, 3166, 4382 and 4440) that contained no skeletal remains and a further two grave-like features (3757 and 4465) that

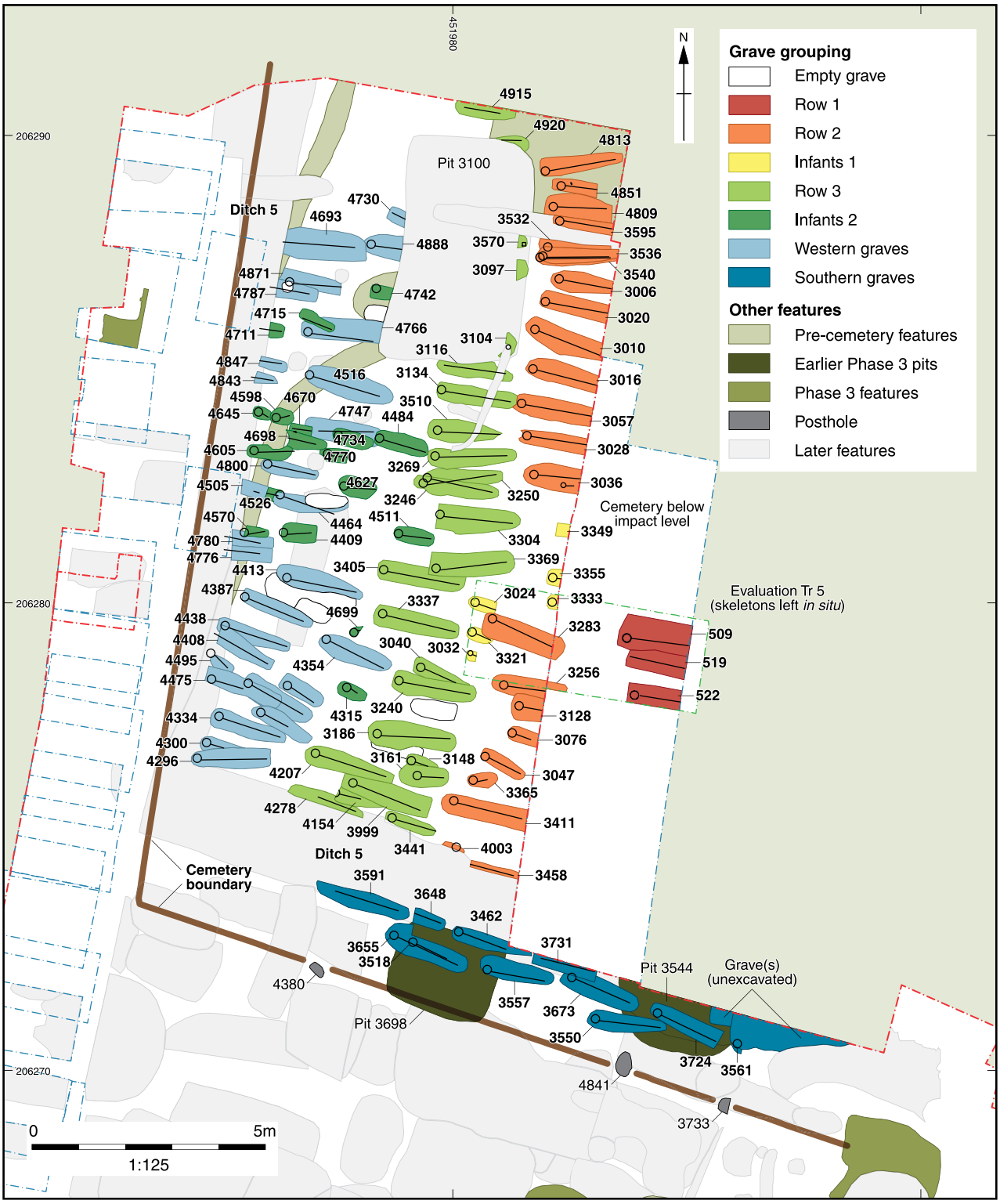


Fig. 2.10 The cemetery

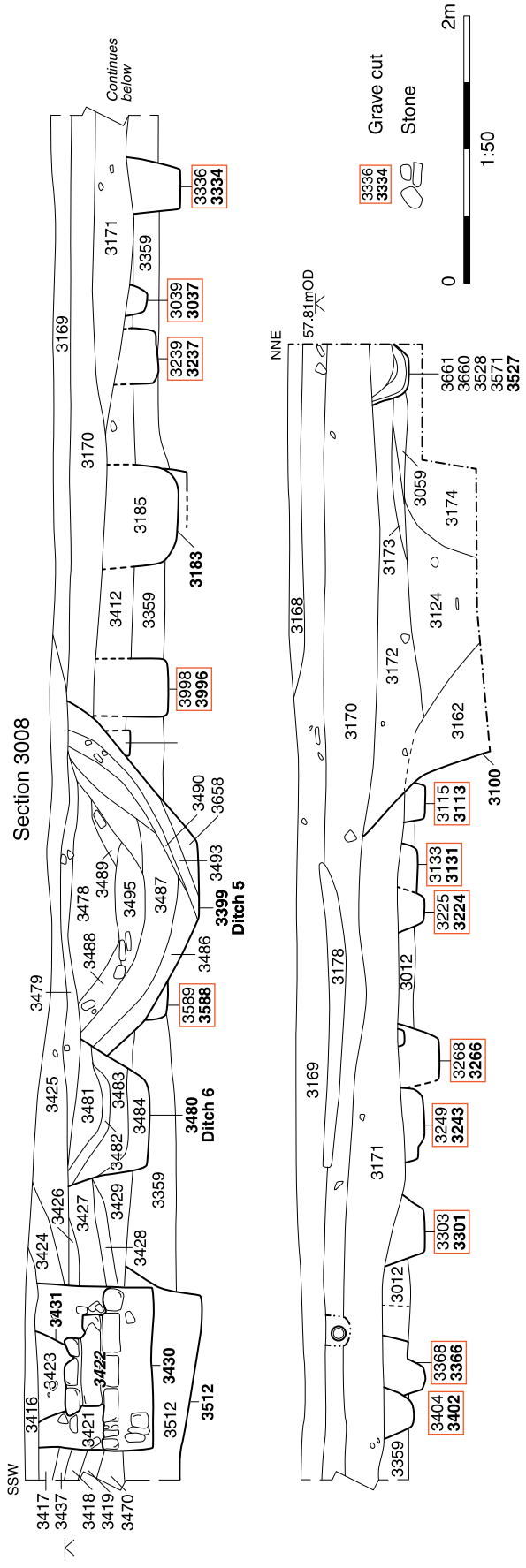


Fig. 2.11 Section 3008

contained disturbed (disarticulated) human remains (not illustrated).

The graves cut a firm yellowish-orange silty clay soil up to 0.35m thick (3012 and 3359 on Fig. 2.11, section 3008), likely to represent a pre-existing ground surface. The soil contained finds of widely ranging date including a Mesolithic flint blade; a Roman radiate dated to AD 293–6; a sherd of a Roman mortarium; late Saxon pottery; and 11th–12th-century wares such as medieval Oxford and Rhenish greyware. Two sherds of later Brill/Boarstall ware are considered intrusive though a fragment of tile, dating from the late 12th century, could be contemporary. The soil also contained a significant quantity of animal bone, suggesting manuring. It was overlain by a grey/greenish and firm silty clay (3412=?3429 on Fig. 2.11, section 3008) that contained large sherds from a Cotswold-type ware bowl together with a few fragments of roofing tile dating from the late 12th century. The relationship of this later layer to the graves was not clearly apparent; it perhaps represented soil that had accumulated during the use of the cemetery.

Full details of the osteological analysis of the skeletons are presented in Chapter 5 and Appendix 14. The composition of the assemblage contrasts with most contemporary cemeteries in terms of the relatively even number of adults and juveniles (ratio 1:0.9) and the high ratio of females to males (1.5 females to every male). As the full extent of the



Fig. 2.12 General view of cemetery, evaluation trench 5, view towards west, scales 2m, 1m and 0.5m

burial ground was not uncovered, it is possible that the relatively high numbers of females and juveniles within the excavated area reflects zonation within the cemetery.

Cemetery limits

Only the southern part of the cemetery was clearly discernible and was indicated by the abrupt termination of the graves. No boundary ditch or wall survived; if one existed, it must have been shallow and insubstantial and perhaps did not survive later levelling of the cemetery area. Alternatively, the southernmost graves may have represented a later expansion of the cemetery, given that southernmost graves cut across pits at the rear of Tenement A. A post-cemetery enclosure ditch (Ditch 6) marking the rear boundary of the tenements during Phase 6 may have been dug along the line of the earlier boundary of the cemetery as the graves did not extend southwards beyond it. Alternatively, a line of three shallow postholes (4380, 4841 and 3733), that may have formed a fence, could have denoted such a boundary at some stage. Prior to this suggested southwards expansion, an earlier boundary may have been removed by the southern arm of post-cemetery enclosure Ditch 5. It is also likely that the western arm of Ditch 5 marked the western boundary of the cemetery but had removed any evidence for an earlier and less substantial boundary. The full extents of the westernmost graves survived intact along the southern half of the cemetery suggesting that any boundary here lay immediately to their west but had been removed by Ditch 5. Furthermore, the lack of human remains found within the watching brief trenches suggests that the cemetery did not extend west of the ditch. Based on this evidence, the cemetery extended for at least 18.0m (N–S) by 15.7m (E–W). No evidence for graves was found during the earlier archaeological work within Magdalen College Grove to the north. This suggests that the southern wall of The Grove, a boundary of medieval origin, represents its furthest northern extent and that the cemetery extended for a maximum of *c* 43m north–south.

Cemetery layout, development and dating

The cemetery was largely well organised, with many of the graves forming clearly discernible north–south alignments. These alignments were particularly apparent towards the west where three rows of graves are clearly evidenced (Rows 1–3). Rows 2–3 show a high degree of organisation, with graves spaced less than 0.40m apart, suggesting the use of markers or that any earthen mounds above the graves remained discernible over a period of time. Towards the south the lines of graves became more fragmented, particularly Row 3. The graves to the west ('Western Graves') show a lesser degree of organisation; these were still generally well spaced but became denser and intercut towards the south. Taken together this evidence suggests that the cemetery developed over time from the east towards the western boundary, the graves perhaps being dug from a north to south direction. In contrast to graves to the north, those along the southern boundary of the cemetery were possibly a later extension or encroachment on to the tenements. They formed perhaps two closely spaced east–west aligned lines ('Southern Graves') that were presumably aligned with a cemetery boundary located immediately to their south (possibly denoted by postholes 4841, 4380 and 3733).

Row 1

This was the easternmost line of graves to be exposed (within evaluation Trench 5). All of the skeletons remained *in situ* after recording had taken place. They comprised three adults, one of which (509, a possible female) was demonstratively interred later along the side of grave 519 (a possible male).

Row 2

This row contained 30 graves and included a well-ordered alignment of 16 adults (predominantly female) and three adolescents. In addition, the row included a group of six infants aged 1–5 years (Infant group 1) arranged in two north–south linear alignments. The lack of other burials suggests that this part of Row 2 had been set aside for the interment of infants. Later, an adult male grave (3283) cut through parts of the graves of two of the infants whilst still maintaining the orderly arrangement of Row 2. The graves to the south of grave 3283 included a further three adults, an adolescent, and three infants. Two of infants were aged 1–5 years and one was a neonate. The second neonate was located close by at the southern end of Row 2. A further neonate was apparently buried within adult grave 3036 to the north of Infant group 1, a female (aged *c* 26–35 years), suggesting that both individuals died at or shortly after the birth. To the north was a 'double' grave (3536/3540) which formed part of a cluster of three intercutting graves, possibly a family group. The earliest (3540, a young adult female) had a second grave 3536 (an adolescent) interred immediately above it. The third grave (3532), which cut grave 3536, contained an adult male aged 36–45 years.

Row 3

This row contained at least 25 graves (13 adults, seven adolescents and four children and a neonate). It is possible that further graves once formed part of this row towards the north but had been removed by later medieval pit 3100. All but one of the graves from this row respected the graves of Row 2, the exception (grave 3134) clipping the extreme west end of grave 3057. The graves became denser and frequently intercut at the southern end of the row, perhaps clustering near an early cemetery boundary, though disturbance of the remains of earlier graves was kept to a minimum. The adults whose sex could

be determined included five females and seven males. The children were all interred at the southern end of the row and perhaps represent the earliest of the graves in this area. The close proximity to the infants in Row 2 suggests that they may have formed part of the same group and were perhaps interred shortly afterwards, particularly neonate grave 3148 and young child grave 3161.

The western graves

Located between Row 3 and the presumed western boundary of the cemetery, this comprised a dispersed group of 28 graves containing 19 adults, six adolescents and three children. Little discernible order or alignments of the graves was present, though as with Row 3 they formed a dense, intercutting cluster towards their southern extent. By contrast, towards the north the graves were largely well spaced apart compared to the rows of graves to their east. Further to their north there was an area where graves were absent, despite an apparent lack of later disturbance. It is possible that graves here were too shallow to survive later landscaping or that this part of the cemetery was not used for burial. Perhaps this area formed part of a path leading into the cemetery from the precursor to Longwall Street to the west.

Infant group 2

Located within the northern part of the Western Graves were 18 graves of young children (Infant group 2). These are likely to represent a distinct group of burials, a number of which could be shown to post-date the graves of the older individuals. It is therefore probable that some, if not all, represent the last group of burials within this area of the cemetery. The majority were children aged between 1–5 years but there were also three infants aged between 1–12 months and two neonates.

The southern graves

This group contained eleven graves, comprising ten adults – largely female – and a single grave of an older child. There were probably further graves to the east, but these remained unexcavated as they were below impact level. The graves appeared to form at least two east–west aligned and closely spaced rows, the southernmost probably representing the latest graves.

Dating evidence

Skeletal material from seven of the graves was submitted for radiocarbon dating (see Griffiths, Chapter 4). In addition to the dating of the skeletons, a radiocarbon date of cal AD 1030–1220 (95.4% confidence; SUERC-80259; Table 2.1) was obtained from a mammal bone from pit 3698 which was overlain by four of the graves from the Southern Graves cemetery group. Bayesian modelling based on all these dates (see Griffiths, Chapter 4) suggests that burial within the part of the cemetery that was subject to excavation began in the second half of the 12th century cal AD and probably lasted for less than 50 years.

As would be expected, pottery from the grave fills was fragmentary and is likely to have derived from deposits which the graves had cut into. Furthermore, given the shallow depth of many of the graves it is quite possible that some of the material is intrusive and derived from overlying, possibly agricultural soils (3171 on Fig. 2.11, section 3008). Nonetheless, a total of 643 sherds (4.8kg) of pottery was retrieved from the grave fills and is dominated by medieval Oxford ware (66% by sherd count) and Cotswold-type ware (25% by sherd count, Fig. 3.1, no. 12) with other pre-13th-century fabrics accounting for 11%. Brill/Boarstall ware accounted for 3% (19 sherds) and was found in only 11 of the graves, including the Western and Southern groups with only a tiny sherd present in one grave from Row 3, perhaps intrusive from a later gully that had cut across it. Sherds of Brill/Boarstall ware were also present in five Row 2 graves, but these were largely from secondary graves to the north, an area also disturbed by a later boundary ditch. Fresh and large sherds of Brill/Boarstall ware were also recovered from the upper fill of pit 3544 which was cut by three graves from the Southern group, implying that the burials here date no earlier than the early part of the 13th century.

Roof tile dating from the late 12th century was present in 21 of the graves, largely from Row 3 and the Western Graves. They include 13th-century forms from graves 3369, 3999, and 3304 in Row 3 and within graves 4296, 4561, 4693 and 4705 in the Western Graves. Two grave fills within Row 2 (3076 and 3283) each produced a small fragment of roofing tile considered to be 13th century or later in date.

The evidence taken together supports the dating for the use of this part of the cemetery indicated by the Bayesian model, the low incidence of Brill/Boarstall pottery suggesting that burial did not extend beyond the early to mid-13th century.

Grave orientation and depth

The graves were orientated on a broad east–west alignment and in all cases the head was placed at the west end. Nonetheless, there was considerable variation of the grave alignment, though the majority of the larger adult graves were orientated on a WNW–ESE alignment. The grave alignments are likely to have been influenced by local topography such as the presumed boundary to the rear of the tenements to the south and perhaps the ancient boundary with Magdalen College Grove to the north. Towards the north of the cemetery the graves were aligned closer to east–west, with several veering towards an WSW–ENE alignment. Variations in grave alignments were more common in the infant and later burials, the latter perhaps influenced by the need to avoid earlier burials.

The overwhelming majority of the graves were

shallow, most being less than 0.20m deep. The shallowest graves tended to be those of infants but otherwise there is no clear pattern in the distribution of grave depth. Only nine graves exceeded a depth of 0.40m, the deepest being 0.60m. It is likely that the shallow depth of the graves was a consequence of post-medieval levelling or landscaping of the area of the cemetery, as demonstrated during the evaluation.

Body position and posture

Where body position and posture could be determined, all the skeletons were interred in an extended supine position, though the legs of up to four were moderately flexed. Arms were commonly placed alongside the body, though at least eleven individuals had one or both hands placed over the pelvic area. One skeleton (male 3126, grave 3128) had a head niche cut into the base of the grave (Fig, 2.13), which is likely to indicate a member of the monastic community (Gilchrist and Sloane 2005, 132–3).

Use of coffins, shrouds and other grave finds

None of the graves revealed evidence for the use of coffins, either in the form of *in situ* nails around the skeleton or staining from the decay of the coffin. A total of 16 iron nails were recovered from the fills of 10 graves, many of which were fragmentary and are likely to have been incorporated into the grave fills from the pre-existing soils that they had cut into. If wooden coffins were used, they were fastened with material such as wooden pegs that would have decayed along with the coffin itself.

It is possible that some of the bodies were bound in shrouds given the tight constraints of some of the skeletons within their narrow graves. No direct evidence was found for the use of shrouds, such as copper pins to fasten the fabric around the body.



Fig. 2.13 Grave 3128 showing head niche, view towards west, scale 0.5m

The few other objects found with the graves included fragments from a possible button of copper alloy found within the fill of grave 3369, an adult ?male, and part of an iron knife in each of graves 3047 and 4516. A pierced scallop shell was found in the surviving grave fill of heavily truncated grave 4278. Such scallop shells were traditionally a badge of pilgrimage to the tomb of St James the Apostle in Santiago de Compostela, north-west Spain. There is no clear evidence that any of these objects had been deliberately interred with the bodies and they may therefore represent material displaced from soils which the graves had cut.

PHASE 4 (13TH CENTURY)

This phase saw the timber structures on the High Street frontage replaced by stone buildings, though it is unclear whether this occurred simultaneously or over a period of time (Fig. 2.14). For the first time the boundary between Tenements A and B was clearly demarcated by abutting buildings that corresponded to pit clusters and timber structures located towards the rear. The boundary between Tenements B and C is likely to have followed that of Phase 3 and corresponds to the extent of stone structures during later phases. Similarly, the rear boundary of Tenement A is likely to have remained, corresponding with the southern edge of the cemetery, which is likely to have gone out of use by the early part of this phase.

Tenement A

Building 1

This building replaced timber Structure 1/1A (see Phase 3) and comprised two components (Fig. 2.15). Its main southern element (Room 1) was clearly defined on its north, south and east sides; its western extent lay outside the excavated area but may have extended up to the frontage of the precursor of Longwall Street. This part of the building measured internally *c* 3.6m wide (N–S) and was perhaps up to 9.7m in length (E–W). Room 1 was subdivided at an early stage into at least two parts by wall 7245 which abutted its north and south walls. There was a protruding foundation along the internal side of the north wall (7892) of the room, perhaps providing a foundation for a stair base. The northern element of the building (Rooms 2 and 3) was less defined but was contemporary with its construction as its eastern wall foundation was bonded into the north wall of Room 1. The two northern rooms formed an annex to the main part of the building and also probably extended westwards up to Longwall Street, assuming that that an early wall foundation (23001) revealed in underpinning Trench 230 was contemporary.

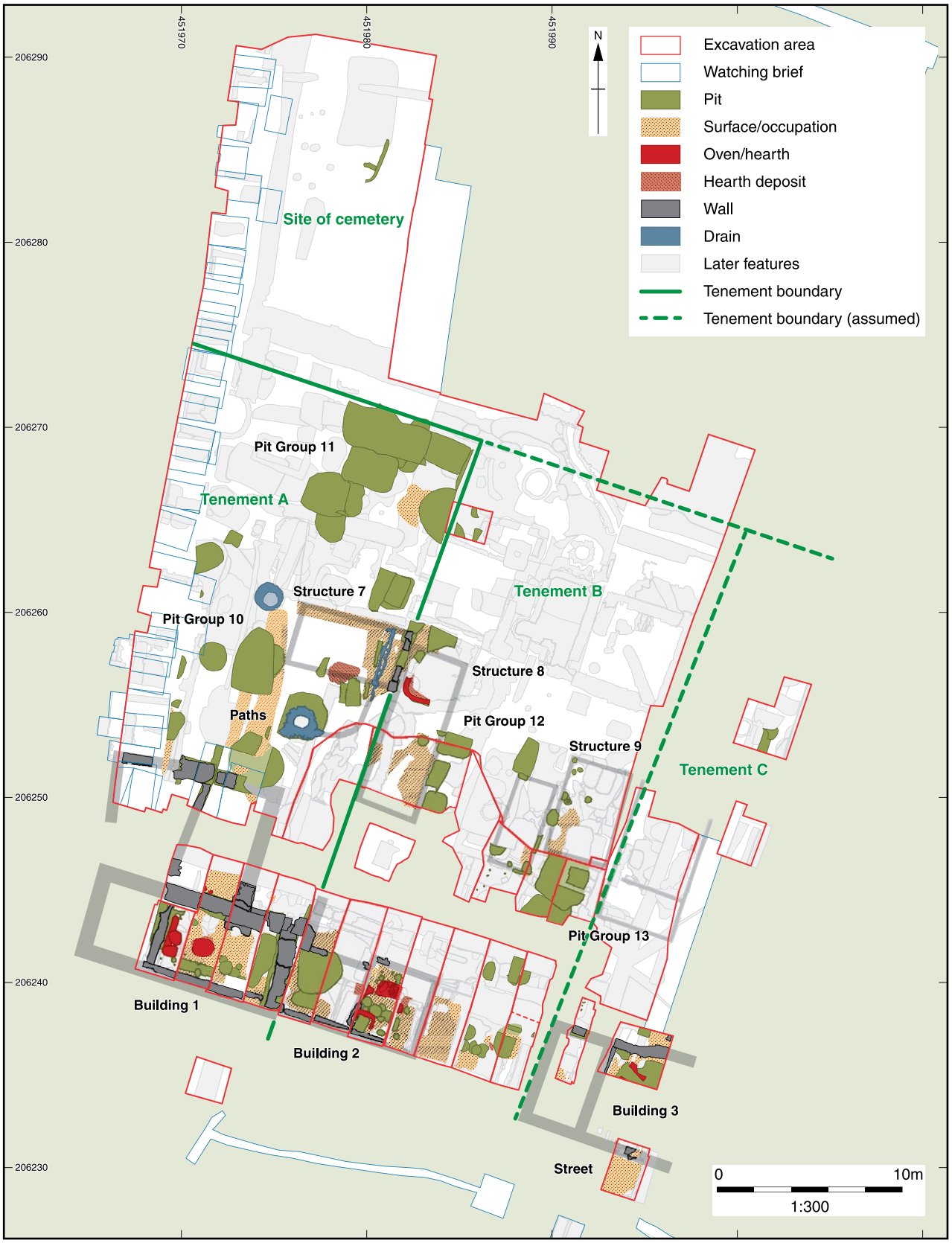


Fig. 2.14 Phase 4: Overall plan



Fig. 2.15 Phase 4: Tenement A

The foundations for the external walls of the building were substantial (Fig. 2.2, section 5030, 7624 and 7672; Fig. 2.2, section 5010, 7266), measuring up to 1.0m wide, suggesting a load-bearing structure, perhaps of two storeys or more. However, it is likely that the standing walls were narrower given that the later floors overlapped the foundations alongside its south wall. The walls were constructed with roughly hewn limestone rubble, and where discernible, were bonded by an orange/yellow sandy mortar. The east wall foundation was constructed with two relieving arches that spanned underlying soft ground that included the infilled late Saxon Ditch 1. It is likely that a large, heavily weathered stone quoin sourced from Taynton had been reused and incorporated into the foundation of the west wall of Room 2 (recorded as deriving from underlying Phase 2 pit 7875=7714 on Fig. 2.5). The internal partition

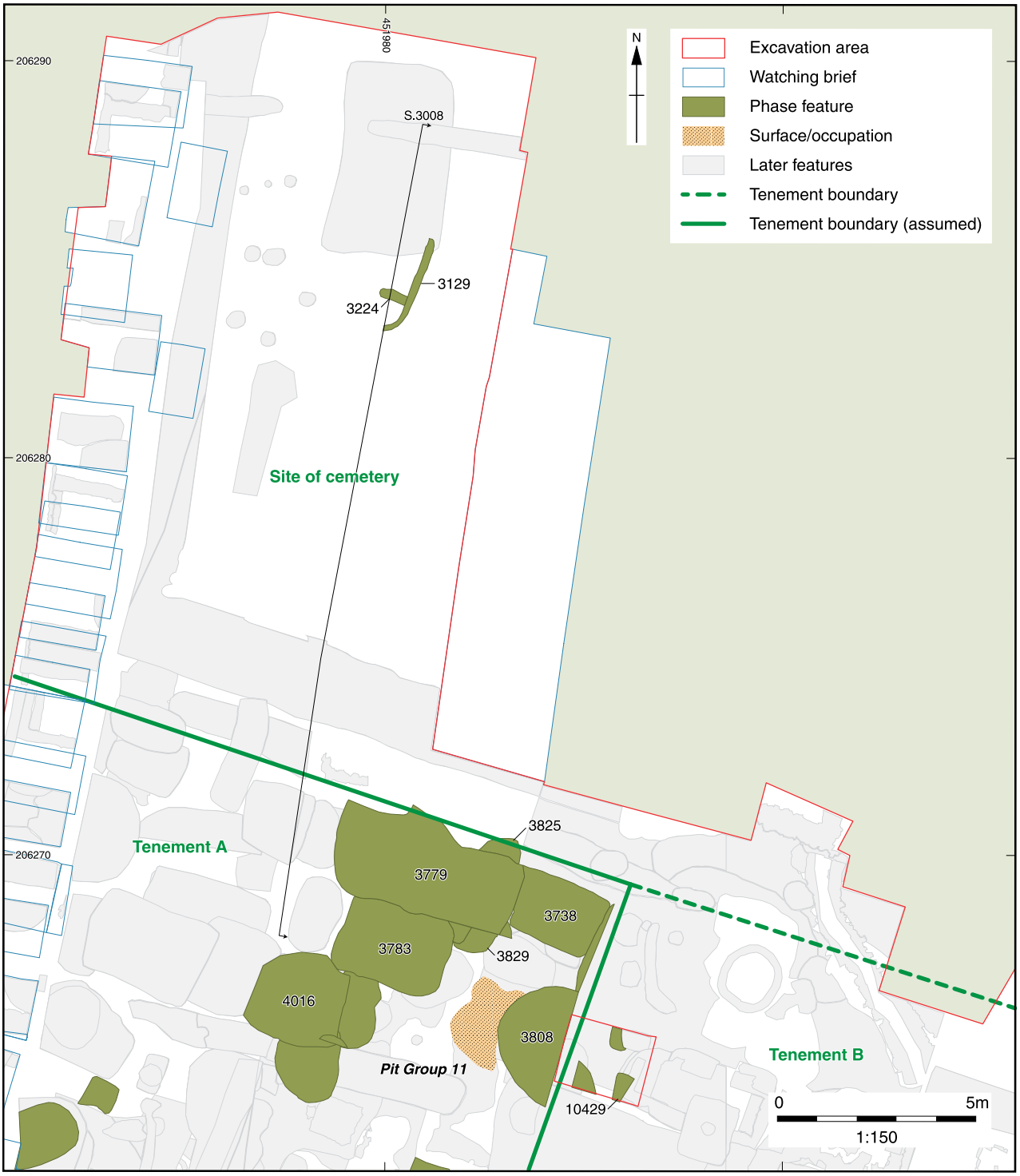


Fig. 2.16 Phase 4: rear of Tenement A and former cemetery area

walls were narrower and survived as shallow foundations (4448 and 7245).

Room 1

Room 1 contained several hearths, the largest of which survived as a circular area of burnt limestone rubble (7686; Fig. 2.17), 1.33m in diameter, founded upon a bedding of gravel. It may have replaced an earlier structure as indicated by pit 7704 or alternatively this pit could have been a rake-out area around the hearth. Running along the west side of the room were the remains of a narrow stone-lined channel (7254), possibly a flue, measuring 0.30m wide and up to 0.30m deep. An unshed antler (part skull and antler) from the fill (7256) suggests small-scale antler working. Remnants of a stone capping survived at its southern end where it presumably originally passed through the southern wall of the building. Two shallow pits (7252 and 7261) were possibly robber trenches that had perhaps removed the stone linings of ovens or hearths. A similar arrangement seems to have occurred at the opposite end of the room where a narrow gully (8096) ran immediately alongside the east wall and exited through the south wall of the building. It may have been associated with a large shallow pit (8080) that contained stone rubble, possibly the robbed remains of a hearth or a similar installation. Shallow pits 7865 and 7878 may have been related to the use of possible structure or adjacent hearth 7686, though none contained concentrations of charcoal to suggest that they served as rake-out pits.

The room was floored with compact gravel (Fig. 2.2, section 5010, 7267) that had been replaced on at least one occasion (Fig. 2.2, section 5030, 7684). Both floor layers were overlain by charcoal-rich, laminated silts (Fig. 2.2, section 5010, layers 7260 and 7263; Fig. 2.2, section 5030, layers 7679, 7681, 7692 and 7703), likely to have been associated with the use of the hearths within the room. The presence of Brill/Boarstall ware throughout the sequence suggests a date from the early to mid-13th century for the construction and use of the earliest phases of Room 1. This is supported by two consistent radiocarbon dates obtained from a charred nut shell and a charred twig (SUERC-100273 and SUERC-100277; Table 2.1) from early occupation deposit 7260 (Fig. 2.2, section 5010) which returned radiocarbon dates of cal AD 1180–1280 and cal AD 1220–80 (95.4% confidence).

Evidence for blacksmithing and high-temperature welding within the room was prevalent, particularly micro-slags, which were present in large quantities within possible robber pit 7252 and rake-out pit 7704 and within the occupation and floor levels, particularly 7681 and 7692 (Fig. 2.2, section 5030), which all predated hearth 7686. Similar material was recovered from floors contemporary with the hearth, particularly 7671 and 7679 in Trench 120 with lesser quantities present away from the hearth in Trench 121 (7846, 7856 and 7859). The hearth was probably associated with a group (7699)



Fig. 2.17 Hearth 7686, Room 1, Building 1, view towards west, scale 0.5m

of stakeholes located along its southern side, possibly used to support a raised bellows. Smithing seems to have occurred shortly following the construction of the building from the evidence obtained by soil micromorphological analysis of laminated occupation deposit 7681 (Fig. 2.2, section 5030). This confirmed the presence of a smithy rather than an iron production area, given the lack of iron silicate slags which would require a temperature of around 1000°C. A grindstone (whetstone) was found in laminated layer 7681 (Fig. 2.2, section 5030) and a mortar of Bathonian freestone (Fig. 3.20, no. 5) was recovered from occupation layer 8086 in Trench 122, located at the east end of the room. Metal objects include a whittle-tang knife from possible rake-out pit 7704 and a decorated bone gaming counter from occupation layer 8056 (Fig. 3.29, no. 9) from Trench 122. Food debris, mainly hazelnut shells and legumes, was found in two samples (5171 and 5180) from occupation deposits 7846 and 7859 (Trench 121) together with laminated deposit 7681 (sample 5135; Fig. 2.2, section 5030), all of which also contained free-threshing wheat, perhaps used for floor coverings or tinder. The charcoal assemblage from flue 7254 (sample 5103) has a high diversity of wood taxa where hawthorn-type wood is dominant, followed by oak heartwood, with small quantities of beech, ash, hazel, field maple, elm and willow/poplar. There were a few identifiable animal bones present from the room, mainly from sheep together with small quantities of pig and cow.

Rooms 2 and 3

Deposits associated with Room 2 survived in a fragmentary state, largely within its south-east corner. Room 2 was floored with gravel (7668) and as with Room 1 this was replaced on one occasion, also with gravel (Fig. 2.2, section 5031, 7635). The remains of a small stone-built hearth (7669) were built into the primary floor (7668). Deposits associated with Room 3 seemingly did not survive later truncation.

Rear of Building 1

Pit Group 11

This comprised a group of up to 16 rectangular or oval pits located against the north-east corner of the tenement (Figs 2.14, 2.15 and 2.16). The northernmost pits (3738, 3779 and 3825) respected the southern extent of the former cemetery that also marked the rear of the tenement. Similarly, pits 3738 and 3808 clustered against the boundary with Tenement B, the latter forming a semi-circle against the boundary. It is likely that some of the larger pits were dug as gravel or clay quarries for building material for use such as flooring for the structures to the south. Most of the pits exceeded 0.50m in depth and the larger pits (3779, 3783, 3808 and 4016) surpassed 0.68m in depth. Smaller rectangular pit 3572 exceeded 1.4m in depth, its vertical sides suggesting that it had originally been lined. This pit was also notable for containing a large assemblage of pottery including highly decorated jugs, together with a fragment from a bottle and a lamp, all in Brill/Boarstall ware and probably dating from the mid-13th century. Large groups of pottery were also recovered from pits 3783 and 3808, including parts of three lamps from the latter pit. Further lamp sherds were found in pits 3572 and 3779. Pit 3829 contained the profile of a cooking jar in medieval Oxford ware (Fig. 3.2, no. 15). In addition, sherds from an aquamanile and a finial were recovered from pit 3808 (Fig. 3.3, no. 26 and Fig. 3.4, no. 30), which was also notable for containing the majority of the glazed ridge roofing tiles. This pit also contained a large quantity of slag and related high-temperature material totalling almost 21kg. The material was presumably dumped from smithing activity undertaken within the tenement, although the pit was located some distance away from Building 1. In total, 15 smithing hearth bottoms were recovered from several fills of the pit, suggesting the pit remained open for an appreciable period and served the needs of the smithy. A smithing hearth bottom was also recovered from adjacent pit 3783. A double-ended buckle of copper alloy and iron, possibly a horse buckle, of 13th- or 14th-century date was found in pit 3779 (Fig. 3.29, no. 12) and an annular brooch was recovered from pit 4016. Pits 3572 and 3808 contained the majority of the identifiable animal bone from the pit group, of which cattle formed the majority, followed by sheep and pig together with a few bones of goose.

Pit Group 10 and path 4938

This group comprised up to 16 pits and included at least two wells that formed a dispersed group located immediately to the north of Building 1 and to the west and south of possible Structure 7 (Fig. 2.15). The pits were generally smaller than those of Pit Group 11 to the north and are likely to have been largely dug for the disposal of rubbish. One of the earliest pits (4339=4069), which predated but otherwise respected the north wall of Room 2 of Building 1, may have been filled shortly after the construction of the building. A path (4938), *c* 1.3m wide and formed from a mix of discarded and compacted hearth debris and cobbles, was constructed over the pit leading to one or both of the wells (4073 and 5041) and Structure 7. A large group of Brill/Boarstall pottery including two near-complete jugs (Fig. 3.2, 13–14) was recovered from a silt deposit (4937) above the surface.

Both wells were of a similar construction, using un-mortared and roughly squared limestone blocks



Fig. 2.18 Well 4073, view towards south, scales 1m and 0.5m



Fig. 2.19 Well 5041, view towards north-east, scale 1m

(Figs 2.18 and 2.19) with shafts each measuring *c* 0.80m in diameter. Only their upper backfills were investigated and no useful dating evidence was recovered from the time of their use, though fresh Brill/Boarstall ware was recovered from the construction pit of well 4073 that included a possible pipkin, perhaps dating from the mid-13th century.

The path was truncated by two large and deep intercutting pits, possibly quarries (4944 and 4966/4974), the former of which was machine excavated to a base at 2.3m. Subsequently, a new path of limestone cobbles (4805) seems to have been reinstated to the west and over the infilled pits.

Large groups of Brill/Boarstall pottery were recovered from pits 4974, 5034 and 5053, the latter of which may be dated to after *c* 1250, but otherwise no discernible later forms were present. Iron slag was only present in noticeable quantities in pit 4944 and a horseshoe of 11th–13th-century date was recovered from pit 5034. The largest pit (4944) produced the largest assemblage of animal bone and appreciable quantities were also present in pits 4105 and 4339. This was predominantly from sheep/goat and cattle, though a few horse bones were also present. Samples taken from the fills of pits 4069, 4944 and 5034 (samples 3147, 3328 and 3334) each contained largely charred free-threshing wheat, the former including possible straw, perhaps discarded floor covering.

Structure 7

Fragmentary remains of a small structure, perhaps measuring 6.2m x 3.5m and predating Building 4 (see Phase 5), were located against the boundary with Tenement B, close to wells 4073 and 5041. Its east wall had two square stone-built pillars (4198 and 3314) at each end, each measuring *c* 0.7m across and founded to a depth of 0.86m. The pillars may have represented the bases of arches to lift the wall over disturbed ground or may have been post pads for a timber phase of the structure. Pit 4147, possibly a large posthole, seems to have formed part of its south wall; otherwise, the extent of the structure was defined by the surviving internal deposits. The remains of a hearth (4059), surviving as a scorched area of clay, stones and charcoal, were found against the line of the south wall. Elsewhere, the structure was floored with clay (4125). A complete copper alloy bar mount was recovered from the hearth (Fig. 3.29, no. 14) and a second bar mount was found in a makeup/dump deposit above floor 4125 (4796; Fig. 3.29, no. 15). Probably contemporary with the structure were the remains of a narrow stone-built drain (4123) that led southwards towards Building 1. Fish bone, mainly herring but also sardine, eel and small gadid, was recovered from the fill of the drain (sample 3148).

A large amount of pottery was recovered from the structure, including parts of Brill/Boarstall ware jugs that probably date after the mid-13th century. Also present were parts of five oil lamps, also in Brill/Boarstall ware. Hammerscale was present in deposits associated with the hearth and the drain. Large fragments of roofing tile were also present, suggesting that that the structure had a tiled roof. Animal bone was predominantly cattle and sheep, with small quantities of pig and chicken. A sample (3142) taken from the hearth largely contains charred and fully processed free-threshing wheat. It is also rich in charcoal with a high diversity of wood species, comprising predominantly heartwood and beech together with smaller quantities of hawthorn type, elm, hazel, ash, field maple, blackthorn/cherry and willow/poplar. This suggests the deposit was derived from both industrial activity and domestic activity such as food storage or preparation.

Tenement B

Building 2

This building replaced timber Structure 2 and abutted Building 1, though the relationship between the two buildings was not clear (Fig. 2.20). Its walls survived in a fragmentary state and its northern extent had been removed by an 18th-century cellar (Building 11, see Phase 9, Fig. 2.69) and the foundations of the existing library. The building consisted of at least three parts (Rooms 1–3), the frontage wall of which was aligned with that of Building 1 to the west. The building probably extended up to the west wall of Building 6 (see Phase 5, Fig. 2.24), both of which were largely robbed.

Room 1

This was probably the largest room on the frontage of the building and measured *c* 4.0 x 3.2m. Few internal deposits survived apart from several levelling deposits (including shallow 'pits' 8294 and 8296/8458) over which was a clay floor (8282). A charcoal layer (8283, sample 5034) located immediately below this floor contained a significant quantity of fish bone confirming food preparation occurred here. The presence of a small quantity of micro-slags (21g) obtained from sample 5034 taken from the layer included predominantly broken flake hammerscale, which suggests the sharpening of knives or other tools rather than smithing. Horse fittings including a copper alloy horse mount (Fig. 3.29, no. 10) and two horseshoes were found in the two 'pits' and an oil lamp rim in Brill/Boarstall ware was recovered from a bedding layer supporting the floor.

Room 2

Room 2 may have measured *c* 3.2 x 3.8m, extending slightly further north than Room 1. The room contained several hearths, the earliest of which (8799) survived as a single course of scorched limestone slabs measuring *c* 0.60m across. A similarly sized hearth was located to its east (9282). Hearth 8799 was replaced by two larger stone-built

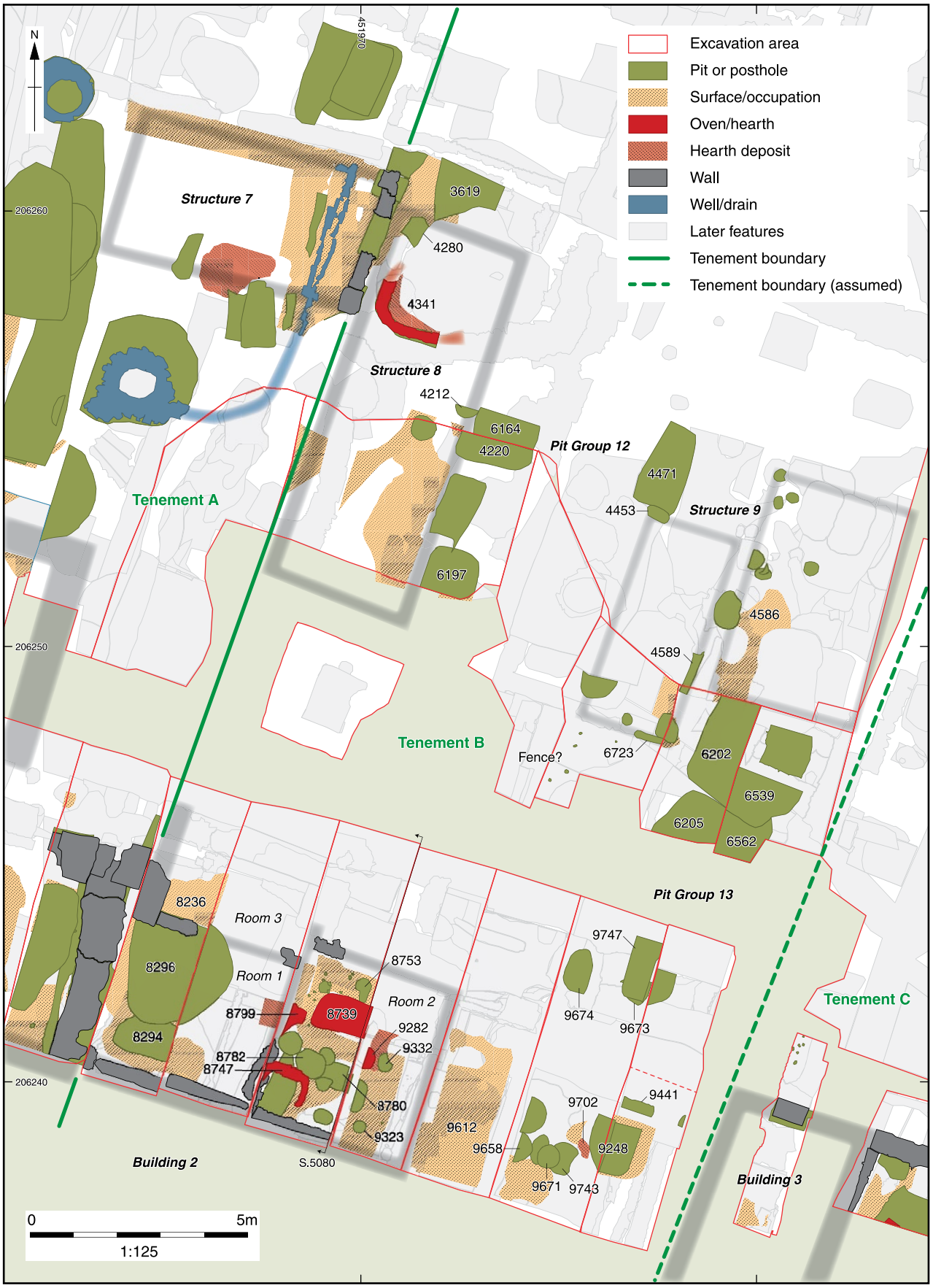


Fig. 2.20 Phase 4: Tenement B



Fig. 2.21 Hearth 8739, Room 2, Building 2, view towards east, scale 0.5m

hearths (8739 and 8747). Rectangular hearth 8739 measured up to 1.26m x 0.90m and was set in a shallow pit (Fig. 2.2, section 5080, 8745) measuring 0.24m deep. It was constructed with limestone slabs and rubble and reused roofing tile fragments (Fig. 2.21) set on a bedding of gravel (Fig. 2.2, section 5080, 8738). The second hearth (8747) survived as a square, stone-lined feature measuring 0.80m across built up against the south-west corner of the room. Its internal area had been filled with clay (8743) containing burnt stones and much Brill/Boarstall ware pottery including a jug of possible 14th-century date.

The room was floored with beaten clay (8751; Fig. 2.2, section 5080) with charcoal-rich occupation silts (8736 and 8756 on Fig. 2.2, section 5080) that were associated with the use of the hearths. Charcoal from hearth 9282 is largely hawthorn type and hazel, suggesting kindling (Appendix 9, sample 5218).

It likely that several small shallow pits containing charcoal-rich silts surrounding the hearths were associated with their use, probably to collect rake-outs. Pits 8780 and 9323, just 0.06m and 0.14m deep respectively, were rich in micro-slags (unbroken hammerscale flakes and spheres, some undiagnostic slag and broken iron flakes) as were charcoal layers 8756, 8784, 8997, suggesting that the hearths were used for smithing. Charcoal from pits 9332 and 9323 is dominated by oak heartwood, likely used as fuel for the hearths, and would have provided sufficient temperatures for the smiths (samples 5221–2). The only notable find was a dress mount of copper alloy (Fig. 3.29, no. 11) that was recovered from pit 8782. Animal bone was sparse, with only one identifiable fragment recovered, suggesting that food was not discarded in the room.

Room 3

It is not clear whether Room 3 was internal or external to Building 2 given the paucity of surviving wall foundations and deposits during this and later phases. A bedding or surface (8236) of light brown clay survived at its south-west corner and was overlain by a charcoal-rich silt, suggesting an internal area. To the east and north of Room 2 was a similar deposit (8951).

East of Building 2

It is likely that most, if not all, of the area to the east of Room 2 remained external during this phase, prior to the construction of Building 6 during Phase 5. A group of eight pits included two large and unbottomed pits (9248=9441=9705 and 9747=9431) and smaller pits less than 0.30m deep. Unlike the internal features within Room 2, these pits contained appreciable quantities of animal bone, most of which – largely sheep – was obtained from large pit 9747. Some smithing micro-slags were recovered from pit 9248 and a pair of copper alloy tweezers was found in pit 9705=9248. Pits were absent from the western part of the area and here there was a surface of compacted gravel (9612), possibly a path (if external), leading off from the street to the south. The surface overlay two dumps of charcoal (9170 and 9172), both of which were rich in charred and fully processed free-threshing wheat together with some food remains such as legumes and hazelnut shells (samples 5147 and 5148).

North of Building 2

Pit Group 12

The group comprised up to nine mainly small pits that clustered around Structure 8. None of the pits measured more than 1.6m across and the largest (6164/4220) was 0.80m in depth. Animal bone, predominantly sheep/goat and cattle, was prevalent in pits 3619 and 4220, suggesting that these pits were used for the disposal of food waste. The proportion of Brill/Boarstall ware pottery present in the pits was low relative to earlier fabrics, suggesting that the pits date to the first part of the 13th century. Oil lamp sherds in Brill/Boarstall ware were found in pits 3619 and 6197. A piece of copper alloy sheet decorated with concentric circles was recovered from pit 6197.

Pit Group 13

This group comprised up to five pits located to the south and west of Structure 9. They included three large rectangular pits (6202/6539, 6205/6562 and 4471) that measured between 2.0m and 2.5m across and up to 0.75m deep, their size suggesting that they originated as quarries. These three pits contained most of the animal bone, largely cattle and sheep/goat with small quantities of pig and a single goose bone from pit 6202. In contrast to Pit Group 12, the pottery was predominantly Brill/Boarstall ware, mainly strip jugs but also including two lamps from pit 6202, suggesting a date from the mid-13th century. A whetstone was found in pit 6539 and large lumps of iron slag in pit 6205.

Structure 8

The presence of a structure located against the boundary with Tenement A is implied by the presence of a possible hearth, postholes and floor-like deposits. The structure, presumably of timber, may have been delimited on its north and east sides by postholes 4280 and 4212, though its southern extent lay beyond the limit of excavation. It probably measured *c* 3.2m in width and was at least 7.9m in length. The possible hearth (4341; Fig. 2.22), largely removed by a later pit, was located towards the north end of the structure. What survived was limestone lining within which was a deposit of scorched reddish silt and charcoal suggestive of *in situ* burning. The floor of the structure comprised creamy white mortar (6193) over which was a dump of clay (6109) from which a bone button was recovered.

Structure 9

This was a possible timber precursor to Building 9 (see Phase 5) and located alongside the boundary with Tenement C. What survived suggests that the structure had two parts or rooms or was perhaps two separate structures altogether. Its western element was delimited by beam slots (4589 and 6723), at least on its southern and eastern sides. Its eastern element was floored with gravel over which there was a thin charcoal-rich occupation deposit containing Brill/Boarstall ware and animal bone fragments.



Fig. 2.22 Hearth 4341, Structure 8, view towards east, scale 1m

Tenement C

Building 3

This building replaced post-built Structure 4 and was partially revealed in Trenches 105, 106 and 117 (Fig. 2.23). Only its northern and south extents were evident, though it probably did not extend westwards as far as Trench 130. Its west wall is likely to have been aligned with the west wall of Building 8 (see Phase 6) which followed that of earlier post-built Structure 5.

The building, comprising at least two rooms, probably extended *c* 6.1m from the street frontage and projected further south than the contemporary frontage buildings in Tenements A and B. It was constructed with largely rough-hewn limestone blocks bonded by orange-brown sandy clay.

Room 1

The largest room measured at least 3.3m wide (E–W) and was floored with gravel, over which were a series of laminated deposits of charcoal-rich silts likely to have been associated with the use of a hearth or oven (6325) located near to its north-west corner. The hearth comprised two parallel walls that perhaps formed the flue for a larger structure that did not otherwise survive. Contained within the 'flue' were a series of laminated deposits of charcoal-rich silts, ash and 'surfaces' of clay and gravel presumably associated with the use of the hearth. An assessment of samples taken from these deposits revealed largely fragmented fuel remains with a few charred grains, legumes and other food remains (samples 4023–6, 4028, 4030 and 4034). The charcoal of one of the deposits was analysed (sample 4030), demonstrating that it contained predominantly oak heartwood, likely to derive from fuel used for the hearth. A sample (4035) taken from a floor makeup deposit (6315) contained mainly charred grain and hazelnut shells, suggesting that activity undertaken within this room was domestic and probably associated with cooking and food preparation.

Room 2

Few internal deposits survived within the smaller room on the west side of the building apart a small area of mortar floor (7128) founded upon a bedding of clayey sand from which a long-cross half penny of Edward I (1279–1307) was recovered.



Fig. 2.23 Phase 4: Tenement C

South of Building 3

Within Trench 106 and to the south of Building 3 was a cobbled surface (6283=6300) comprising tightly packed, large, rounded pebbles supported on a bedding of gravel. The surface remained largely unexcavated and below impact level but appears to have been either contemporary with or earlier than the south wall of Building 3. It is likely to have represented an early surface of the contemporary street (High Street). It was overlain by later street surfaces (Phases 5 and 6).

North of Building 3

It is possible that timber Structure 5 (Phase 3) continued in use during the early part of this phase as the only features assigned to Phase 4 were confined to its north-east in Trench 103. These comprised several intercutting pits, the earliest of which contained sherds from 13th-century Brill/Boarstall ware strip jugs. It is possible that there was a further room or perhaps a separate structure to the north of Building 3, as indicated by wall stub 6374, apparently aligned north–south.

Site of the cemetery

As described above, Bayesian modelling suggests that the cemetery ceased to be used after the early part of the 13th century, possibly around the same time that the buildings on the tenement frontage were rebuilt in stone. The area of the former cemetery appears to have been largely unused and left open, at least during the mid-13th to 14th centuries (Fig. 2.16). A soil layer (3171; Fig. 2.11, section 3008) accumulated over the cemetery and is likely to have derived from horticultural activity. Shallow gullies (3129 and 3224) that cut several graves, and which possibly served for drainage, may have been associated with this activity.

PHASE 5 (14TH TO EARLY 15TH CENTURY)

Tenement A

Building 1

Building 1 continued in use but with substantial modifications (Figs 2.24 and 2.25). The west internal wall of Room 1 was removed, therefore enlarging the room that perhaps extended along the full length of the building. Two substantial hearths or furnaces were then inserted into the room, associated with increased iron-smithing activity. The status of the two rooms to the north (Rooms 2 and 3) is uncertain, though the eastern room may have been demolished during this phase.

Room 1

A large stone-built structure (7832 and 7833; Figs 2.26 and 2.27), probably the base of a hearth or furnace, was inserted into the east side of the room and was probably associated with a shallow 'stoking' or rake-out pit on its east side (8063). The hearth/furnace survived as a shallow foundation measuring *c* 1.8m x 2.4m, constructed with roughly hewn limestone rubble bonded by yellowish brown clay. The structure had a central T-shaped 'flue' that seems to have opened on to its east side next to pit 8063, though this was later blocked by wall 7828. The sides and floor of the flue had been scorched red from intensive heat. Over the floor was a thin charcoal-rich silt (7826) which was rich in micro-slags, including broken hammerscale flake and spheres of various sizes (some non-magnetic), iron shavings, and ferruginous concretion. Above this was a deposit of larger iron slag fragments (7831) totalling almost 1.4kg that also included hammerscale flake and spheres together with tiny iron fragments, and iron-rich undiagnostic slag. Pit 8063 was 0.15m deep and contained almost 10kg of bulk slag, largely comprising smithing hearth bottoms. It is therefore likely the structure was associated with iron smithing on a significant scale. The pit is likely to have been contemporary with several stakeholes (Group 8073) positioned on its north and south sides, which were perhaps formed by tools such as pokers used to distribute fuel in the furnace, or possibly supported bellows. Probably contemporary with the furnace were charcoal- and slag-rich floor occupation deposits 7240 and 7242 between a floor of sandy gravel (7241; Fig. 2.2, section 5010). These levels were supported on makeup deposits (7257, 7249 and 7259; Fig. 2.2, section 5010) likely to have been laid down when the furnace was constructed. It is probable that shallow pit 7678, posthole/pit 7848 and possible post-pad 7682 were dug alongside the north wall of the room during this phase; their purpose is uncertain. There was a heavily scorched area of floor (7673) located immediately to the west of the furnace suggesting the presence of further hearths. A sample (5131) from this contained oak charcoal, a good quantity of broken hammerscale flake and spheres suggestive of smithing, and food remains in the form of legumes and burnt grain. Soil micromorphological analysis of related charcoal-rich occupation deposit 7650 (Fig. 2.2, section 5030) showed a largely domestic character, indicating trample of kitchen and cereal processing waste from the rake-out from a hearth(s).

Cutting these deposits and located towards the west side of the room was a rectangular hearth (7227) surviving as a shallow pit measuring 1.5m x 1.1m and 0.20m deep (Fig. 2.28). The hearth had been lined with clay that had been heavily scorched, over which was a succession of ash and charcoal-rich fills that were associated with its use. These deposits, notably 7236 and 7238, contained a total of 302g of slag that was largely undiagnostic but included a piece of iron with flake hammerscale adhering. Notable finds included at least seven

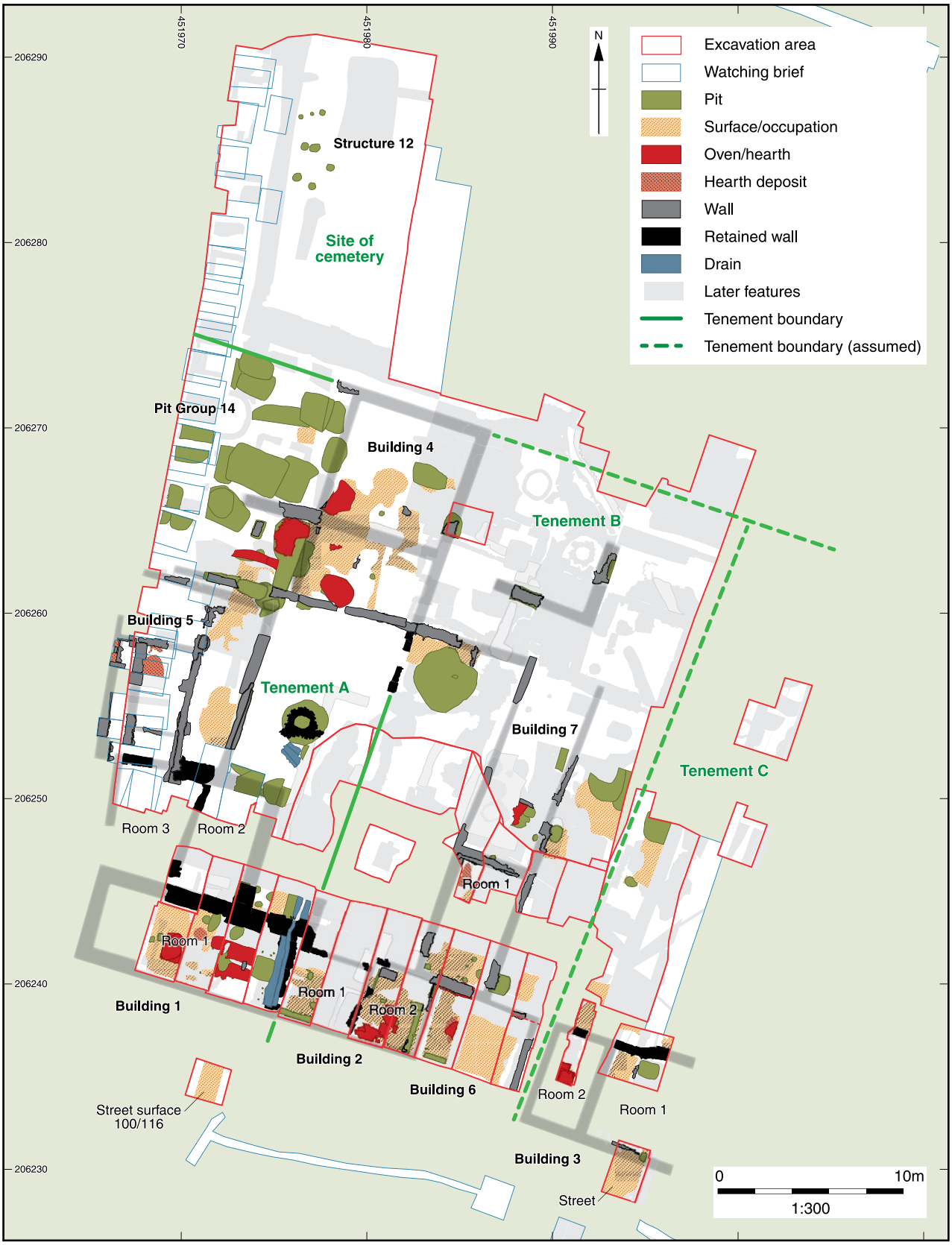


Fig. 2.24 Phase 5: Overall plan



Fig. 2.25 Phase 5: Tenement A

beads distributed throughout fills 7233, 7234, and 7238, comprising five of glass, one of bone and one of jet. A sample (5077) taken from one of the fills identified charred food remains, largely legumes, together with fully processed free-threshing wheat, perhaps burnt kindling or flooring material. A second sample (5078) identified much beech round-wood charcoal, together with lesser quantities of oak, field maple and hawthorn type, all likely to represent spent fuel from use of the hearth. A rake-out layer (7221; Fig. 2.2, section 5010) likely to be associated with the hearth contained similar food and charcoal remains, the latter predominantly from beech (sample 5063).

A stone-lined drain (8077; Fig. 2.29) abutted the east wall of the room and clipped the eastern lip of stoking pit 8063. Where it met the north wall of the room, a narrow and slightly sinuous channel, *c* 0.16m wide, cut through the foundation and the base of the drain and was lined with limestone slabs. This suggests the presence of a doorway into the building at this point. A stone slab (8043) abutting both the exterior edge and the west side of the drain may have marked a threshold into the building. To the north and presumably outside the building, the base of the drain was unlined, suggesting that water drained into the underlying soil. Alternatively, it may have continued northwards as drain 3951, located to the south of well 4073 (see Phase 4), which may have remained open before being robbed and filled later during this phase (robber 3860). The silty fill of the drain (8061) was notable for containing 90 amber and jet beads, probably for a paternoster prayer bead string (Fig. 3.25). A sample (5068) taken from the deposit was rich in a variety of fish bone, suggesting food consumption occurred in the room. A conical lid in Brill/Boarstall ware was recovered from drain 3951 (Fig. 3.3, no. 20).



Fig. 2.26 Furnace/hearth 7832/7833, Room 1, Building 1, view towards east, scale 1m



Fig. 2.27 Furnace/hearth 7832/7833, Room 1, Building 1, view towards west, scale 1m

Rooms 2 and 3

No deposits or features were found within these two rooms that can be allocated to this phase. At some point the east and north walls of Room 2 were demolished and robbed (robber trenches 4291 and 7870), perhaps when Building 5 was constructed. Subsequently, a slag-rich pit (3919) cut through the northern robber trench; this contained highly decorated sherds from Brill/Boarstall jugs, suggesting a mid-13th- to mid-14th-century date. The pit was also notable for a containing an antler from a fallow deer that had cut marks suggesting that it had been worked.

To the south-east of Room 2 were a series of external cobble and gravel surfaces (8029, 8041 and 8042) that were not found inside the building. They



Fig. 2.28 Hearth 7227, Room 1, Building 1, view towards east, scale 1m



Fig. 2.29 Drain 8077, Room 1, Building 1, view towards west, scale 1m

post-dated the construction of drain 8077 and their presence suggests that Room 2 was still standing at this time. The presence of two oil lamp sherds in Brill/Boarstall ware and the lack of late medieval wares suggests that they belong to this phase. Also present in this area were several shallow pits, one of which (7868) contained a bone skate.



Fig. 2.30 Cobbled surface group 4743, Building 5, view towards north, scales 2 x 2m

Building 5

A large building (or buildings) was constructed along the Longwall Street frontage, the eastern part of which was revealed during the watching brief. The building occupied an area previously set aside for pitting during Phase 4 and was located immediately to the west of a path (4805, see Phase 4 above) which may still have been in use. The new building may have adjoined the north side of Building 1, though the relationship between two is not clear. The building was formed in three main sections, though it is not clear whether all these elements were contemporary.

The eastern part of the building seemingly comprised a large elongated 'room', its slight asymmetry suggesting that it may have been a later addition to the building. Two 'pillars' (4971 and 4973) were built into the west wall (4970) of the room, perhaps the bases of arches, which would imply that it was originally a load-bearing external wall. There may have been a doorway at the north end of the west wall as indicated by a possible stone step or threshold (4867). Its construction incorporated a smithing hearth bottom that was split in half and would have provided a firmer and perhaps more water-resistant base. A copper alloy contemporary copy of a cut half penny of Henry III (Fig. 3.26, no. 1) issued in 1248–50 was found in its construction trench and a Brill/Boarstall ware



Fig. 2.31 Hearth 21611, Building 5, view towards east, scale 1m

anthropomorphic jug fragment (Fig. 3.3, no. 25), possibly of 14th-century date, was found within the east wall foundation (4753). The floor of the east 'room' comprised tightly packed and rounded cobbles (4743, Fig. 2.30), areas of which had been heavily scorched. There was a narrow depression along its west side, alongside wall 4970, that may have served for drainage. It replaced an earlier cobbled surface (4956 and 4801) that had become very worn through use. The nature of these surfaces together with evidence from the east wall suggests that the room may have been external, perhaps an enclosed courtyard. Between the two cobbled surfaces was a dump of iron slag fragments (4788), of which a total of 1.65g was recovered including three smithing hearths, likely to have derived from nearby smithing activity. Pottery from the deposit included large sherds from 14th-century Brill/

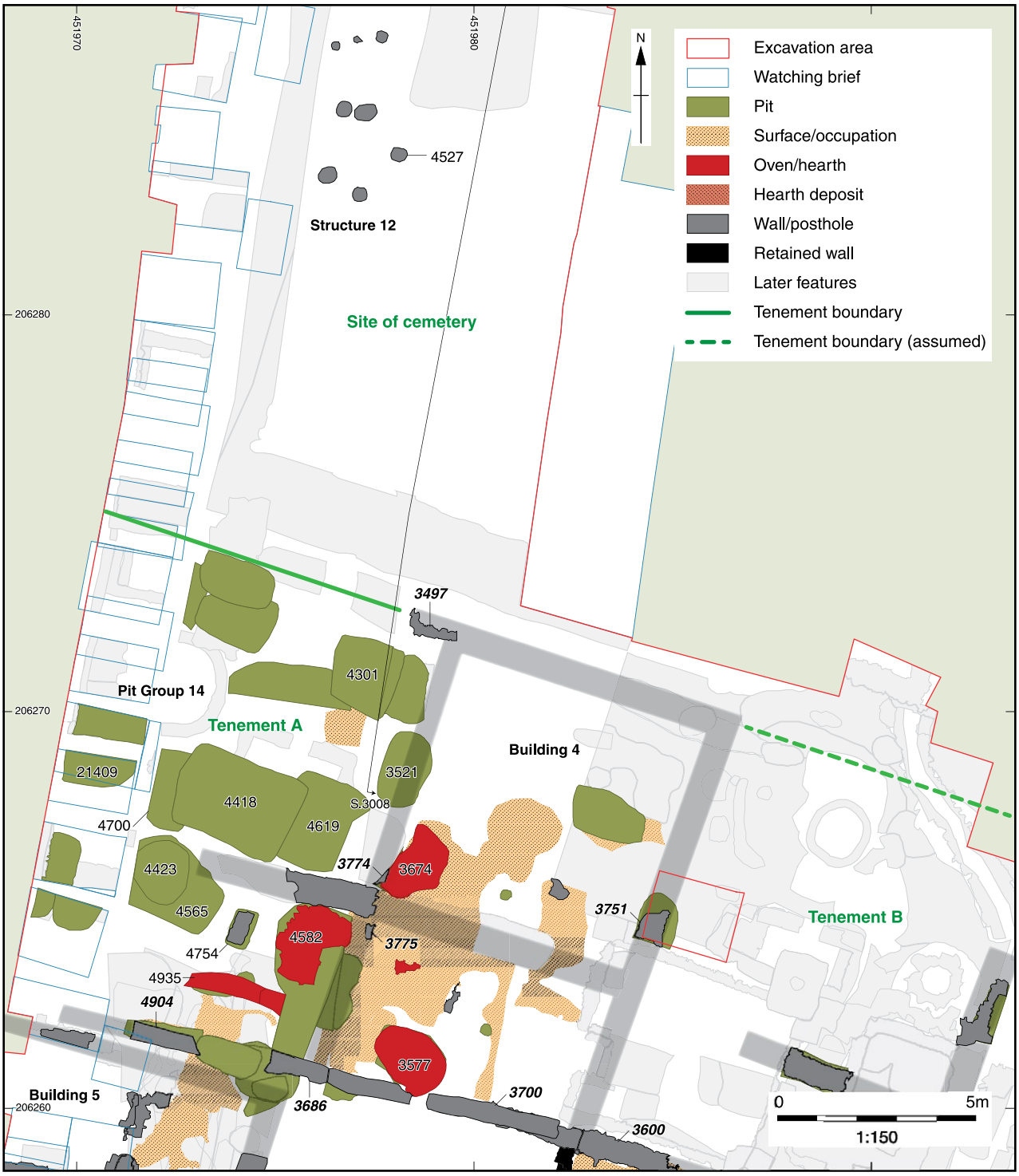


Fig. 2.32 Phase 5: rear of Tenement A and former cemetery area

Boarstall stamped jugs. The bedding/makeup layers (4584 and 4789) for later cobbled surface 4743 also contained a large quantity of slag and 14th-century Brill/Boarstall jug sherds together with an oil lamp fragment. A copper alloy dress buckle was recovered from deposit 4584.

The western part of Building 5 survived in a fragmentary state as its wall foundations were only revealed during the watching brief within the underpinning trenches. It appears to consist of a narrow corridor on its west side positioned alongside at least three rooms to the east. No useful dating evidence was recovered and the relationship with the eastern 'room' of the building was not established. A series of clay floors and occupation deposits were observed within the large room in Trench 216, including the remains of a possible hearth (21611) that had been built against the north-west corner of the room (Fig. 2.31). Further possible floor and trample deposits were also observed in Trench 223 and may have been contemporary with the building.

Building 4

This structure was situated in the north of the tenement, immediately to the north of Building 5 (Fig. 2.32). It overlay Pit Group 11 (see Phase 4) but was respected by and contemporary with at least some of the pits of Pit Group 14 located to its west. Much of the structure survived in a fragmentary state and there is some uncertainty regarding its northern and western extents. What survived suggests that the building was divided into at least three parts or rooms. Its southern extent was defined by wall 4904/3686/3700 which terminated at the boundary with Tenement B where it was abutted by wall 3600, the latter forming part of Building 7 which followed the same alignment. The wall overlay well 5041 (see Phase 4) which had been robbed and infilled and had a four-ribbed mortar in Bathonian freestone sourced from the south Cotswolds built into it (Fig. 3.20, no. 7). The eastern extent of the building had largely been removed by post-medieval cellared Building 10 (see Phase 8/9); shallow wall fragment 3751 probably marked its position, though this could have originated as a boundary wall with Tenement B. It is also possible that a similar shallow foundation (3497) marked the northern extent of the building or was perhaps the remains of the boundary of the tenement with the site of the former cemetery. Shallow north–south aligned foundation 4754, formed of reused stone roofing tiles, may have marked an internal division with the building.



Fig. 2.33 Hearth 4582, Building 4, view towards west, scale 2m

The remains of at least three hearths or ovens were contained within the building, all of which overlay a 0.30m-thick makeup deposit (3450, not illustrated) that contained a large quantity of pottery, animal bone, ceramic and stone roofing tile and 6.2kg of bulk slag that included three smithing hearth bottoms. This deposit, although apparently abutting wall 3751, was probably a deliberate dump or midden of domestic kitchen and other waste laid down prior to the construction of the building. The deposit overlay an earlier dump (4460, Phase 4, not illustrated) that was notable for containing a bone skate broadly dated to the 8th–13th centuries. The pottery, predominantly Brill/Boarstall ware, included fragments of at least two skillets and three lamps and the animal bone included forelimb, hindlimb and feet of cattle, sheep and pigs, suggesting deposition of whole carcasses. Also contained within the bone assemblage was a fragment of sawn antler, suggesting antler working. The roofing tile comprised forms dating to no later than the 14th century and was supplemented by stone examples sourced from west and north Oxfordshire.

Hearth 4582 (Fig. 2.33) was situated within the north-east corner of the south-west room of the building and survived as a circular area of slabs of fire-reddened limestone, measuring *c* 2.0m in diameter, with traces of stone edging around it, largely robbed. It seems to have replaced an earlier, possibly square hearth (4935) of similar size that was built against southern wall of the room. A sample (3323) taken from a charcoal deposit (4883) that was probably associated with the earlier hearth contained 1.4kg of slag including two smithing hearth bottoms. A further sample (3316) taken from a deposit (4861) overlying later hearth 4582 contained a wide variety of wood charcoal (beech, hawthorn type, oak, ash, hazel, blackthorn/cherry, field maple, holly, elm and willow/poplar) together with legumes and charred wheat grain.

Hearth 3577, located within the south-east room, was of a similar construction and size to hearth 4582 and was a later addition to this room. A fourth possible hearth (3674), located in the south-west corner of the north-east room, survived as a shallow depression filled with stone rubble over which was a deposit of charcoal-rich silts.

Gravel floor surfaces and laminated charcoal-rich silts survived in the two eastern rooms of the building. Two deposits (3580 and 3581) associated

with possible hearth 3674 within the north-east room contained a large quantity of iron slag, of which 23.4kg was retrieved from soil samples along with a quantity of hammerscale, suggesting that smithing was undertaken within this room. The samples (3116 and 3117) taken from these two deposits both contained predominantly coal and clinker, with small quantities of wood charcoal, suggesting the former was used as fuel. A deposit associated with either the construction or robbing of hearth 4935 in the south-west room also produced 1.38kg of iron slag. Deposits associated with hearth 3577 in the south-east room were also rich in charred and processed free-threshing wheat (samples 3099, 3100, 3123 and 3124) perhaps from floor covering or hearth kindling as there was little evidence for food remains. A heat-affected deposit (4862) overlying infilled pit 4565 within the south-west room may have been a trample deposit associated with the hearths to its east. This could imply that the south-west room of the building was a later addition though there is otherwise no other surviving evidence for this. The deposit was notable for containing a mortar of Wheatley limestone (Fig. 3.20, no. 8) and a whetstone.

Pit Group 14

This group comprised a dense cluster of up to 19 pits situated on the north-west corner of the tenement to the north of Building 5 and to the west of Building 4. It included several otherwise undated pits recorded in the watching brief that are on stratigraphic and spatial grounds considered part of this group. The pits were largely rectangular, the largest measuring 2.0–3.0m in length and up to 1.3m deep. The pits occupied an area that was previously free of pitting, and the largest could have served as quarries, particularly contiguous pits 4418, 4619 and 4700. Square pit 4301 (Fig. 2.34), at least 1.3m in depth, may have served as a cesspit as it contained berry and fig seeds within its lower fill, some possibly mineralised, though they were in a poor condition (sample 3183, assessment only). There were a large variety of fish remains in the pit fills including herring and eel, with smaller quantities of roach, bleak, minnow, gudgeon, ray, haddock, gadid, conger eel and mackerel. The remains were consistent with cooking and subsequent mastication and therefore could be latrine waste.



Fig. 2.34 Pit 4301, Pit Group 14, view towards west, scale 1m

Possible quarry pit 4418 was notable for containing a large quantity of iron slag (7.98kg) that included six smithing hearth bottoms, undiagnostic slag and some coal. Pit 3521 also produced two smithing hearth bottoms. The waste was presumably derived from nearby smithing, possibly from Building 4. The pottery from the pits is dominated by Brill/Boarstall ware, including possible 14th-century forms. The pottery included a complete oil lamp dish and a skillet (Fig. 3.5, no. 36) from pit 4418 and an oil lamp stem from pit 3521. Two stone mortars (Figs 3.20 and 3.21, nos 9 and 12, the latter from a Phase 6 fill) and a mount/bridle boss were found in pit 4418. A large quantity of roofing tile was also recovered from the uppermost fills of the same pit, possibly representing overlying levelling deposits that had subsequently sunk into the pit. They include glazed ridge tile fragments, several of which may date to the 15th century. Significant quantities of identifiable animal bone in good condition were found in pits 3521 and 4418. Notably, bones from fallow deer were found in pits 4423, 4418 and 21409 and a hare tibia was retrieved from pit 3521.

Tenement B

Building 2 continued in use with activity focussed within its eastern room (Room 2) associated with a succession of hearths (Fig. 2.35). A second building (Building 6), or possibly an extension to Building 2, was added to its east, occupying a previously open area. A large building or buildings (Building 7) was added to the rear of Buildings 2 and 6, with traces of further buildings to the north.

Building 2

Room 1

This room was refloored on several occasions with mortar associated within thin silt and charcoal spreads, together with makeup and levelling deposits. Soil micromorphology analysis of these deposits suggests domestic activity with perhaps evidence for floor coverings using plant matter (layer 8243). Micromorphological analysis of charcoal layer 8262 suggests domestic activity, probably from kitchen hearths. A long-cross half penny of Edward I–III (1279–1377) was found within one of the occupation deposits in Trench 123. A copper alloy buckle frame (Fig. 3.30, no. 16) was recovered from one of the charcoal layers (8262). A shallow gully (8955) ran along the south side of the

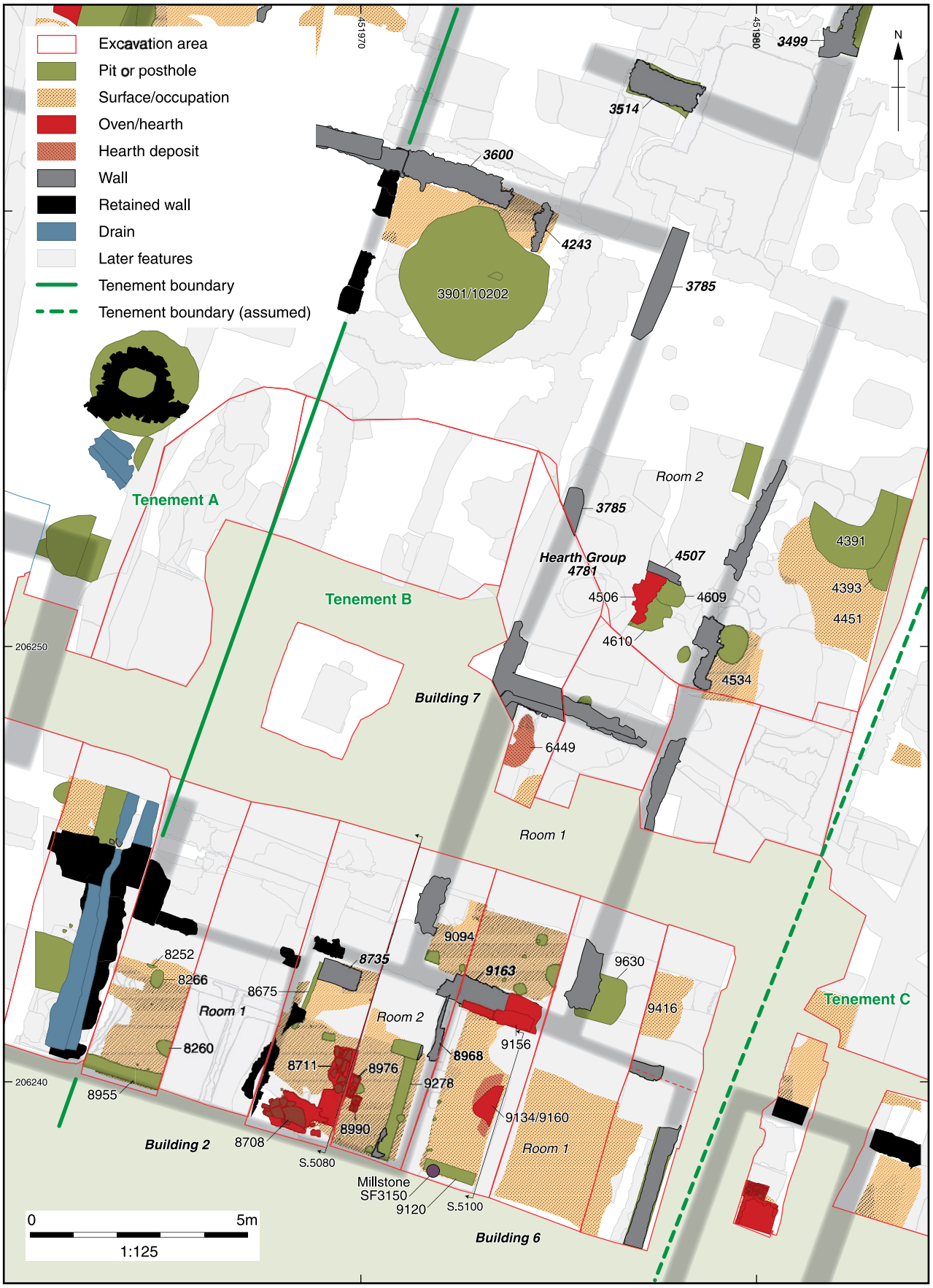


Fig. 2.35 Phase 5: Tenement B

room, possibly marking the position of an installation or fitting. Otherwise, the only other features were several postholes (8252, 8260 and 8266). A pair of iron shears (Fig. 3.30, no. 23) was recovered from a dump or levelling deposit (8259) in Trench 123. A buckle frame and plate (Fig. 3.30, no. 20) were recovered from bedding deposit 8277, also in Trench 123.

Room 2

The room was given a floor of clay (Fig. 2.2, section 5080, 8728) and a possible doorway on its east wall was blocked with wall foundation 8968. A copper alloy strap-end (Fig. 3.30, no. 19) was recovered from floor layer 8993 (possibly corresponding with 8728) together with pottery possibly dating from the later 14th century. A shallow limestone foundation (8735) of uncertain function was inserted into the north-west corner of the room. It may have been the base of an oven, though no evidence for heating was observed. The earlier hearths (see Phase 4) within the room were replaced on at least two occasions. The earliest, square hearth 8711, was positioned centrally within the room and measured 1.0m across (Fig. 2.36). It may have lain within a 'working area' defined by narrow slot 8675 to the west and possible robber trench 9278 to the east.



Fig. 2.36 Hearth 8711, Room 2, Building 2, view towards east, scale 1m



Fig. 2.37 Hearth 8976, Room 2, Building 2, view towards west, scale 0.5m

The hearth was constructed with stacked limestone slabs, the surface of which had been scorched red, within a shallow clay-lined pit (Fig. 2.2, section 5080, 8716). Broken hammerscale flakes and tiny smithing spheres were recovered from the hearth and its associated components (8991 and 8992 in Trench 126, not illustrated). Situated immediately to the east in Trench 126 was a smaller rectangular hearth (8976, Fig. 2.37) constructed with stone slabs with a surround of upright stones. Its relationship with the adjacent hearth in Trench 125 was not clearly established but may been later as its surface lay *c* 4cm above that of hearth 8711. It had replaced a similar but slightly smaller stone-built hearth (8990; Fig. 2.38) located immediately to its south. The use of the hearth was associated with a thick charcoal-rich silt (Fig. 2.2, section 5080, 8715) that contained much animal bone, oyster shell and Brill/Boarstall pottery together with two copper alloy buckles (Fig. 3.30, nos 17–18). Hearth 8708 was



Fig. 2.38 Hearth 8990, Room 2, Building 2, view towards north-west, scale 0.5m



Fig. 2.39 Hearth 8708, Room 2, Building 2, view towards south, scale 1m

later than both hearths 8711 and 8976 as it overlay charcoal-rich silt 8715. It was positioned against the south wall of the room and was constructed with roughly hewn limestone slabs bonded with clay that had been scorched red (Fig. 2.39). It was associated with a worn mortar floor (8712), over which was an extensive spread of charcoal-rich laminated silt (8707; Fig. 2.2, section 5080). A similar laminated silt (8971, not illustrated) within Trench 126 may have been associated with hearth 8976 or hearth 8708 and was notable for much broken hammerscale flakes, many tiny spheres, and tiny iron flakes offering further evidence for smithing activity within the room.

Building 6

This building (or extension to Building 2) survived in a fragmentary state but appears to have comprised a single room measuring *c* 5.2m across (E–W). Its southern wall lay beyond the excavated area but the building must have extended more than 3.8m from the street frontage. It is possible that shallow slot 9120 marked the position of a structural installation that was placed against the south wall suggesting its frontage wall lay immediately to the south of the excavated area. The north wall (9163=8973, Fig. 2.40) of Building 6 was partially shared with Building 7, suggesting that the two buildings were of contemporary construction. Prior to its construction the area was levelled with thick soil dump (9162) that overlay a charcoal spread (9170 and 9172; Fig. 2.2, section 5100).

The building contained traces of at least two hearths, the earliest of which (9156) was built into its north wall and survived as an area of fire-reddened clay above its offset foundation. A floor or occupation layer (9157, not illustrated) associated with the hearth contained a significant quantity of very broken hammerscale flakes and tiny spheres suggestive of secondary smithing. The later hearth 9134/9160, predating stone-built hearth 9090 (see Phase 6) had largely been robbed and survived as a shallow depression, the sides of which had been scorched red. Its fills (9133 and 9161; Fig. 2.2, section 5100) contained part of a rotary quern and fragments from a ceramic bottle in Brill/Boarstall ware respectively. Broken hammerscale flakes, tiny spheres and some distorted micro-slags were found in the deposits associated with the hearth. The room had been floored with a succession of trampled clay and gravel deposits interlaced with thin occupation deposits (9171 up to 9117 on Fig. 2.2, section 5100). Built into one floor (9140) was half of an upper millstone (Figs 2.41 and 2.42, SF 3150; Fig. 3.22, no. 15). Its surface showed some evidence for scorching



Fig. 2.40 Wall 9163, Building 6/7, with a large ammonite fossil visible on the upper layer, view towards north-west, scale 2m



Fig. 2.41 Floor 9136, Building 6, view towards south, scale 1m



Fig. 2.42 Millstone (SF 9150), set into floor of Building 6, view towards south, scale 0.5m

and had therefore perhaps been used for the base of a hearth. Few food remains were present on the floors, the identifiable bone comprising largely chicken, though possible occupation layer 9157 was rich in fish bone and egg shell, suggestive of food preparation. Samples (5046 and 5060) taken from two deposits (9157 and 9627) largely contained charred and processed free-threshing wheat, perhaps derived from floor covering, together with hazelnut shells. Notable finds included a Roman *nummus* from the House of Constantine from occupation deposit 9627, a biconvex copper alloy button from floor 9140 and a whetstone from occupation layer 9614. The last of these layers also contained a small quantity of broken hammerscale flakes and occasional spheres. Built into the north wall of the building (9163) was a large ammonite fossil (Fig. 2.40). Two writing leads (Fig. 3.30, no. 21) were found in the construction trench for the north wall (9163=8973) of the building.

Building 7

Structure 9 (see Phase 4) was replaced by Building 7, a large structure that extended from the rear of and was contemporary with Building 6. It extended northwards for a length of 17.9m, its north wall having probably been removed by the south wall of post-medieval Building 9. This assumed northern extent also corresponds with wall 3600, potentially a boundary wall. The building had two rooms, the larger and more northerly of which (Room 2) was a later addition and was slightly skewed in relation to the south room.

Room 1

This room measured 6.3m in length by 3.2m wide and had substantial wall foundations of limestone rubble up to 0.65m in depth (Fig. 2.40). The foundations of its south wall (9163), which also formed the north wall of Building 6, were bonded with brown-orange sandy gravel with lime mortar on its basal stones. The lime mortar was similar to that found in pit 9630, which was partially overlain by the east wall of Building 7, and suggests that this feature served as a mortar-mixing pit during the construction of Building 6 and that the walls of Building 7 were built slightly later. Few internal deposits that can be dated to this phase were identified, though a possible floor of beaten clay (eg 9094) similar to that in Building 6 survived in places. Against the north-west corner of the room the floor had been scorched red (6449), perhaps marking the position of a robbed hearth. A sample (4049) taken from this deposit largely contained charred sedge seeds and some heather, probably from floor covering. Several postholes and stakeholes at the southern end of the room suggest the presence of timber partitions or storage areas. A possible belt fitting was recovered from an occupation deposit (9087) at the southern end of the room.

Room 2

The walls of this room were similar to that of Room 1 and were also deeply founded, particularly its west wall (3785; Fig. 2.43), the southern end of which abutted the north wall of Room 1. Few internal features survived, the earliest of which was hearth group 4781, which was located towards the southern end of the room. This comprised a succession of intercutting hearths, the earliest of which comprised two 'fire pits' (4610 and 4609), 0.22m and 0.36m deep



Fig. 2.43 Wall 3785, Building 7, view towards east, scale 2m



Fig. 2.44 Hearth group 4781, Room 2, Building 7, view towards south-east, scale 1m

respectively (Fig. 2.44). The sides of each pit had been scorched red and were overlain by deposits of charcoal. Later, a stone-built hearth (4506) was placed over the infilled pits, the remains of which had been largely robbed. A shallow east–west aligned foundation (4507) may have been the remains of hearth edging or an internal division within the room. Sherds of Brill/Boarstall jugs, possibly of 14th-century or later date, were found in pit 4609. The fill of this pit was rich in charred rye grains and free-threshing wheat together with small amounts of wood charcoal, largely oak (sample 3254). A similar assemblage of charred material was found in pit 4610 (sample 3255).

Other structures

The area to the north of Building 7 remained generally unexcavated below impact level, at which a garden soil was revealed which contained a significant quantity of Brill/Boarstall ware, some of which may be dated to the 14th century or later. Cutting this soil and predating post-medieval Buildings 9 and 10 (see Phase 8) were two wall foundations (3499 and 3514) that may have formed part of a building. No associated levels or dating evidence were found.

To the west of Building 7 were the remains of a possible structure, the north wall of which (3600)



Fig. 2.45 Walls 3600/4243 and pit 3901/10202 under excavation, view towards south, scales 1m

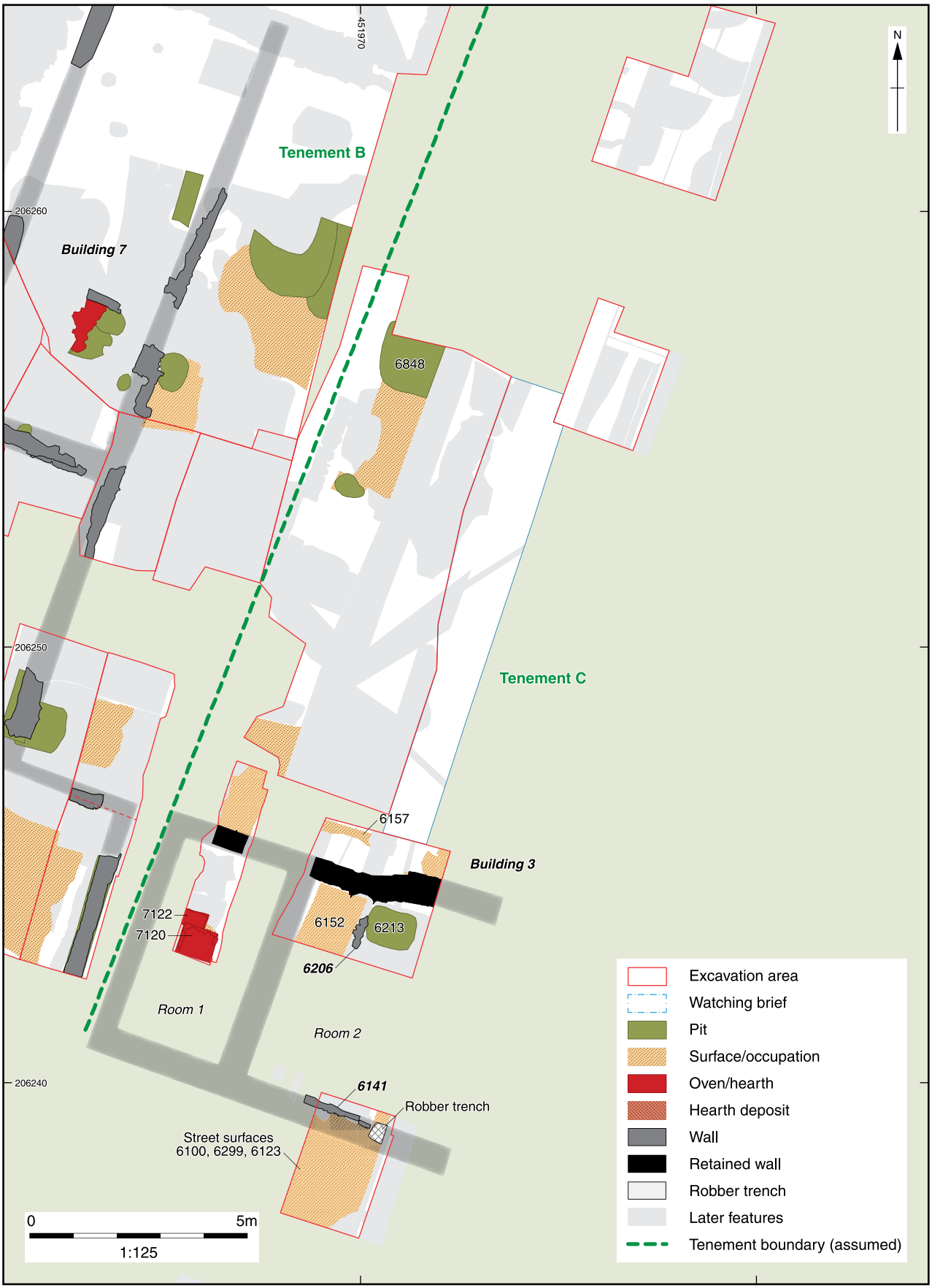


Fig. 2.46 Phase 5: Tenement C

abutted the south-east corner of Building 4 (Fig. 2.45). This wall might have originally extended eastwards up to Building 7 but no evidence for this survived. Narrow wall foundation 4243 was perhaps an internal division within the structure and was located next to an opening in its north wall. The building had a floor of redeposited natural gravel/sand over which was a charcoal-rich silt which contained a mixture of charred cereal drains and hazelnut shells (sample 3155). A lamp fragment in Brill/Boarstall ware was also recovered from this deposit. The structure was short-lived, since it was cut through by a large circular pit (3901/10202) that measured 3.2m in diameter and at least 0.80m in depth. The pit contained a large quantity of 14th-century Brill/Boarstall pottery including kitchen/dining forms such as small skillets and possible condiment vessels from fills 3903 and 4259 (Fig. 3.2, nos 16–17). Also present in these fills were oil lamp sherds and a sherd possibly from a Spanish drug-jar or Lebrillo dated to *c* 1250–1500. The animal bone from the pit was in good condition and presumably kitchen waste. It was largely cattle, pig and sheep/goat but also included teeth/mandible fragments from a horse, a fallow deer bone and a femur from a swan. Notable finds included a bone tuning peg (Fig. 3.30, no. 22) from fill 3903 and a buckle plate from fill 4259.

Yard to the east of Building 7

The area to the east of Building 7 seems to have remained external as it was floored with gravel and large cobbles (4451, 4534 and 9416). This was cut by two successive pits (4393 and 4391), each of which contained a large quantity of Brill/Boarstall jugs, with two oil lamp sherds from the later pit (4391). Subsequently, a garden soil seems to have accumulated over part of the yard, from which 14th-century roofing tile and a fragment from a finial (Fig. 3.4, no. 29) were recovered together with an adze and a mount (Fig. 3.30, no. 24).

Tenement C

This phase saw modifications to Building 3 together with limited activity to its north which remained external (Fig. 2.46).

Building 3

Room 1

This room saw the addition of two successive stone-built hearths that were inserted near to its centre. The earliest hearth (7122; Fig. 2.47) was constructed with pitched, reused Bathonian roofing slabs sourced from Oxfordshire and bonded by lime mortar. Above this was a laminated spread of ash, charcoal and silt (7121) associated with its use which contained fish bone and bones from woodcock. The later hearth (7120) had been largely robbed, leaving a bedding layer of mortar and its edging stones.



Fig. 2.47 Hearth 7122, Room 1, Building 3, view towards south, scale 0.5m

Room 2

This room appears to have refurbished with the addition of a partition wall constructed towards its west side (6206). It is possible that the exterior side of its south wall was refaced or repaired at this time with limestone slabs (6141), one course of which survived at the base of the trench (Fig. 2.48). This refacing occurred shortly after two new street surfaces of tightly packed and rounded cobbles (6100 and 6299) were laid immediately to its south. They were possibly the same as surfaces revealed in evaluation Trench 1 (110 and 116) to the south of Building 1 (Fig. 2.24). The earlier surface was laid over a levelling layer of sandy silt (6282) that contained part of a Brill/Boarstall oil lamp and a shield-shaped mount possibly used to decorate a stirrup, scabbard or harness (Fig. 3.29, no. 13). Above the second cobbled surface was a 0.12m-thick layer of compacted sandy gravel (6123) that also contained several sherds of Brill/Boarstall ware.

Probably contemporary with this refurbishment was a possible mortar-mixing pit (6213). The pit, 0.42m deep, contained a 0.12m-thick deposit of lime mortar (6210) at its base, within which were large sherds of Brill/Boarstall jugs that had been impregnated with similar material. The pit had been backfilled with rubbish, including a mortar of Bathonian freestone (Fig. 3.20, no. 6) from fill 6208. The pit was then sealed with gravel that was used to refloor the room (6152), over which a thick charcoal-rich silt accumulated, presumably from a nearby hearth.

Rear of Building 3

This area remained external, probably as a yard, as indicated by surviving traces of cobbling (6157). Pit 6848 located towards the rear of the tenement contained Brill/Boarstall ware and a copper alloy belt buckle (SF 3310).



Fig. 2.48 Street surface 6100 and refacing 6141 of south wall of Building 3 (overlain by late 18th-century college stable foundations), view towards north, scales 1m and 2m

Site of the cemetery

This area remained open (Fig. 2.32), and it is likely that garden or agricultural soils that had begun to accumulate during the preceding phase continued to develop (3171; Fig. 2.11, section 3008). A group of shallow postholes (Structure 12), some of which cut into the underlying graves, was located towards the north. The postholes measured up to 0.58m in diameter and 0.16m deep and may have formed part of an agricultural or related structure. Posthole 4527 contained a fragment of 14th-century glazed ridge tile.

PHASE 6 (MID-15TH TO MID-16TH CENTURY)

Tenement A

Building 1

The remaining part (Room 1) of Building 1 appears to have been rebuilt during this phase from its foundations upwards, the resultant walls of which were considerably narrower than their predecessors (Figs 2.49 and 2.50). Its east wall (8021) measured 0.36m wide, similar in size to the north wall (7837 and 1550 in evaluation Trench 1). The east wall was shared with Building 2, which also seems to have been rebuilt at this time, since floor deposits lapped up against its eastern edge.

The rebuilt building was subdivided by narrow wall foundations (7620, 7621 and 7810) to form at least four internal rooms. Posthole 7819 may have marked the position of a door post or formed part of an earlier timber partition. Prior to these divisions a slag-rich deposit (7634=7813; Fig. 2.2, section 5030), up to 0.09m thick, had been laid down across the room, though no contemporary hearths associated with it were found. The deposit included five smithing hearth bottoms together with fragments of iron – either smith's offcuts or waste from the ironworking itself. It may have been used as floor makeup or levelling that was laid down during the reconstruction of the building, as probably were equivalent deposits 7220/7223 (Fig. 2.2, section 5010), as such bulk material would have normally been cleared from a smithy floor. Large fragments from a roofing tile of 15th–17th-century date were found in deposit 7813 and a French jetton dated to *c* 1350–1425 was recovered from deposit 7220 together with a bone bead. A sample (5163) taken from deposit 7813 largely contained clinker, presumably spent fuel. In contrast to the earlier phases, the floors of each of the subdivisions were of mortar that had been replaced on several occasions, some having worn away through use (7604, 7627 and 7642 on Fig. 2.2, section 5030; 7210, 7217 and 7219 on Fig. 2.2, section 5010). Each of the floors was overlain by occupation deposits (7216 and 7218 on Fig. 2.2, section 5010; 7611, 7622, 7623, 7630, 7631 and 7641 on Fig. 2.2, section 5030). Small quantities of 15th-century and later pottery such as Cistercian ware (7604) and Tudor wares (7216 and 7218) were present throughout the floor and occupation sequences, though there was an absence of fabrics that could be dated beyond the mid-16th century. Within the south-east part of the room a small pitched-stone hearth (8015), measuring 0.70m across, was inserted. Its function seems to have been largely domestic given the scant quantities of bulk metalworking debris present compared to the preceding phase of the building, although a quantity of broken hammerscale flakes and iron flakes were recovered, suggestive of ordinary hot-working of iron objects. The hearth may have been contemporary with floors/occupation layer 7816 within the same room in Trench 121 (not illustrated), which contained hammerscale flakes, large and small spheres, and flakes of iron. Its use was short-lived, however, as it was later overlain by a further mortar floor. Several domestic clothing fasteners (pins and lace tags) were found in occupation deposits 8004, 7216, 7218 and 7623, several bone beads in deposits 7216 and 7618, and a glass bead in deposit 8004. A sample (5112) taken from laminated occupation deposit 7623 contains processed free-threshing wheat and some rye and legumes, suggesting food consumption. Samples

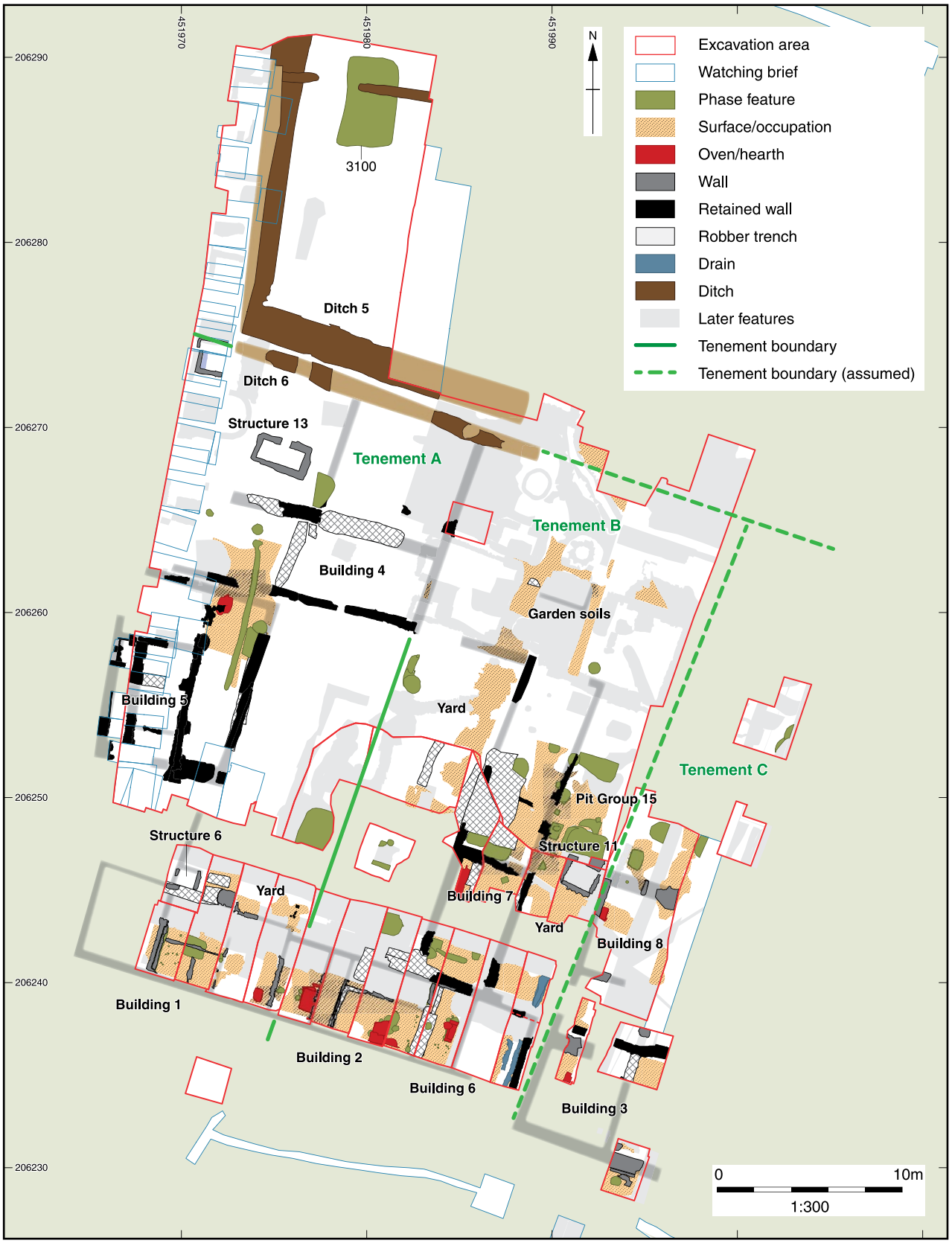


Fig. 2.49 Phase 6: Overall plan



Fig. 2.50 Phase 6: Tenement A



Fig. 2.51 Wall 7207, Building 1, view towards south, scale 1m



Fig. 2.52 Latrine Structure 6, view towards south-east, scale 1m

from occupation layers 7617 and 7618 both contained much broken hammerscale flake, tiny spheres and small undiagnostic fragments, suggesting that secondary smithing was still undertaken in the room.

Subsequently, there were further modifications to the building with the addition of wall 7207 (Fig. 2.51), which in contrast to the earlier partition walls was more substantial and constructed upon an offset foundation 0.45m in width, suggesting that it had a load-bearing function. Roofing tile dated to the 16th–17th century was recovered from its foundation trench. The wall cut all the surviving floor deposits associated with the earlier partitions to its east. To its west, it was apparently abutted by a slag-and-hammerscale-rich deposit (7201) which overlay a makeup deposit (7208) containing a sherd of Brill/Boarstall 'Tudor green' pottery and roofing tile of 15th–17th-century date. The slag, totalling 5.8kg, included nine smithing hearth bottoms and is likely to represent a deliberate dump for levelling during the building modifications rather than *in situ* debris from smithing (see Keys, Chapter 3).

A small stone-lined latrine (Structure 6), measuring 1.40m across, was later attached to the rear wall of the building at some stage. Only its east and west lining survived, and the north wall of the building provided its south lining (Fig. 2.52). The latrine was 1.0m deep and contained backfill deposits with no evidence for its use, suggesting that it had been regularly cleaned out. The backfill (7404) contained late medieval Brill/Boarstall ware and stone roofing tiles, the latter possibly once forming a roof for the structure. There was also a fragment of a Stabbed Wessex-type floor tile (Fig. 3.18, no. 3).

A square foundation of limestone rubble foundation bonded by pale yellow mortar (7607) seems to have been a late addition to the exterior north wall of the building. Its purpose is unclear; perhaps it was the base of a chimney or a staircase.

Yard to the north of Building 1

The area immediately north of Room 1 appears to have been external. Beyond this was a large pit (6715), its size suggesting that it served as a quarry. The pit, measuring at least 2.2m across and 0.55m deep, contained a single deposit suggesting that it had been rapidly backfilled. The pit contained sherds of late medieval Brill/Boarstall ware pottery, part of a Tudor green ware cup, a jug sherd with possible anthropomorphic decoration (Fig. 3.5, no. 39) and a copper alloy pin.

Buildings 4 and 5

The status of Buildings 4 and 5 during this phase is uncertain given the lack of floor and other deposits, though it is likely that by the end of this phase one or both structures had been demolished and robbed, and a garden soil subsequently developed over the area, at least on the site of Building 4 (3565, not illustrated) which contained a bunghole jar of 15th-century date, a stone mortar (Fig. 3.21, no. 11) and a large iron buckle. Some form of activity seems to have occurred at the northern end of the east 'room' of Building 5. The floor was resurfaced with cobbles the surface of which showed evidence for burning (4512), perhaps marking the position of an otherwise robbed hearth, and incorporated two smithing hearth bottoms. A sherd of Tudor green ware and a whetstone were recovered from the cobbles together with a copper alloy vessel fragment. A subsequent gravel layer (4419) overlay these



Fig. 2.53 Stone-lined pit (Structure 13), view towards east, scales 1m and 2m

deposits and contained large sherds from a possible storage jug in late medieval Brill/Boarstall ware. A narrow slot (4428), possibly a drain, ran through the room and continued northwards to the site of Building 4. Its silty fill contained a large part of one or more bunghole cisterns in late medieval Brill/Boarstall ware. Overlying these deposits was an extensive midden-like deposit (4422=4429= 3566) that extended into Building 4 to the north (Fig. 2.54), suggesting that both structures had fallen into disuse. This deposit contained a large quantity of glazed ridge and plain roofing tile dating to the 15th to 17th centuries, suggesting demolition of the building(s), unless it was dumped from elsewhere. Also present were fragments from a possible copper alloy cooking vessel including part of a foot (Fig. 3.31, no. 25) and a fallow deer bone. Several small pits (4902, 4454, 4572 and 4431), each of which contained charred material, may also have been contemporary with the late use or the immediate disuse of the two buildings. Each pit contained a quantity of iron slag, with pit 4431 also containing late medieval Brill/Boarstall ware. A bone stylus (Fig. 3.31, no. 36) was recovered from a trench (4019) robbing the east wall of Building 5.

Other features

A rectangular stone-lined pit (Structure 13, Figs 2.53 and 2.54) cut into pit 4418 (see Phase 5, Pit Group 14). The uppermost fills of the earlier pit, possibly levelling, contained 21.2kg of bulk slag that was presumably associated with the smithing activity that was occurring in Buildings 4 and 5. The material included including 20 smithing hearth bottoms, considerable quantities of undiagnostic slag and fragments of burnt, laminated coal. These fills also contained a large assemblage of medieval roofing tiles that was presumably derived from a nearby demolished building. They included several crested roofing examples in fill 4468 (Fig. 3.17, no. 3) and a few roof tiles dated to the 15th–17th centuries. The stone-lined pit measured 3.2m x 1.8m and survived to a depth of 0.8m. Its sides were lined with rectangular limestone blocks bonded by pale yellowish mortar, and it had a floor of large limestone slabs. There was a narrow entrance or opening, 0.48m wide, on its north side. The purpose and date of this structure are uncertain, though there is no evidence that it was a latrine and it may have been used for storage. It was backfilled with rubble that contained a large quantity of plain roofing tiles, all of which are dated to the 15th to 17th centuries, perhaps derived from its roof. The only other dating evidence consisted of several sherds of late medieval Brill/Boarstall ware.

Part of a stone-lined pit (21808=22710), probably a latrine, was revealed during the watching brief, positioned against the north-west corner of the tenement. Its cesspit-like fill (21810) contained a near-complete vessel in late medieval Brill/ Boarstall ware (Fig. 3.5, no. 34), possibly used for distilling.

Tenement B

Building 2

It is likely that Building 2 was also rebuilt during this phase, its layout having close similarities to that of Building 1, with which it shared a party wall (8021) (Fig. 2.55). Similarly, its east wall probably formed the west wall of Building 6 (8966), though the junction of two excavation trenches at this point leaves the relationship uncertain. As with Building 1, contemporary levels pertaining to the northern half of Building 2 had been removed by a modern ground beam leaving only the deeper robber trenches surviving (Fig. 2.2, sections 5010, 5030 and 5080). The north wall of the original building had been removed by a robber trench (9813) which was cut by a later robber trench (8661; Fig. 2.2, section 5080) that probably robbed the north wall of the rebuilt structure. The rebuilt structure consisted of at least four rooms (Rooms 3–6), formed by narrow internal wall foundations, that flanked a corridor leading from the street. No deposits survived in the north-east room (Room 6).

Room 3

The room was initially floored with a thin layer of buff sandy lime mortar (8701), largely worn away, over which was a thick occupation or makeup deposit of mottled sandy silt with patches of burnt material (8696; Fig. 2.2, section 5080). A whetstone was recovered from a contemporary makeup deposit (8920) for the mortar floor and a strap-end and a mount (Fig. 3.31, nos 30–31) from further makeup deposits (8453 and 8454, not illustrated). A worn long-cross penny, probably of Henry III, was also found in this deposit and was presumably a relict item. A line of stakeholes and a posthole (8905) positioned along the eastern edge of the room were probably contemporary. A bone whistle was recovered from the posthole. The floor was cut by a

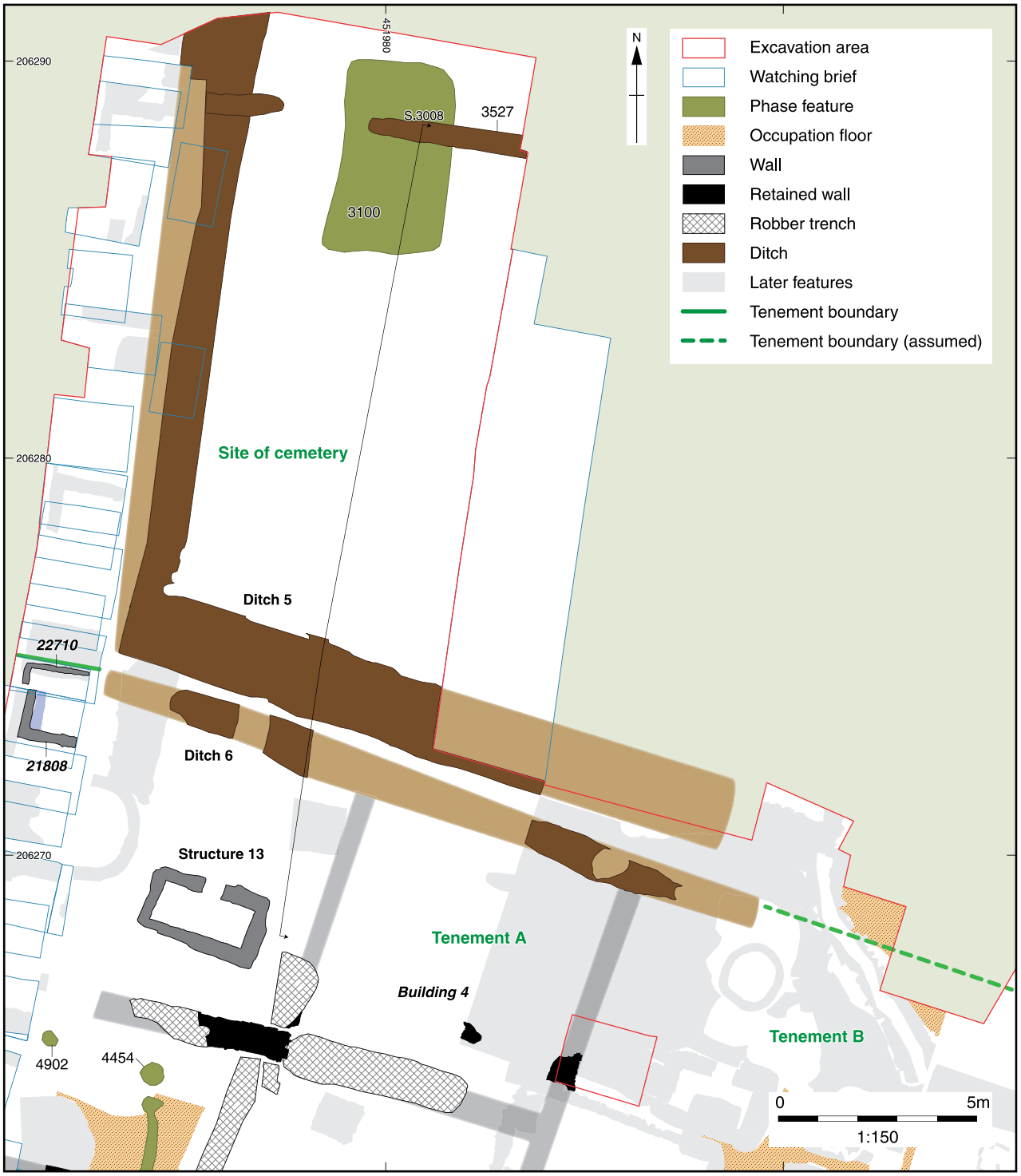


Fig. 2.54 Phase 6: rear of Tenement A and former cemetery area

succession of hearths positioned near or against the south wall of the room. The earliest (8681=8878, Fig. 2.56 and Fig. 2.2, section 5080) survived as a base of scorched limestone slabs that was probably associated with a shallow rake-out pit (8697=8891; Fig. 2.2, section 5080), the basal fill of which (8698) comprised ash. The pit was levelled with burnt clay (8690=8887) that contained 7kg of iron slag and a sherd of Brill/Boarstall 'Tudor green' ware dating to the late 15th or 16th century. The slag comprised much smithing debris, including two smithing hearth bottoms, hammerscale flake, spheres, dribbles, iron bits, ferruginous concretion and burnt coal. A whetstone was found in a mortar floor (8678; Fig. 2.2, section 5080) that was associated with use of the hearth. A charcoal-rich occupation layer above this floor (8677) contained large iron flakes, broken hammerscale flakes, spheres and small

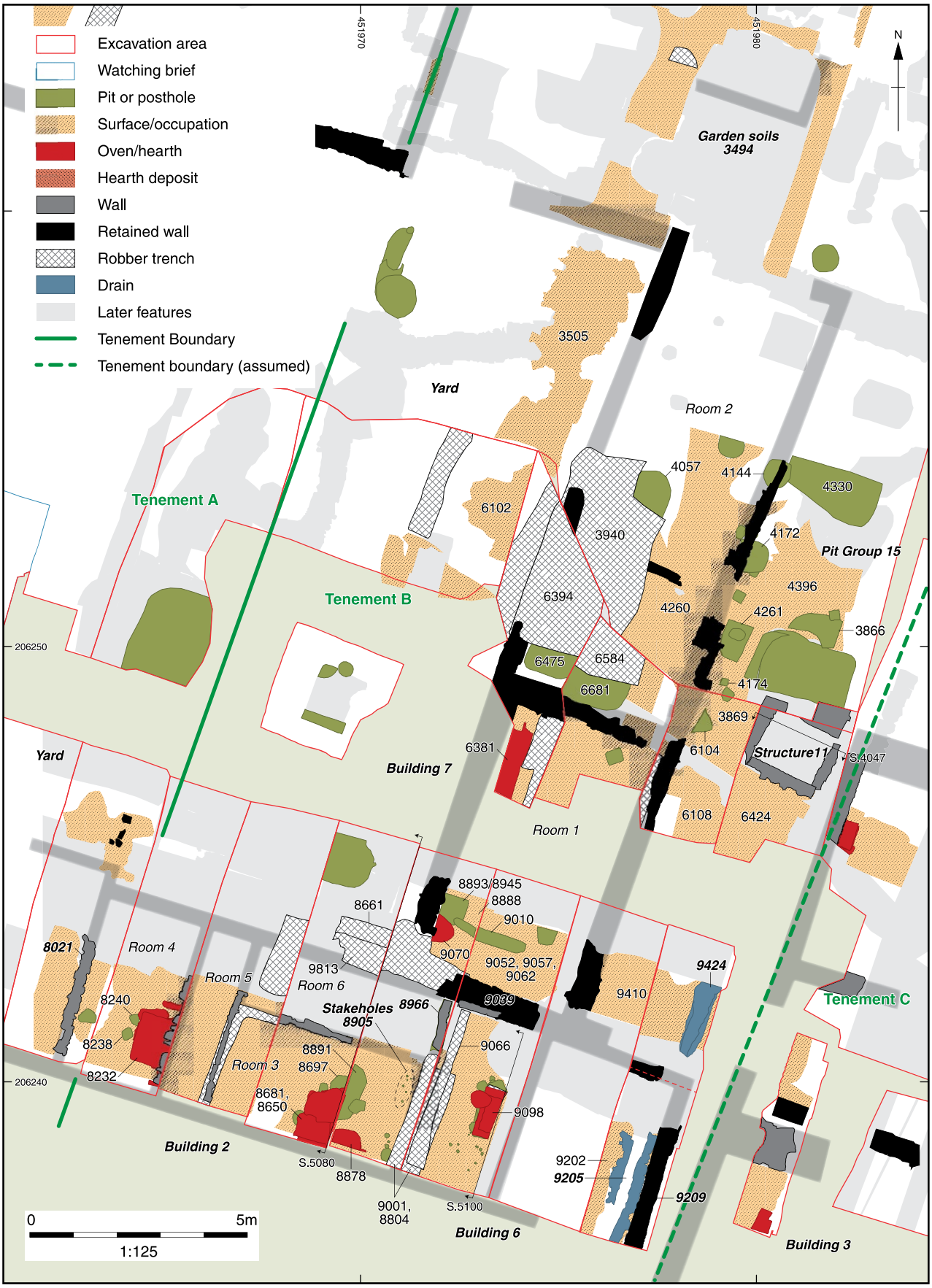


Fig. 2.55 Phase 6: Tenement B



Fig. 2.56 Hearth 8681, Room 3, Building 2, view towards south, scale 0.5m

undiagnostic slag, present in small quantities. The second phase of hearth (8663, not illustrated) survived as three stone slabs of Wheatley limestone mouldings. A bone bead was recovered from a subsequent occupation layer (8856). A subsequent laminated occupation layer (8686) contained a medieval geometric lead token probably dating to the 15th or 16th century (Fig. 3.26, no. 4) together with micro-slags. This was overlain by an occupation layer (8685=8882; Fig. 2.2, section 5080) that was rich in a variety of fish bone, suggesting food preparation and consumption. A copper alloy bar mount (Fig. 3.31, no. 33) was recovered from this deposit The second phase or reflooring of the hearth survived as a scorched limestone slab (8649, not illustrated), a sample from which (5070) contained well-preserved wood charcoal dominated by oak together with other species including elm, blackthorn, hazel, beech, holly and hawthorn type. The third phase of the hearth (8650; Fig. 2.2, section 5080) was well preserved as a rectangular area of heavily burnt limestone slabs measuring over 1.2m in length. It was edged on its west side with two courses of roughly dressed rectangular limestone blocks (Fig. 2.57), suggesting this formed the back of the hearth. The floor of the hearth was replaced with limestone slabs laid directly over the earlier base (8600; Fig. 2.2, section 5080). This probably occurred at the same time that the room was given a further mortar floor (8630). The surface of the latest hearth was overlain by a charcoal deposit associated with its use (8618 and 8628). Charcoal-rich deposits to the west of the hearth, probably from its rake-out, contained a few fresh sherds from pottery dated to 1480–1550, one of which (8616) contained food remains including fish bone and eggshells (sample 5021). The area around the north and west of the hearth was later floored with a surface of roughly hewn limestone blocks (8613) to form a 'working surface', over which were further thin deposits of charcoal and ash-rich material (8609 and 8602; Fig. 2.2, section 5080).



Fig. 2.57 Hearth 8650, Room 3, Building 2, view towards south, scale 1m

These surfaces represented the latest surviving levels in the room. An iron trowel was recovered from a later floor surface (8607, not illustrated) found in association with sherds of a Cistercian ware cup dated to 1470–1600.

Room 4

Room 4 contained a stone-built hearth (8232; Fig. 2.58) that had been constructed against its east wall. It was built with heavily fire-reddened limestone slabs and had subsequently been rebuilt or resurfaced with large limestone blocks. Two shallow pits (8238 and 8240) positioned alongside the front of the hearth were used to collect ash and charcoal sweepings. The hearth was associated with ash- and charcoal-rich occupation deposits (8223, 8226 and 8235) that contained food remains, including eggshells and fish bones together with a few mammal and fowl bones including rabbit and chicken. Sherds of late medieval Brill/Boarstall ware were also recovered from the deposits, together with up to 20 copper alloy pins and lace tag fragments associated with garments and clothing. Later, the hearth was covered by a mortar floor that overlay a makeup deposit (8215) from which a Nuremberg ship penny ('Galley de France') jetton was recovered, dated to 1490–1550. A bedding layer (8221) for one of the mortar floors contained fragments from decorated Stabbed Wessex-type floor tiles.



Fig. 2.58 Fireplace 8232, Room 4, Building 2, view towards east, scale 0.5m

Room 5

This room formed a 0.95m-wide corridor between Room 3 and 4 and was floored with a succession of beaten clay layers and thin occupation deposits. A small quantity of late medieval pottery including a sherd of Cistercian ware (*c* 1470–1600) was recovered from these deposits.

Building 6

West side

Unlike Buildings 1 and 2, it is not entirely clear whether Building 6 was also rebuilt during this phase. An early robber trench (9066) measuring 0.30m deep and at least 0.26m wide ran along the western edge of Trench 127 but was not seen in the adjacent trench. This was later overlain by floor deposits which would have lapped up to the line of wall 8966 which also formed the east wall of Building 2. This would suggest that the wall had been rebuilt, especially as a second robber trench (9001=8804) had later removed wall 8966. A copper alloy button incised with a heraldic shield and dating to the 12th–16th centuries was recovered from the fill together with a leg from a copper alloy cooking vessel (Fig. 3.31, no. 26). A possible threshold (9039) formed by a line of mortared limestone blocks set upon a tiled bedding was added to the north wall of the building, which it shared with Building 7. This marked a doorway between the two buildings since floor deposits overlapped the foundation that divided the two. Additionally, floor deposits surviving along the presumed east (Trench 129) and west (Trench 127) areas of the building differed in character, those to the east showing a more distinct exterior character which suggests more than one room was originally present. Any dividing wall between the two areas, presumably located within Trench 128, did not survive but probably was not located further west than the east wall of Building 7.

The main feature along the west side of the building was hearth 9098, which was located in the same position as earlier hearths during the preceding phase. The structure sealed earlier laminated occupation deposits (9102, 9099 and 9095; Fig. 2.2, section 5100) and stakeholes (Group 9101) that were presumably related to earlier hearths located elsewhere in the building. Two of these deposits (9095 and 9099) contained a number of fish bones, suggesting the preparation and consumption of food (samples 5025 and 5027). A jet bead was also recovered from deposit 9099 together with a copper alloy toothpick/ear scoop. In its earliest phase (9090, Fig. 2.2, section 5100) the hearth was well constructed with a surrounding wall of mortared limestone blocks and a floor of limestone slabs (Fig. 2.59). It measured 1.16m in length and at least 0.45m wide and was raised *c* 0.10m above the contemporary floor level. Part of its floor had been repaired with pitched roofing tiles dated to the 15th or 16th century. Subsequently, the hearth was rebuilt and given a new but more rudimentary floor of limestone slabs. A deposit (9059) associated with the use of the hearth contained a jet bead, fish bones and late medieval Brill/Boarstall ware. After the hearth fell out of use, it was covered by a makeup deposit (9146; Fig. 2.2, section 5100) and thin mortar floor layers (9007 and 9013; Fig. 2.2, section 5100) and bedding layers (9005 and 9032; Fig. 2.2, section 5100) that contained a few sherds of Brill/Boarstall ware. An occupation deposit (9003, not illustrated) over the latest surviving floor contained two jet beads together with egg shell and fish bone in some quantity, suggesting the preparation or consumption of food (sample 5110).



Fig. 2.59 Hearth 9090, Building 6, view towards east, scale 1m

East side (external archway?)

Running along the immediate west side of wall 9209 that formed the original eastern extent of Building 6 was a stone-lined drain (9205, Fig. 2.60), which continued northwards in Trench 130 as drain 9424. Within Trench 129, the drain did not have a stone base, perhaps due to robbing; both the base and capping stones of the drain survived within Trench 130. Sherds of late medieval Brill/Boarstall ware were recovered from the fabric of drain 9424.



Fig. 2.60 Drain 9205, view towards south-east, scale 2m

Primary silting (9203 and 9423) survived in both sections, containing fish bone (samples 5165 and 5232) and a copper alloy pin. To the west of drain 9205 was a compact, 0.04m-thick gravel surface (9202), over which were thick deposits of dark grey silt, suggesting an exterior surface. To the north, in Trench 130, the drain was also abutted by a gravel surface which had been replaced on two occasions, the earliest of which (9410) was supported on a base of stone slabs and gravel, 0.06m thick. A similar sequence of external gravel and cobble surfaces was also present to the north, abutting the east side of Building 7 (eg 6108, 6424, 6103 and 4396), suggesting that these areas remained external. A bone tuning peg (Fig. 3.32, no. 39) and a decorated bowl (Fig. 3.3, no. 23) were recovered from an occupation deposit associated with these surfaces (6511).

Building 7

It is possible that this building or at least its southern room (Room 1) continued in use, though its northern part (Room 2) may have been demolished.

Room 1

Floor and occupation deposits abutting the threshold in Building 6 survived at the southern end of the room. These comprised a series of mortar, clay and gravel floors interleaved with thin and often charcoal-rich occupation deposits. Fragments of lead waste, spillage and droplets were recovered from gravel surface 9057 and silting layers 9052 and 9062 located within the southern part of the room and are indicative of small-scale lead working. A sample (5199) taken from charcoal spread 8876, possibly associated with nearby hearth 6381, contained largely beech charcoal, with a variety of other species, including oak, elm, ash, hawthorn type, blackthorn/cherry and hazel. A variety of fish bone was present in occupation deposit 9021 (sample 5114), including bones from a large cod and conger eel. Sherds of pottery in a variety of late medieval fabrics were present throughout these levels, suggesting a late 15th- to 16th-century date, and include a sherd from a finial (Fig. 3.4, no. 28) together with fragments of roofing tile of similar date and a fragment from a 'Stabbed Wessex'-type floor tile (6646; Fig. 3.18, no. 1). Two amber beads were recovered from contemporary deposits 8841 and 9021 together with a peg tile of 15th- to 16th-century date from the latter context. An iron knife was recovered from floor/demolition deposit 6585. A number of shallow pits or scoops were associated with this sequence of floors, one of which had a mortar-rich fill suggesting that it may have robbed a structural feature within the room. A shallow gully (9010) with a V-shaped profile was the latest surviving feature in this part of the room and may have blocked access into Building 6 to the south.

The northern part of the room continued to be occupied into the late 15th century, given the presence of several charcoal-rich occupation deposits associated with late medieval Brill/Boarstall ware which are likely to have been associated with nearby hearths. A large hearth or fireplace (6381) was added to the north-west corner of the room, constructed with pitched roofing tiles of 16th- to 17th-century date and edged by limestone flagstones to its north and south. It seems to have replaced an earlier, robbed hearth over which was a deposit of ash that contained charred processed grain, legumes and hearth fuel together with a quantity of fish bone (sample 4046). Sherds of late medieval Brill/Boarstall ware and Brill/Boarstall 'Tudor green' ware were also recovered from this deposit, suggesting a date in the late 15th century. A late demolition deposit (6586) within the room contained late medieval Brill/Boarstall ware and an iron spur (Fig. 3.32, no. 41).

Room 2

No features or deposits that can be attributed to the use of the north room of Building 7 during this phase were found. Nonetheless, it is possible that this part of the building continued to be used or at least remained standing into the early part of the phase. A cobbled yard (6102 and 3505) to its west seems to have been contemporary with the standing building or at least predates robbing of its walls. Similarly, garden soils (3494) began to develop to its north and were absent within the site of the building. Part of a cauldron in late medieval Brill/Boarstall ware was recovered from cobbled surface 6102 (Fig. 3.5, no. 35) and a decorated jug (Fig. 3.4, no. 33) and a condiment dish (Fig. 3.5, no. 37) were recovered from the garden soil together with roofing tiles dated to the 15th–17th century and much animal bone. Bone tuning pegs were recovered from both the yard surface and the overlaying silt layers (Fig. 3.32, nos 38–40). However, later cobbled surfaces of the yard (4260 and 3869) overlay the robbed east wall of the structure, suggesting that the room had been demolished by this time. A copper alloy buckle

(Fig. 3.31, no. 37) was recovered from one of the robber trenches (3940). The earlier surface (4260) contained a sherd of Tudor green pottery dated to the 15th or 16th century and a whetstone (Fig. 3.19, no. 3). A subsequent occupation layer above this surface (4194) produced the base and leg-stump from a further cauldron (Fig. 3.5, no. 38). The later surface (3869) contained roofing tiles dated to the 15th–16th century together with part of a glass beaker (Fig. 3.23, no. 1) A dump above this surface (3897, not illustrated) contained a large number of iron nails.

Subsequently, a number of rubbish pits were dug within the footprint of the room (6475, 6681 and 4057) which contained late medieval Brill/Boarstall ware, late medieval roofing tiles and animal bone waste. These formed part of a group of pits (Pit Group 15) located to the north of stone latrine Structure 11. Pit 3866 also contained a jetton of Edward III (1327–77) or Richard II (1377–99). A whetstone, a thimble and a horseshoe were found in pit 4330. At a later date, and after the west wall of Room 2 had been robbed, a large rectangular pit (3940=6394=6584) of uncertain function was dug through these pits. The pit measured *c* 4.9m x 2.2m and up to 0.82m deep and had been rapidly filled with mixed soil and redeposited natural. These deposits contained a large quantity of freshly deposited late medieval Brill/Boarstall ware pottery which together with single sherds each of Raeren stoneware and post-medieval redware suggests a mid-16th-century date. Though recorded as a possible robbed cellar, no features such as floor levels or evidence for a stone lining were found, though both may have been completely removed.

Structure 11

Structure 11, a stone-lined pit, was positioned near to the eastern boundary of the tenement and is likely to have served as a latrine. It was late in the sequence of pits and yard surfaces in this area. It may have been situated within a timber structure, the western extent of which was defined by a line of late postholes (including 4144, 4172, 4174, 4261 and 6104) that post-dated the robbing of the north room of Building 7. One of these pits contained a possible book cover fitting (Fig. 3.31, no. 32). Structure 11 measured 1.4m x 1.20m internally and *c* 1.3m deep and was lined with roughly squared limestone blocks. It was filled with a series of dark grey organic silts interleaved with dumps of ash and charcoal (fills 6582 and later, Fig. 2.61, section 4047), probably deriving from hearths, before finally being capped with clay and sand (6481–3, Fig. 2.61, section 4047). A sample (4065) taken from one of the lower fills (6573) contained a number of mineralised seeds including fig and blackberry/raspberry, probably derived from faecal deposits.

The pit also contained a large amount of late medieval pottery throughout, which can be dated to the late 15th to mid-16th centuries (Fig. 3.6, nos 40–6 and Fig. 3.7, nos 48 and 53). The majority comprised late medieval Brill/Boarstall ware, including bunghole cisterns, with smaller proportions of Tudor table wares such as cups in Raeren stoneware and Cistercian ware. The dating corresponds with the large quantity of roof tiles present, most of which can be broadly dated to the 16th–18th centuries. The metal finds included several pins and lace tags and, from a lower fill (6510), a lead spoon (Fig. 3.31, no. 29) inscribed with a maker's mark. Several notable stone objects were also recovered from the pit, including an octagonal lamp (SF 3098; Fig. 3.22, no. 16), a large bowl (Fig. 3.22, no. 13) and a whetstone (Fig. 3.19, no. 2). Kitchen waste, particularly fish bone, was present throughout the pit. The animal and bird bone included goose, hare and deer. The uppermost fill (6457) contained a large quantity of marine shell, largely oyster but also including some cockle and mussel.

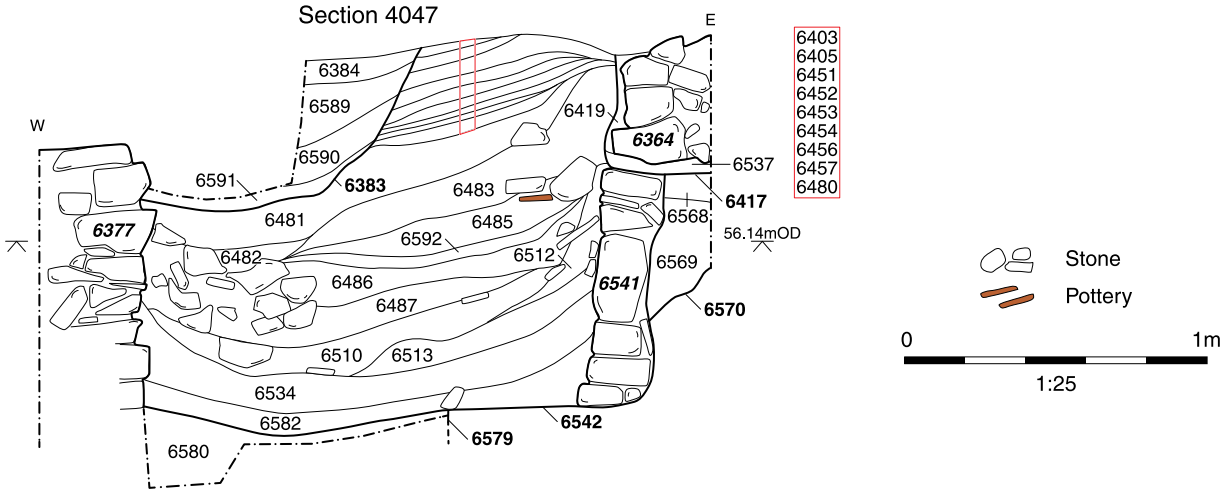


Fig. 2.61 Section 4047

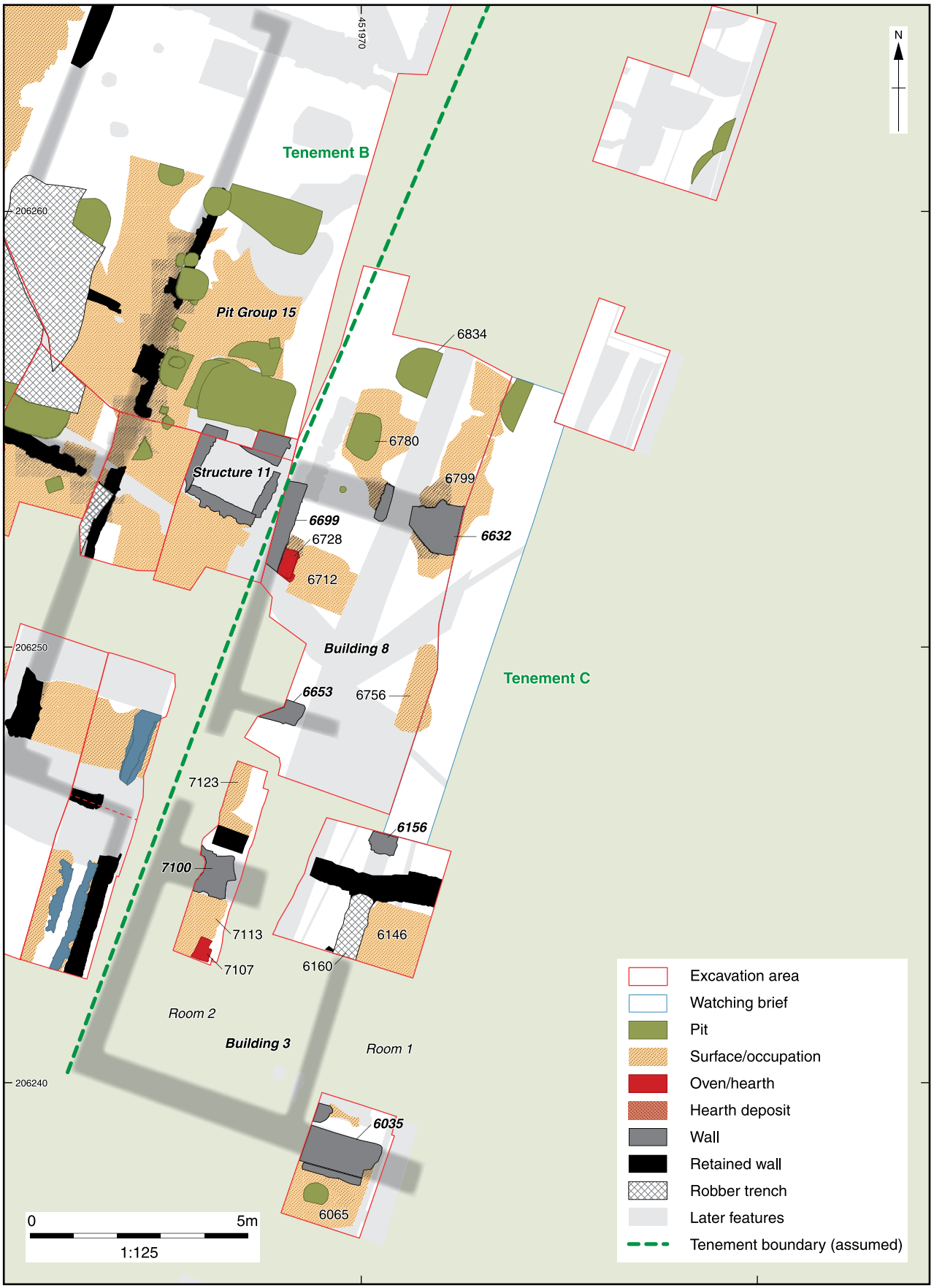


Fig. 2.62 Phase 6: Tenement C

Tenement C

Building 3

As with the buildings to its west, Building 3 may also have been rebuilt, though there is uncertainty given the sporadic nature of the surviving evidence (Fig. 2.62). At some point its south wall was replaced by a substantial limestone foundation (6035), measuring 1.7m wide, that was faced on its exterior (southern) side with squared limestone blocks bonded with yellowish brown sandy mortar (Fig. 2.63). The wall cut a demolition deposit likely to have been associated with the removal of the earlier wall (see Phase 5, wall 6141) which contained pottery dated to the late 15th to mid-16th century together with a copper alloy stylus (Fig. 3.31, no. 35) and a bronze pin. The wall was recorded as built freestanding and directly above the earlier street surfaces. It was abutted by a sequence of presumably external deposits to its south consisting of rough cobble surfaces (eg 6065) interleaved with refuse-rich deposits that presumably pertained to the use of the highway. These deposits contained a considerable quantity of pottery dated to the late 15th to mid-16th century, suggesting the wall was late medieval in date. The pottery included a stamped mug in Brill/Boarstall 'Tudor green' ware (6056, Fig. 3.7, no. 56) and sherds of Andalusian lustreware (6089; Fig. 3.7, no. 52). The north wall of the putative rebuilt building may have been denoted by substantial wall fragment 7100, though this was not present to the east in Trench 105, so was perhaps the foundation for an internal installation such as a staircase or chimney. It may be that the original north wall of the building was retained, as the presence of a robber trench (6160) abutting this wall implies it was not rebuilt, at least at foundation level. Indeed, it may have been extended northwards to join Building 8 (see below).

The hearths in the west room (see Phase 5, Room 2) were replaced on a third occasion with hearth 7107 (Fig. 2.64), which survived as a dressed limestone stone slab surface with a limestone block surround. A decorated Stabbed Wessex-type floor tile fragment was recovered from a bedding deposit for the hearth (7115, Fig. 3.18, no. 2). Above the hearth surface was a thin charcoal-rich silt (7114) which contained a sherd of Brill/Boarstall 'Tudor green' ware of late 15th- to 16th-century date together with a quantity of fish bone (sample 5002). The hearth was abutted by a compact, creamy white mortar floor (7113) that had been replaced on at least one occasion and by an ash/charcoal-rich occupation deposit that contained a fragment of roofing tile dated to the 15th century or later.

Within the east room (Room 1) was a lightly gravelled surface (6158) that predated the robber trench (6160) and lay between two charcoal-rich deposits. The earlier deposit (6159) contained two sherds of Brill/Boarstall 'Tudor green' ware and fish bone (sample 4013) whilst the later deposit (6146) contained a large part of a late medieval Brill/Boarstall ware jug of 15th- to early 17th-century date together with an iron chisel (Fig. 3.31, no. 27).



Fig. 2.63 Wall 6035, Building 3, view towards east, scale 1m



Fig. 2.64 Floor 7113 and hearth 7107, Building 3, view towards south, scale 1m

Building 8

A building is assumed to have existed to the north of Building 3 as implied by the presence of stone-built hearth (6728) and rake-out deposits surviving in an adjacent hollow. The hearth was built against a pre-existing wall foundation (6699) that presumably represented the west wall of the building. Its south wall may have denoted by wall 6653, though this had a yellowish sandy mortar, in contrast to wall 6699 which was bonded by clay. The northern wall of the building, if contemporary, may have been represented by a 0.55m-deep rubble foundation (6632), though this was bonded by a pale buff lime mortar, differing from the other foundations. Roofing tile dated to the 16th to 18th centuries was recovered from this foundation together with large and fresh sherds of late medieval Brill/Boarstall ware. Possible clay surfaces (6756 and 6799) and trampled occupation deposits within the remaining area of the building may be contemporary with its construction rather than the use of the building. A stone mortar (Fig. 3.21, no. 10) was found in a rubble dump (6788) overlying the surface and an iron knife was recovered from floor 6799 (Fig. 3.31, no. 28). These levels sealed two pits (6780 and 6834), both of which contained a few sherds of 15th–16th-century pottery. Pottery of similar date was recovered from the trampled deposits and a roof tile dated to the 16th–18th centuries was also recovered from surface 6756. A horseshoe was recovered from pit 6834.

The largely robbed hearth (6728) survived as fire-blackened limestone slabs overlain by a thick charcoal-rich silt (6640) that filled a hollow to its east. The deposit contained sherds from late medieval Brill/Boarstall ware jugs and charred barley and free-threshing wheat grains, together with food debris including legumes and fish bone (sample 4078) and two bronze pins. Charcoal from the deposit was mixed but was mostly beech and oak, together with elm, ash, holly and hawthorn type. The base of the hearth was replaced on two occasions with limestone slabs associated with spreads of charcoal that contained a similar assemblage of food remains (sample 4076). Also recovered from the deposit were further sherds of 15th–16th-century pottery, 16th–17th-century roofing tiles, a pair of scissors and a copper alloy dress buckle.

It is unclear whether the area between Buildings 3 and 8 remained external. It is possible that wall fragment 6156 may have formed part of an adjoining room, though the deposits to its west appear to have been of an external nature. This included a surface of large limestone cobbles (7123) overlain by a thick grey silt layer containing pottery and roofing tile fragments dated to the 15th–16th century. Above this was patchy clay surface similar to that found within in Building 8 which contained Cistercian ware and roof tile fragments, which together suggest a 16th-century date.

Site of the cemetery

This phase saw increased activity (Fig. 2.54). A large rectangular pit (3100, Fig. 2.11, section 3008) cut through the underlying graves suggests that the burials within the cemetery had either been forgotten or were deemed not of importance. The pit measured 4.8m x 2.8m and 1.2m deep, its large size suggesting that it served as a gravel quarry (Fig. 2.65). It was rapidly backfilled with redeposited natural (3162 and 3174) and garden soils (3124 and 3172; Fig. 2.11, section 3008). The fills contained a large quantity of human bone derived from the graves that the pit had removed, together with Brill/Boarstall ware pottery and a large quantity of medieval roofing tiles, many of which are 14th-century glazed ridge tiles. A sherd of Tudor green ware of 15th- or 16th-century date was recovered from its upper fill (3172). A shallow ditch or gully (3527; Fig. 2.11, section 3008) was subsequently cut across the infilled pit. This produced a possible pantile of late 16th- or 17th-century date (Fig. 3.17, no. 2) and an iron knife (Fig. 3.33, no. 43).

Ditch 5 (Fig. 2.66) was a major boundary that possibly demarcated the bounds of Magdalen



Fig. 2.65 Pit 3100, view towards east, scales 2m and 1m



Fig. 2.66 Boundary Ditch 5, view towards west, scale

College after it was founded in 1457. It respected the rear extent of Tenement A and probably continued eastwards along the rear of Tenements B and C. Its western extent would have respected the eastern edge of the precursor to Longwall Street, though no evidence for the street itself was found in the watching brief. The ditch had steep sides and a narrow base, measuring between 1.9 and 2.0m wide and up to 1.4m deep (3399 on Fig. 2.11, section 3008), and cut a thin garden soil (3170) that had developed over pit 3100. Its basal fills (3434=3486/3493 and 3433) contained a group of pottery dated to the late 15th to mid-16th century, including a condiment dish in late medieval Brill/Boarstall ware (Fig. 3.7, no. 50), a mug in Brill/Boarstall 'Tudor green' ware (Fig. 3.7, no. 49) and a South Netherlands maiolica vase fragment (Fig. 3.7, no. 51). Also found in these fills was an iron padlock key (SF 3019) and a quantity of animal bone. The ditch seems to have been rapidly backfilled with stone rubble, clay and soil (3495, 3488 and 3478) and was subsequently recut on a smaller scale as Ditch 6 immediately to the south (3480; Fig. 2.11, section 3008). The later ditch was up 1.2m wide and 0.50m deep with steep sides and a flat base. The only finds recorded were disarticulated human bone derived from the underlying graves that it cut. Both ditches were levelled with clay (3479) after which a further garden soil developed (3425; Fig. 2.11, section 3008).

PHASE 7 (LATE 16TH TO MID-17TH CENTURY)

Survival of post-medieval levels

Post-medieval levels did not survive within the footprint of the New Library, having been previously truncated during the reduction of its floor during the conversion of the former Magdalen College School in 1931 (Fig. 2.67). Consequently, *c* 16th-century floor levels of the medieval frontage buildings (Phase 6) lay immediately below the foundation level of the modern floor slab and later levels did not survive (Fig. 2.2, sections 5010, 5030, 5031 and 5080). Therefore, it cannot be determined whether some or all of the buildings along the frontage remained in existence, though it may be assumed that any post-medieval modifications were not substantial and did not leave any surviving evidence. Hence, these buildings are likely to have remained in existence until the construction of the former Magdalen College School in 1849–51. Similarly, it is likely that further truncation occurred in the area to the north of the New Library as a result of post-medieval gardening and later activity.

Due the lack of surviving deposits or activity, particularly within Tenements A and B, there are no recognisable boundaries between the two tenements nor any clear evidence for their (northern) rear extents. Similarly, the ubiquitous post-medieval garden soils that were present towards the rear of the two tenements (largely mechanically excavated) were not distinguishable either between the two tenements or the site of the former cemetery to the north. Pottery from these soils was mainly late 16th and 17th century (3872, Fig. 3.8, no. 59; 3213, Fig. 3.8, no. 60). A copper alloy strap-end and an iron hinge pivot were found in garden soil 4118 and a farthing of Charles I, struck in 1625–9, in garden soil 6529. Cutting these soils were a group of irregular pits, possibly bedding or planting pits, which remained largely unexcavated. A worn groat, probably of Henry VIII and dating to 1526–44, was recovered from the fill (3206) of pit 3229 together with a medieval crested ridge tile (Fig. 3.17, no. 5) and sherds of late 16th- to early 17th-century vessel glass including a beaker (Fig. 3.23, no. 4).

Tenement A (The Greyhound Inn)

The only surviving feature that may date to this phase was a square stone 'plinth' (3564) surviving as a freestanding limestone foundation, measuring 1.0m x 1.1m, that was abutted by garden soils. Part of a Frechen stoneware jug and two 17th-century clay pipe stems were recovered from its foundation. It may have supported an ornament or similar feature within the garden.

Tenement B

A possible stone-built structure was added along the eastern side of the tenement against the boundary with Tenement C, though the area to its north remained external and used for pitting (Pit Group 17).

Building 7

It is possible that the south room (Room 1) of Building 7 may have also continued in use with a possible addition on its east side. This addition was represented by limestone wall foundation 6416, which cut into the backfills of latrine Structure 11 (see Phase 6) and abutted possible tenement boundary wall 6364 (Fig. 2.61, section 4047) that had been built up against Building 8 in Tenement C. Abutting the south side of wall 6416 was a roughly paved limestone surface (6365), though it is unclear whether this was an internal floor or an external yard surface. Abutting the north side of wall foundation 6416 was a series of makeup deposits and possible floor deposits (6456–6403; Fig. 2.61, section 4047) that predated later boundary wall 6364. These deposits were cut by pit 3772/6383, implying that this area, if ever internal, later became external.

Pit Group 17

This comprised five shallow, rectangular rubbish pits located to the north of Building 7 that formed a

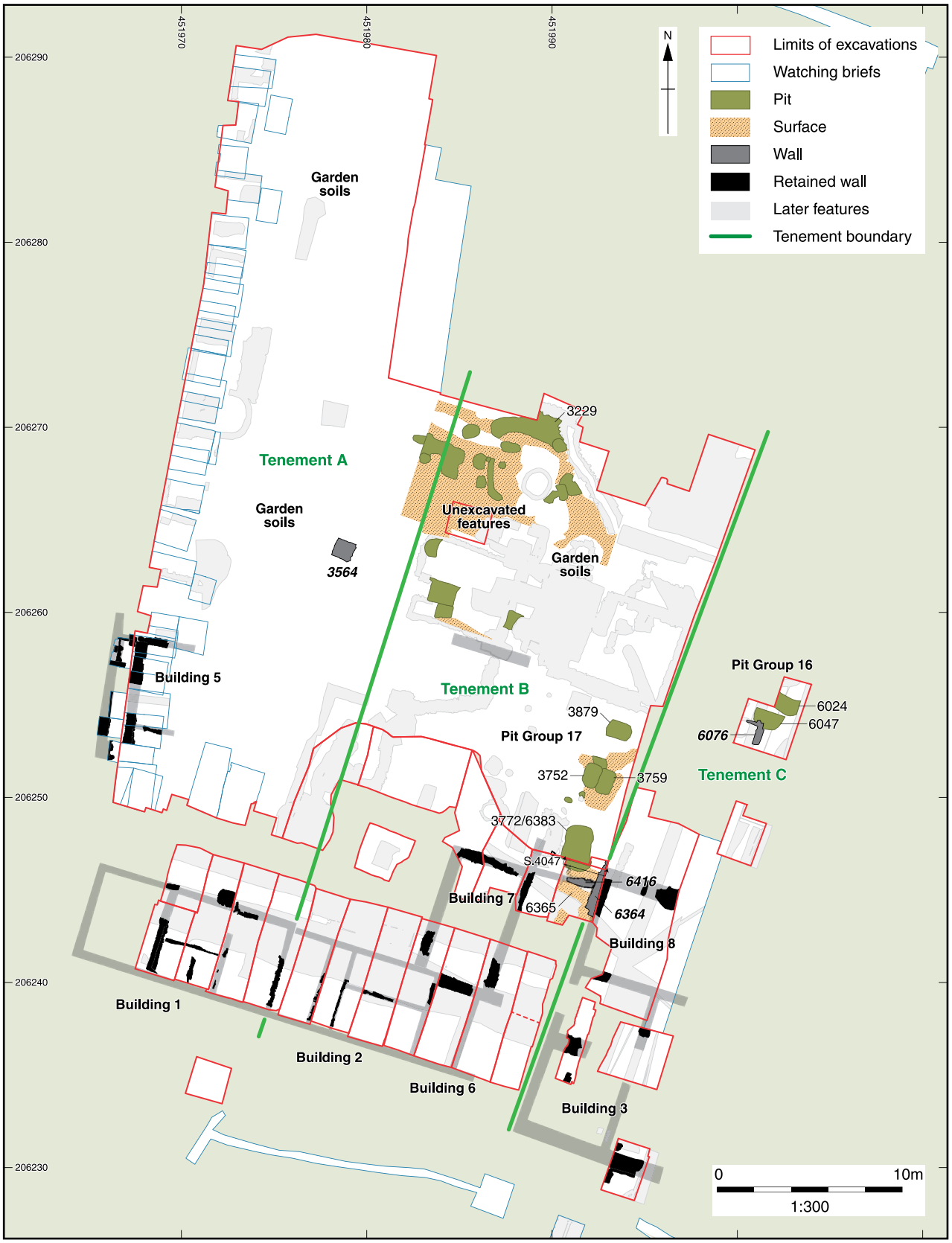


Fig. 2.67 Phase 7

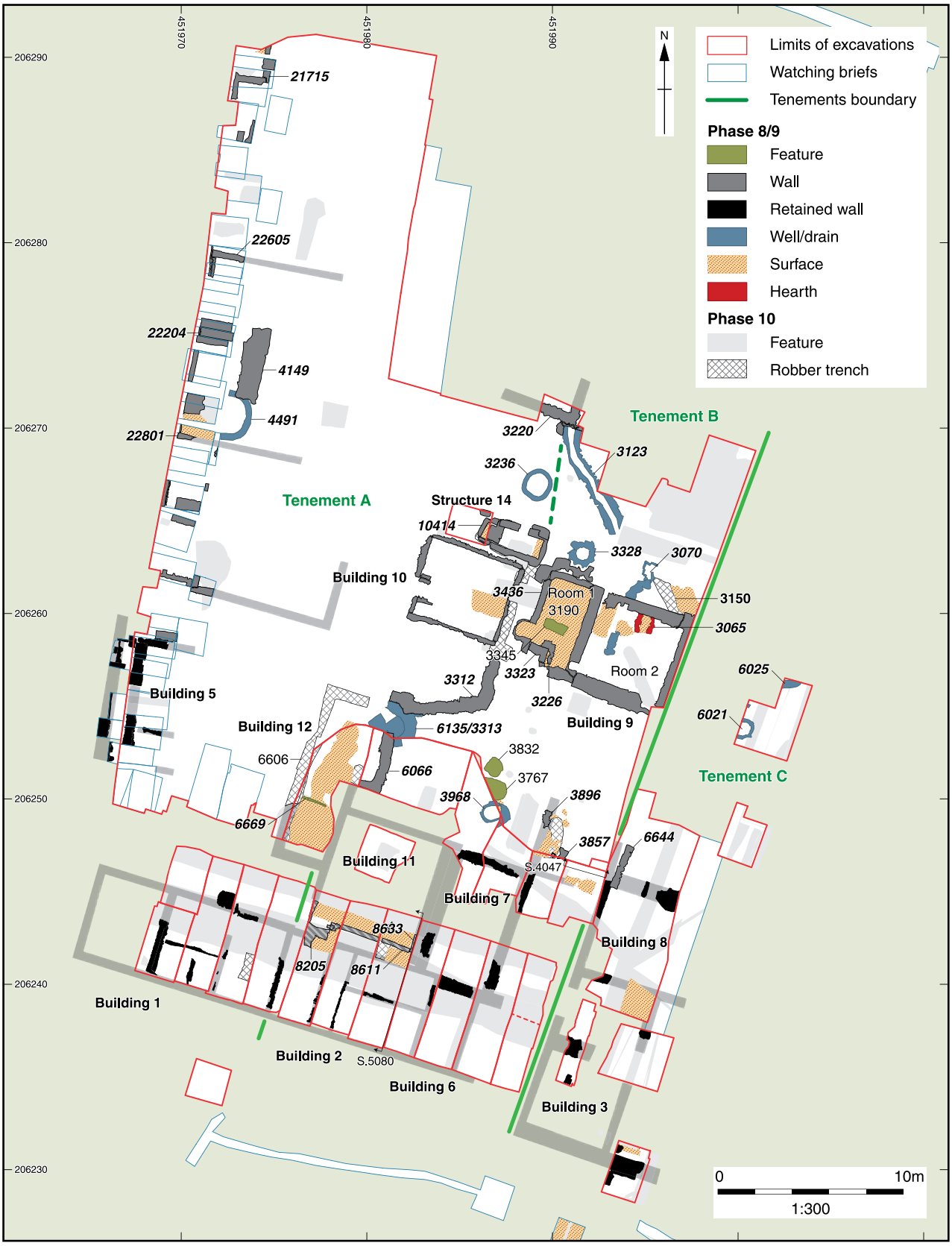


Fig. 2.68 Phases 8–10

cluster situated close to the boundary with Tenement C. Pit 3752 was notable for containing the near-complete profile of a highly decorated Bartmann face jug dating to the late 16th or early 17th century (Fig. 3.8, no. 61). Also found in the same pit fill was an assemblage of late 16th- and early 17th-century glass drinking vessels including jugs and beakers (Fig. 3.23, no. 3). Vessel glass of a similar date was also found in pits 3759 and 3772/6383 (Fig. 2.61, section 4047), along with several copper alloy lace tags and pins. Pit 3772/6383 contained parts of a large bowl or pancheon (Fig. 3.10, no. 65) and a lugged costrel (Fig. 3.10, no. 64) together with a buckle and two buckle frames, a copper alloy finial (Fig. 3.33, no. 42) and a decorated floor tile (Fig. 3.18, no. 5). This pit also contained large quantity of animal bone, probably kitchen waste, that included fallow deer, hare and rabbit.

Tenement C

Activity that can be dated to this phase was confined to the north end of the tenement in Trench 103 and comprised several pits (Pit Group 16) and a stone-lined feature, possibly a latrine. The earliest pit (6047) contained roofing tile dated to the 17th or 18th century and an iron knife. This was cut by a probable stone-lined pit (6076) that was subsequently infilled with pottery dated to the early to mid-17th century. A garden soil that abutted the structure contained a Frechen stoneware mug with 'Adam and Eve' decoration (6020, Fig. 3.9, no. 62). Pit 6024 also contained 17th-century roofing tile together with a large quantity of animal bone and a hinge pivot.

PHASES 8 AND 9 (LATE 17TH TO EARLY 19TH CENTURY)

This phase saw renewed activity towards the rear of Tenement B with the construction of further stone buildings (Buildings 9 and 10) and structures (Structure 14) together with associated wells and drains (Fig. 2.68). The new buildings correspond to structures first depicted on Loggan's map of 1675. Within Tenement A, a number of otherwise undated wall foundations recorded during the watching brief alongside Longwall Street may also belong to structures depicted on the 1675 map.

There is evidence that Tenement A (now the Greyhound Inn) had acquired part of Tenement B along its north side suggested by limestone wall foundation 3312 which dog-legged about 4m eastwards into the adjacent tenement. This dog-legged boundary is clearly depicted on Holdsworth's plan of Magdalen College of *c* 1728 (Fig. 6.5) and Taylor's map of Oxford of 1750 (Fig. 1.4). The boundary wall was aligned with the east walls of Building 10 and Structure 14 implying that both were contained within Tenement A.

Tenement A (The Greyhound Inn)

Building 12

This building had largely been robbed, though its outline closely corresponds to a long rectangular structure depicted on Holdsworth's plan of *c* 1728 (Fig. 6.5). Only part of its east wall survived within the areas excavated, and this partially lay over the wall of well 6135/3313 in Tenement B (see below). It was not clearly established whether the well remained in use, though this is possible if the surviving east wall (6066; Fig. 2.69) originated as a boundary wall and the well was shared between the two tenements. If so, then Building 12 had been constructed against a pre-existing boundary wall.

In its earliest phase the building was floored with compacted gravel that was supported upon a layer of sand which contained clay pipes dated to *c* 1660–80 and late 17th- to early 18th-century wine bottle



Fig. 2.69 Wall 6066, Building 12, view towards south, scale 2m

fragments. The building was subsequently subdivided by a timber partition (6669) of which the remains of the decayed beam were still discernible. Later gravel floors, levelling and trampled deposits contained wine bottle fragments, pottery (Fig. 3.12, no. 76) and clay pipes of late 18th- to early 19th-century date.

Building 10

Building 10 (Fig. 2.70) was a near-square cellared structure, located 1.4m to the west of and separate from Building 9 and corresponding to a building depicted on Holdsworth's plan of *c* 1728 (Fig. 6.5). It was built adjacent to the west side of boundary wall 3312, which had been robbed at this point. This suggests that the structure was located within Tenement A, which had encroached eastwards. The structure measured 4.8m x 4.2m and survived to a depth of *c* 1.0m. It was lined with narrow (*c* 0.30m wide) walls of limestone blocks that were roughly faced on their internal face with adhering plaster surviving. It is likely that the foundations of the above-ground building that the cellar lay within



Fig. 2.70 Buildings 9 (Room 1) and 10 and boundary wall 3312 under excavation, view towards north



Fig. 2.71 Structure 14, view towards south, scale 0.5m

were wider but did not survive. Wine bottle fragments of mid-18th-century date were recovered from the fabric of its east wall. There was an entrance on the west wall flanked by the remains of a projecting stairwell on its internal side which would have allowed access from within Tenement A. This was later rebuilt in red brick using an English bond, a method of construction common prior to the 19th century. There was no convincing evidence for a floor; any stone slabs may have been robbed before the cellar was infilled.

Structure 14

This was a large, rectangular, limestone-lined pit that measured *c* 3.0m x 1.0m and 0.65m deep (Fig. 2.71), built immediately to the north of Building 10. There was no evidence that it served as a latrine, and it was perhaps used for storage, as it had an entrance in its north wall. The structure underwent several modifications including a reduction in length with the addition of wall 10414 at its west end.

Located immediately to the north of Structure 14 and possible contemporary was well 3236, which was constructed with brick and limestone blocks.

Structures to the west

The watching brief alongside Longwall Street revealed a number of limestone wall fragments predating the existing mid-19th-century boundary wall associated with Magdalen College School. Though there was little direct dating evidence, those located immediately to the north of medieval Building 5 were located fully within the outline of a structure depicted on Holdsworth's plan of *c* 1728 (Fig. 6.5). To the north a stone-lined latrine (21715) may have served a second building depicted on the plan. The area between the two buildings is shown as open by Holdsworth, and it is probable that stone-lined well 4491 dates to this period. By the time of Taylor's map (1750), further buildings were constructed, of which walls 22605, 22801, 22204 and 4149 probably formed part.

Tenement B

Building 7

It is possible that the earlier eastward extension of Building 7 was extended further northwards given the presence of wall fragments (3857 and 3896) and possible occupation deposits that had slumped over Phase 7 pit 3772/6383. The upper levelling of the pit contained mid- to late 17th-century pottery and part of an 18th-century glass flask or bottle (Fig. 3.23, no. 5). A grindstone was found in wall 3857 and a locking buckle (Fig. 3.34, no. 45) was recovered from a possible clay floor that abutted wall 3896.

Building 9

This building (Figs 2.70 and 2.72) was formed of two rooms, the eastern room of which (Room 2) was apparently a later addition. The smaller western room (Room 1) was rectangular measuring 3.6m x 2.2m internally, and had a protruding alcove on its west wall, probably the site of a hearth. There was an opening in the south wall for a *c* 1.3m-wide doorway with evidence for a stone-built threshold (3226) and possible subsequent blocking wall (3323). A pocket-knife (Fig. 3.34, no. 44) was recovered from the threshold. The walls were built with limestone rubble which was roughly faced on the internal sides and bonded with brown-orange sandy mortar. A counterstruck Nuremberg jetton dated 1586–1635 was found embedded in its south wall. A medieval crested ridge tile (Fig. 3.17, no. 4) was reused in its west wall (3436) and an iron looped clasp was found within its north wall. Parts of three Bellarmine jugs were incorporated in the possible blocking wall (3323).

The earliest deposit within the structure (3372), a soft grey-brown silt, lay largely below impact level, though a complete clay pipe bulb dated to 1660–80 was recovered (Fig. 3.38, no. 3). This was overlain by a more floor-like and firm yellow-grey sandy silt (3376) in which a copper alloy thimble was found. This deposit supported a further floor of compact gravel with lenses of charcoal (3350) that contained fresh pieces of clay pipe possibly dated to 1670–90, 17th-century pottery, late 17th- to early 18th-century wine bottle fragments and a spade iron. Cutting this floor was a rectangular pit (3345), at least 0.29m deep, filled with loose gravel and charcoal, which contained a large circular grindstone (Fig. 3.19, no. 4). Remnants of later gravel surfaces overlay the pit and supported an extensive deposit of charcoal-rich silt (3270), 0.02m thick, that covered the entire area of the building. This deposit probably represented sweepings from a hearth or fireplace within the structure, possibly freestanding within the alcove, the remains of which did not survive. It contained 17th-century pottery, including a large part of a dripping dish that suggests the cooking of meat was undertaken within the room, together with fragments of late 17th- to early 18th-century wine bottles.



Fig. 2.72 Detail of Buildings 9 and 10, view towards west, scales 1m and 2m

The larger east room (Room 2) measured 4.5m x 4.0m internally and appears to have been a later addition to the building. It overlay a pre-existing stone-lined drain (3123), which had been partially robbed prior to the construction of the north wall of the building. The backfill of the robber trench (3150) contained roofing tile and brick fragments dated to the 16th–18th centuries and a post-medieval chafing-dish fragment. To the north, the drain still had its capping stones surviving and contained a silt fill from which 17th-century pottery and a clay pipe stem of late 17th- to early 18th-century date was recovered. It is possible that drain 3123 was diverted southwards as drain 3070 which was built into and passed through the north wall of the building. The limestone rubble wall foundations of the room were of a similar construction to Room 1, employing a brown-orange sandy mortar. There was little evidence for internal deposits apart from a clean, fine sand surviving within its north-west corner, possibly bedding for a stone floor that had been removed. A small stone-built structure (3065) was added against the internal side of the north wall and was possibly the base of a hearth or fireplace. No evidence for heating was observed, though there was a deposit of fine ash within it.

Room 1 of the building, at least, appears to have been demolished during the mid- to late 18th century, as attested by a 0.35m-thick silty sand dump (3190) that overlay the latest occupation deposits. This was notable for containing 3626 wig curlers, the largest assemblage ever found on an archaeological excavation in this country, though it cannot be determined whether they were *in situ* or dumped from elsewhere within the tenement. Clay tobacco pipes from the deposit date no later than the late 18th or early 19th century, one of which dated to *c* 1750–90 (SAM RODEN), and a large quantity of table ware pottery perhaps dated from *c* 1780–1830 (Fig. 3.12, nos 73 and 74). In addition the deposit contained wine bottle glass that probably dated to the mid- to late 18th century. This includes two pieces with seals for Magdalen College Common Room, one of which carries the date 1769 (Fig. 3.23, nos 8–9), providing a *terminus post quem* for the destruction of the building. Another bottle seal bears the initials 'R·H' (Fig. 3.23, no. 7). Also present were ceramic and stone roofing tiles, fragments of window came, a lock plate and a knife with an antler handle (Fig. 3.35, no. 48).

Building 11

This was a cellar attached to the north side of Building 2. It respected the west side of Building 7, which was presumably still standing. Only its southern extent was available for investigation, though its outline corresponds with a structure depicted on Holdsworth's plan of *c* 1728 (Fig. 6.5). The cellar measured 5.6m across internally and probably extended for a similar distance to the north, as attested by the 1728 plan. The cellar survived to a depth of 1.05m (walls 8611 and 8633; Fig. 2.2, section 5080) and had an entrance on its south side, presumably leading from Building 2, though only the stone slab threshold (8205) survived robbing. The walls were constructed with large, squared limestone blocks bonded with



Fig. 2.73 Interior of well 6135/3313, with detail showing rope marks, view towards south-east, scale 2m

orange-brown sandy mortar and had traces of render on the inside faces. The cellar was floored with limestone slabs on a bed of mortar, though there was evidence for earlier mortar floors. Wine bottle fragments of mid- to late 18th-century date, clay pipes and pottery including a tea bowl and a sugar/slop-bowl (Fig. 3.9, no. 63; Fig. 3.11, nos 71 and 72) were found within makeup deposits and the possible mortar floors below the stone slab floor. A charcoal-rich silt (8409) above the stone floor contained pottery dated to 1820–60 together with a marked clay pipe stem dated 1740–80 (Fig. 3.38, no. 4), indicating that the cellar was still in use shortly before its demolition in 1851, when the Magdalen College School was built.

Wells and other features

Built into boundary wall 3312, but apparently predating the east wall of Building 12, well shaft 6135/3313 remained open to a depth of *c* 2m (Fig. 2.73). It was well constructed with ashlar limestone blocks and had been capped with limestone slabs after its disuse. There were rope marks worn into the sides of the well. It is likely to have gone out of use prior to the construction of the Magdalen College School playground, as backfills 3377–8 contained a large group of pottery and wine bottles dated to the late 18th or early 19th century, the pottery including tankards and a sauceboat (Fig. 3.12, nos 75, 77 and 82), together with a medieval copper alloy ring (Fig. 3.35, no. 46), an iron hinge plate, a drop handle (Fig. 3.35, no. 47) and a bone brush. Well 3328 was located immediately north of Building 8 and predated its construction. It was perhaps once enclosed within a wellhouse, since a contemporary wall foundation was present between the two structures. The well shaft, measuring 0.70m in diameter, was constructed with roughly dressed limestone blocks and excavated to a depth of 0.52m. The well backfill contained a clay pipe stem of late 17th- or early 18th-century date together with 17th-century pottery and bricks. Well 3968 was in an open area immediately north of Buildings 7 and 11 (Fig. 2.74) and was still open when revealed but capped with stone slabs. It was sited adjacent to two rubbish pits (3767 and 3832), the former of which contained flowerpots (Fig. 3.11, nos 66–8) and wine bottle glass dated to the early to mid-18th century; this included a bottle seal with the initials 'R·H' (Fig. 3.23, no. 6), comparable to the example from Building 9.



Fig. 2.74 Well 3968, view towards south-west, scale 1m

Tenement C (Magdalen College stables)

There is very little surviving evidence during these phases, all of which was confined to the northern part of the tenement. It is likely that this tenement had been turned into Magdalen College stables by 1772 (Salter 1914, 151, fn 1), which would have resulted in the demolition of Buildings 3 and 8. Wall 6644 may have been a late boundary between Tenements B and C and seems to have projected from the north-west corner of Building 8, though its relationship with the building was not clearly established. A 19th-century brick was built into the wall – though this could have been a later repair –

together with part of an earlier (mid-16th–earlier 17th-century) glass beaker or goblet (Fig. 3.23, no. 2). The line of the wall corresponds closely with a property boundary depicted on Holdsworth's plan of *c* 1728 (Fig. 6.5) and the wall was probably retained as the boundary between Tenement B and the college stables. To the north were two stone-lined wells (6021 and 6025). Late 18th-century clay pipes were recovered from the construction trench of well 6025 and mid- to late 17th-century clay pipes were found in the construction trench of well 6021. The backfill of well 6021 contained a fragment of a 19th-century sewer pipe.

PHASE 10 (MID-19TH CENTURY AND LATER)

The construction of Magdalen College School (completed 1851) would have resulted in the demolition of Tenements A (the Greyhound) and B. Though it is not certain if all the earlier buildings were still standing by this time, infills of the cellared buildings (Buildings 10 and 11) and the surviving demolition deposits and robber trenches of Building 12 contained pottery, bottle glass and clay pipe fragments that could be dated to the first half of the 19th century (Fig. 3.12, nos 78 and 79; Fig. 3.38, no. 6). For example, the cellar of Building 10 was infilled with rubble that contained clay pipes dated to *c* 1820–60, a large fragment of a ceramic sewer pipe and a bone brush (Fig. 3.36, no. 57). Similarly, a few sherds of pottery that could be dated to the first part of the 19th century were recovered from the backfill of the cellar of Building 11. A rum jar dated to the mid-19th century and a residual medieval book clasp were recovered from the robber trench that removed the west wall of Building 12 (6606) and clay pipe fragments dated to 1820–30 were recovered from a demolition deposit associated with it (6621). This deposit also contained metal objects including a copper alloy tap and a handle (Fig. 3.36, nos 49–50) and two shoe pattens (Fig. 3.36, no. 51). The infill of Structure 14 contained two long-handled brushes of bone (Fig. 3.36, no. 54), a knife with a bone handle (Fig. 3.36, no. 53) and a rowel spur (Fig. 3.36, no. 55) together with ceramic table ware dated to 1830–40.

Chapter 3

Artefactual Evidence

POTTERY *by Paul Blinkhorn*

Methodology

The pottery was initially bulk-sorted and recorded on a desktop computer using DBase IV software. The material from each context was recorded by number and weight of sherds per fabric type, with featureless body sherds of the same fabric counted, weighed and recorded as one database entry. Feature sherds such as rims, bases and lugs were individually recorded, with individual codes used for the various forms. Decorated sherds were similarly treated. In the case of Anglo-Saxon and medieval rim sherds, the form, diameter and the percentage remaining of the original complete circumference were all recorded. This figure was summed for each fabric type to obtain the estimated vessel equivalent (EVE).

The terminology used is that defined by the Medieval Pottery Research Group's *Guide to the classification of medieval ceramic forms* (MPRG 1998) and to the minimum standards laid out in the *Minimum standards for the processing, recording, analysis and publication of post-Roman ceramics* (MPRG 2001). All the statistical analyses were carried out using a DBase analytical package written by the author, which interrogated the original or subsidiary databases, with some of the final calculations made using an electronic calculator. Any statistical analyses were carried out to the minimum standards suggested by Orton (1998–9, 135–7).

The assemblage

The post-Roman pottery assemblage comprised 13,185 sherds with a total weight of 217,746g. The late Anglo-Saxon and medieval material was recorded using the conventions of the Oxfordshire County type-series (Mellor 1994), and the post-medieval wares using the conventions of the Museum of London type-series (Vince 1985). The range of fabric types suggests that there was more-or-less unbroken activity at the site from the late Anglo-Saxon period onwards (Table 3.1). It is typical of sites in the city other than a few rare medieval regional and continental imports. Their possible significance is discussed in detail below. In addition, 13 sherds (314g) of residual Romano-British pottery were noted.

Qualitative and quantitative analysis and chronology

A total of 1390 contexts produced post-Roman pottery, with the average sherds per context being 9.5 and the average sherd weight 16.5g. In all, just over 75% of the context-specific groups comprised ten or fewer sherds, with 32 producing more than 50, of which eight had over 100 sherds. Nearly 69% of the assemblages each weighed under 100g in total, with 37 (2.7%) weighing over 1kg. Of these, three had between 2000g and 3000g of pottery, and nine had over 3000g.

Each stratified, context-specific pottery assemblage was given a ceramic phase (CP) date based on the range of ware and vessel types present and, if necessary, adjusted according to the stratigraphic matrix. The chronology, defining wares and the amount of pottery per phase is shown in Table 3.2. The occurrence of the major fabrics per ceramic phase is shown in Table 3.3. The number of sherds per context expressed as a percentage of each phase assemblage is shown in Table 3.4. Table 3.5 shows the medieval vessel occurrence by EVE, expressed as a percentage of the CP assemblage.

The data in Table 3.2 shows that, as the range of fabric types present suggests, there was activity at the site from the late Anglo-Saxon period onwards, with large amounts of material deposited throughout the medieval period. There was then something of a drop-off in pottery deposition from CP PM2 until CP PM6 and the modern era (late 18th century onwards).

The data in Table 3.3 shows a fairly typical pattern of pottery consumption by ware type for post-Roman sites in the city of Oxford. Residual material is present in moderate quantities from CP M3 onwards, with the proportion of redeposited pottery being very high in the post-medieval groups CP PM1, PM2, PM4 and PM5, and also in the MOD groups, indicating there was fairly considerable disturbance of earlier strata at those times.

The data in Table 3.4 shows that the largest context-specific groups of pottery were mostly of medieval date, although some post-medieval and modern assemblages were fairly large as well.

The data in Table 3.5 shows a fairly typical overall pattern for medieval sites in the city of Oxford. The late Anglo-Saxon assemblage comprised entirely jars and bowls, as did the Saxo-

Table 3.1: Pottery types and quantifications

Fabric	*Common name*	*Date (AD)*	*No. sherds*	*Weight (g)*	*EVE*
Medieval					
BATH	Bath 'A' ware	Late 11th–12th century	3	3	0
CSTN	Cistercian ware	1470–1600	32	511	0.71
OXAC	Cotswold-type ware	975–1350	1518	18,072	9.62
OXAG	Ashampstead-type ware	Late 11th–14th century	59	972	0.68
OXAM	Brill/Boarstall ware	1200–1600	4733	65,136	39.35
OXB	Oxford shelly ware	Late 8th–early 11th century	3	36	0.05
OXBB	Minety-type ware	Early 13th–16th century	7	137	0.08
OXBC	Brill/Boarstall 'Tudor green' ware	1475–1600	99	817	1.25
OXBF	Kennet Valley A ware	1050–1400	473	8985	3.87
OXBG	Surrey whiteware	Late 13th–mid-15th century	13	105	0.06
OXBK	Shelly coarseware	1100–1350	30	1116	0.80
OXBN	Tudor green ware	15th–16th century	81	266	0.76
OXBX	Late Brill/Boarstall ware	15th–late 17th century	1252	34,857	10.26
OXD	Rhenish greyware	9th–11th century	3	46	0
OXK	Michelmersh ware	950–1050	2	25	0
OXR	St Neots ware	850–1050	232	2069	3.76
OXX	North French greyware?	9th–11th century	1	11	0
OXY	Medieval Oxford ware	1075–1350	3774	43,441	24.57
OXZ	Stamford ware	850–1150	9	106	0
SAIP	Saintonge polychrome ware	1280–1350	1	3	0
SPGR	Spanish green-glazed ware	1250–1500	1	4	0
WORC	Worcester glazed sandy ware	Late 11th–14th century	2	16	0
Post-medieval					
ANDA	Andalusian lustreware	1250–1450	5	55	-
BBAS	Black basalt ware	1770–1900	6	682	-
BORDB	Brown-glazed border ware	1600–1700	4	170	-
BORDG	Green-glazed border ware	1550–1700	27	362	-
BORDY	Yellow-glazed border ware	1550–1700	21	817	-
CHPO	Chinese porcelain	1580–1900	18	236	-
CREA	Creamware	1740–1830	70	1446	-
DERBS	Derby stoneware	1700–1900	10	217	-
ENGS	English stoneware	1700–1900	78	7117	-
FREC	Frechen stoneware	1550–1750	57	2537	-
HORT	Horticultural earthenwares	17th–20th century	30	1573	-
LANG	Langerwehe stoneware	1350–1500	1	4	-
MART	Martincamp-type earthenware	1480–1650	2	56	-
METS	Metropolitan slipware	1600–1900	7	618	-
MPUR	Midland purple ware	1450–1750	1	29	-
PEAR	Pearlware	1770–1830	25	665	-
PMBL	Post-medieval black-glazed redware	1550–1700	15	133	-
PMR	Post-medieval redware	1550+	201	16,304	-
RAER	Raeren stoneware	1480–1600	21	1791	-
REFW	Refined whiteware	1800–1900	181	4169	-
REST	Red stoneware	1730–80	1	3	-
SNTG	South Netherlands maiolica	1480–1575	1	2	-
SPAM	Merida-type ware	1270–1650	1	11	-
STSL	Staffordshire-type slipware	Late 17th–18th century	2	19	-
SWSG	Staffordshire white salt-glazed stoneware	1720–1800	21	785	-
TGW	English tin-glazed ware	1600–1800	34	824	-
WEST	Westerwald-type stoneware	1590–1800	4	41	-

Table 3.2: Ceramic phase chronology, occurrence and defining wares

Ceramic phase	*Defining wares*	*Date*	*No. sherds*	*Weight (g)*	*Mean sherd weight (g)*	*EVE*
LSAX	OXR	10th–E11th C	46	469	10.2	1.15
SN	OXAC	E–L11th C	103	1068	10.4	1.01
M1	OXY, OXAG, OXBK	L11th–12th C	1980	26,266	13.3	15.15
M2	OXAM	13th–14th C	6963	88,273	12.7	54.94
M3	OXBX, OXBN	E–L15th C	1756	29,695	16.9	12.38
M4	CSTN, OXBC, RAER	L15th–M16th C	962	20,450	21.3	10.71
PM1	PMBL, PMR, BORDG, BORDY, FREC	M–L16th C	311	9623	30.9	-
PM2	TGW, METS, WEST, BORDB	E–M17th C	105	1537	14.6	-
PM3	STSL	M–L17thC	126	3730	29.6	-
PM4	DERBS, ENGS, SWSG	E–M18th C	144	3705	25.7	-
PM5	CREA	M–L18th C	59	2071	35.1	-
PM6	BBAS, PEAR	L18th–E19th C	153	11,827	77.3	-
MOD	REFW	19th C+	476	19,008	39.9	-
U/S	-	Unstratified	1	24	24.0	-
		Total	13,185	217,746		

Table 3.3: Pottery occurrence per ceramic phase by fabric type expressed as a percentage of the total weight per phase, major fabrics only

Fabric	*LSAX*	*SN*	*M1*	*M2*	*M3*	*M4*	*PM1*	*PM2*	*PM3*	*PM4*	*PM5*	*PM6*	*MOD*
OXR	95.7%	32.4%	1.9%	*0.7%*	*0.2%*	*0.3%*	*0.1%*	*0*	*0*	*0.1%*	*0*	*0*	*0*
OXAC	-	54.3%	24.1%	10.5%	*2.8%*	*2.7%*	*2.2%*	*2.7%*	*0*	*4.7%*	*0.2%*	*0*	*0.2%*
OXY	-	-	67.6%	25.6%	*4.1%*	*6.4%*	*3.1%*	*1.2%*	*0*	*4.9%*	*2.0%*	*0*	*0.1%*
OXBF	-	-	3.4%	6.9%	*6.2%*	*0.4%*	*0.3%*	*0*	*0*	*0.6%*	*0*	*0*	*0.1%*
OXAG	-	-	0.4%	0.8%	*0.6%*	*0.1%*	*0.3%*	*0*	*0*	*0*	*0*	*0*	*0*
OXBK	-	-	2.2%	0.4%	*0.7%*	*0.1%*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
OXAM	-	-	-	54.8%	37.0%	14.3%	*12.2%*	*12.9%*	*0.8%*	*18.4%*	*8.5%*	*0*	*3.0%*
OXBN	-	-	-	-	0.7%	0.2%	0	0	*0*	*0*	*0*	*0*	*0*
OXBX	-	-	-	-	46.7%	65.7%	37.4%	25.1%	46.2%	*3.6%*	*7.2%*	*0*	*8.3%*
CSTN	-	-	-	-	-	1.9%	1.1%	0.3%	*0*	*0*	*0*	*0*	*0.1%*
OXBC	-	-	-	-	-	3.2%	0	*0*	*0*	*0.4%*	*0*	*0*	*0.8%*
RAER	-	-	-	-	-	4.1%	9.3%	*3.8%*	*0*	*0*	*0*	*0*	*0*
PMBL	-	-	-	-	-	-	0.1%	0.3%	3.1%	*0*	*0.2%*	*0*	*0*
PMR	-	-	-	-	-	-	15.2%	34.7%	11.2%	22.0%	30.9%	62.7%	26.4%
BORDG	-	-	-	-	-	-	1.9%	3.8%	2.4%	1.2%	*0.3%*	*0*	*0*
BORDY	-	-	-	-	-	-	4.0%	0	6.9%	0	*0.5%*	*0*	*0.9%*
FREC	-	-	-	-	-	-	12.9%	6.7%	14.9%	0	*13.6%*	*0.1%*	*1.7%*
TGW	-	-	-	-	-	-	-	5.8%	0	6.6%	1.9%	3.7%	*0.1%*
METS	-	-	-	-	-	-	-	0.9%	9.6%	0	0	2.0%	0.1%
WEST	-	-	-	-	-	-	-	1.0%	0	0.2%	0	0.1%	*0.1%*
BORDB	-	-	-	-	-	-	-	0.2%	1.8%	0	*0*	*0*	*0*
STSL	-	-	-	-	-	-	-	-	0.5%	0	*0*	*0*	*0*
ENGS	-	-	-	-	-	-	-	-	-	6.9%	0	12.3%	28.4%
SWSG	-	-	-	-	-	-	-	-	-	1.7%	5.6%	*1.6%*	*2.2%*
HORT	-	-	-	-	-	-	-	-	-	27.6%	0	2.7%	*0*
CREA	-	-	-	-	-	-	-	-	-	-	23.3%	4.5%	*2.3%*
PEAR	-	-	-	-	-	-	-	-	-	-	-	5.3%	*0*
REFW	-	-	-	-	-	-	-	-	-	-	-	-	21.5%
Total weight (g)	469	1068	26,266	88,273	29,695	20,450	9623	1537	3730	3705	2071	11,827	19,008

Italicised = residual material

Table 3.4: Number of sherds per context, expressed as a percentage of the ceramic phase assemblage

Ceramic phase	*No. contexts*	*1–10 sherds*	*11–20 sherds*	*21–50 sherds*	*51–100 sherds*	*>100 sherds*
LSAX	25	100%	0	0	0	0
SN	24	87.5%	8.3%	4.2%	0	0
M1	247	76.1%	15.0%	7.7%	1.2%	0
M2	624	74.0%	12.3%	10.3%	2.4%	1.0%
M3	210	76.7%	14.8%	7.1%	1.0%	0.5%
M4	131	77.1%	16.0%	6.1%	0.8%	0
PM1	45	86.7%	8.9%	2.2%	2.2%	0
PM2	12	83.3%	8.3%	8.3%	0	0
PM3	5	0	20.0%	80.0%	0	0
PM4	12	75.0%	16.7%	0	8.3%	0
PM5	14	92.9%	0	7.1%	0	0
PM6	7	28.6%	14.3%	57.1%	0	0
MOD	33	66.7%	12.1%	15.2%	3.0%	3.0%
Total	1389	1053	181	123	24	8

Norman CP other than a few pitchers also being present. The earliest medieval CP, M1, shows a similar pattern, but with the addition of a small quantity of lamps. The proportion of lamps and jugs increases through the medieval period, with vessel types such as bottles, skillets, lids and dripping dishes occurring, mostly at the expense of jars, in the 13th–14th centuries. In the 15th century (CP M3), cups, mugs and cooking pottery such as cauldrons came into use, with non-rim sherds from storage vessels such as cisterns also noted (see below), The latest medieval phase, CP M4, late 15th–mid-16th century, is dominated by drinking pottery such as cups and mugs, with pottery associated with food very scarce. The slight increase in jar rims in this phase is likely to be due to the presence of cisterns, as the rim forms of such vessels are not greatly different to those of jars and can only be confidently identified if a handle and/or bunghole is present. The increase in bowls at this time is not unusual, and a large assemblage of well-preserved examples along with large fragments of cisterns and a few cups occurred in a single pit, latrine Structure 11, in Tenement B.

Table 3.5: Medieval vessel occurrence by EVE, expressed as a percentage of the ceramic phase assemblage

	LSAX	*SN*	*M1*	*M2*	*M3*	*M4*
Jars	94.8%	45.5%	81.9%	37.7%	22.7%	24.1%
Bowls	5.2%	43.6%	8.1%	3.3%	10.1%	31.9%
Jugs	0	10.9%	9.0%	48.4%	50.1%	26.6%
Lamps	0	0	1.1%	8.5%	12.8%	0
Bottles	0	0	0	0.3%	0	0
Skillets	0	0	0	1.4%	0	0
Cups/mugs	0	0	0	0	3.5%	17.4%
Cauldrons	0	0	0	0	0.3%	0
Lids	0	0	0	0.3%	0.5%	0
No. rims	9	13	152	472	96	71
Total EVE	1.15	1.01	15.15	54.94*	12.38*	10.71*

* does not include dripping dishes as they are asymmetrical and the EVE cannot be measured

Occurrence by tenement

The data in Tables 3.6–3.8 show various aspects of the nature of the pottery assemblages in each tenement by ceramic phase. The data in Table 3.6 shows there was very little pottery from CP LSAX or CP SN from what later became the areas of the tenements and support the idea that the site was somewhat liminal before the late 11th century. There was very little pottery from any of the tenements in the post-medieval period except Tenement B, so meaningful comparative analyses cannot be carried out on those assemblages.

Overall, the main period of pottery deposition in Tenement A was from CP M1 to M3, with a sharp drop-off during CP M4 and very little deposited thereafter. Tenement B shows activity throughout the medieval period and into CP PM1, with a drop-off occurring in CP PM2. The assemblages from CP PM3 and CP PM4 are reasonably large, as are those from CP PM6, with material from CP PM5 being somewhat sparse. Tenement C produced far less pottery than the other two throughout its existence, and nearly all of it was deposited during the medieval period, so any comparisons with the material from the other two tenements would have to be regarded as tentative at best.

The data in Table 3.7 shows that there was very little difference in the consumption of the main fabric types across the tenements during CP M1–M4, other than perhaps of Brill/Boarstall ware and medieval Oxford ware in Tenement C during CP M2 when compared to the other two tenements, although given the huge difference in the assemblage sizes of

Table 3.6: Pottery occurrence per ceramic phase by tenement

	Tenement A		*Tenement B*		*Tenement C*	
Phase	*No. sherds*	*Weight (g)*	*No. sherds*	*Weight (g)*	*No. sherds*	*Weight (g)*
LSAX	9	55	5	58	1	2
SN	6	59	10	152	0	0
M1	623	8498	482	10,777	266	2290
M2	3122	44,692	2873	34,327	577	5051
M3	352	9963	1197	16,829	152	1819
M4	46	416	673	17,210	151	1523
PM1	22	378	194	5320	4	66
PM2	0	0	8	169	49	662
PM3	0	0	126	3730	0	0
PM4	0	0	35	2181	0	0
PM5	11	152	9	555	0	0
PM6	0	0	89	5078	0	0
MOD	21	930	82	4055	0	0
Total	4212	65,143	5783	100,441	1200	11,413

Table 3.7: Pottery occurrence by major fabric type per tenement per ceramic phase, expressed as a percentage of the tenement CP assemblage by weight

Fabric	*Tenement*	*M1*	*M2*	*M3*	*M4*
OXAC	A	26.5%	10.3%	*3.0%*	*0*
	B	18.8%	10.8%	*2.4%*	*2.3%*
	C	21.6%	9.0%	*6.1%*	*1.4%*
OXY	A	64.0%	23.2%	*1.5%*	*9.1%*
	B	73.7%	23.0%	*4.3%*	*5.5%*
OXBF	A	6.7%	6.0%	*0.6%*	*0*
	B	2.1%	8.9%	*10.2%*	*0.2%*
	C	0.2%	3.8%	*0.4%*	*1.4%*
OXAM	A	-	59.1%	34.9%	44.2%
	B	-	55.4%	42.1%	12.4%
	C	-	31.7%	13.1%	22.7%
OXBX	A	-	-	59.0%	41.4%
	B	-	-	38.2%	71.4%
	C	-	-	53.1%	56.6%
RAER	A	-	-	-	0
	B	-	-	-	3.9%
	C	-	-	-	0.1%
CSTN	A	-	-	-	1.9%
	B	-	-	-	2.1%
	C	-	-	-	0.3%
OXBC	A	-	-	-	2.9%
	B	-	-	-	1.7%
	C	-	-	-	8.4%
Tenement A total weight (g)		8498	44,692	9963	416
Tenement B total weight (g)		10,777	34,327	16,829	17,210
Tenement C total weight (g)		2290	5051	1819	1523

Italicised = residual material

Table 3.8: Medieval vessel occurrence per tenement by EVE, expressed as a percentage of each tenement ceramic phase assemblage

Vessel	*Tenement*	*M1*	*M2*	*M3*	*M4*
Jars	A	81.2%	33.7%	15.5%	22.2%
	B	77.6%	37.3%	22.3%	27.0%
	C	93.2%	61.2%	57.0%	0
Bowls	A	9.1%	2.8%	3.9%	0
	B	9.0%	2.8%	10.8%	38.0%
	C	0	4.6%	18.6%	3.0%
Jugs	A	9.7%	53.9%	39.0%	0
	B	10.8%	47.0%	56.3%	18.0%
	C	6.6%	21.1%	24.4%	92.6%
Lamps	A	0	7.0%	37.1%	0
	B	2.6%	11.1%	5.6%	0
	C	0	13.2%	0	0
Bottles	A	0	0.5%	0	0
	B	0	0	0	0
	C	0	0	0	0
Skillets	A	0	1.4%	0	0
	B	0	1.8%	0	0
	C	0	0	0	0
Cups/mugs	A	0	0	4.5%	77.8%
	B	0	0	3.7%	17.0%
	C	0	0	0	4.4%
Cauldrons	A	0	0	0	0
	B	0	0	0.5%	0
	C	0	0	0	0
Lids	A	0	0.6%	0	0
	B	0	0	0.8%	0
	C	0	0	0	0
No rims	A	50	232	16	4
	B	50	171	68	60
	C	15	35	6	4
Total EVE	A	4.83	29.50	3.10	0.27
Total EVE	B	6.20	19.46	7.81	8.89
Total EVE	C	1.47	3.04	0.86	1.35

the Tenement A and B material when compared to that from Tenement C, this may simply be due to the vagaries of archaeological sampling, since much less of Tenement C was within the excavation area. The data in Table 3.8, however, shows that there was a much higher occurrence of jar rims in CP M2 assemblages in Tenement C when compared to the corresponding groups from the other tenements, and a lower occurrence of jugs in the former. Given jars were generally in unglazed wares such as medieval Oxford ware and jugs tended to be in Brill/Boarstall ware by that time, this may explain the difference in fabric consumption. However, once again, the vagaries of archaeological sampling may be the cause, as the discrepancy in assemblage sizes means that the total number of rims from Tenement C was far lower than those of the other two tenements.

This aside, the data in Table 3.8 shows that the rim occurrence is very low in most of the CP from Tenement C, so there is again little value in comparing the occurrence of the different vessel forms there with that in the other two tenements. Tenements A and B do not show many differences, with the proportion of jars, bowls and jugs mostly broadly similar in each area throughout the medieval period. One major difference is in CP M3 contexts, where Tenement A has a much higher proportion of lamps (37.1%) than Tenement B (5.6%). It must be noted, however, that the assemblage from Tenement A in this phase is quite small (16 rims, EVE 3.10) and so once again the vagaries of archaeological sampling may be the cause. The CP M4 assemblages are very different, but very few rim sherds occurred in Tenement A during this CP, so the data is not reliable enough to allow any firm conclusions to be drawn.

The data in Tables 3.6–3.8 therefore indicate that there is little to be gained from detailed analysis and comparison of the pottery by tenement. The large discrepancies in the assemblage sizes at most stages of the life of the site means any results cannot be considered significant, and so the following analyses will be carried out by overall CP group only. For example, the size of the assemblages meant that vessel consumption analysis other than by vessel type was somewhat limited, with the data for the medieval Oxford ware jar rims, the most common vessel form by fabric, limited to CPs M1 and M2. Only six medieval Oxford ware jar rims occurred in CP M3 tenement contexts, and just ten from CP M4 groups. The data in Table 3.9 suggests that slightly larger vessels with a wider range of sizes were used in Tenement B when compared to the other two tenements during CP M1, but that the reverse was true during CP M2, and the differences are not so stark that they would appear to be significant.

The assemblage by ceramic phase

Ceramic Phase LSAX: 10th–early 11th century

A total of 25 contexts produced pottery of this date, with an average of 1.8 sherds per context and an average sherd weight of 10.2g, which is fairly large given that the main fabric type, St Neots ware, is often quite low-fired and friable. This suggests that much of the material is fresh and reliably stratified. All the contexts of this date yielded ten or fewer sherds (Table 3.4), and all but one group, from fill 7716 of ditch 7728 (Ditch 1), weighed under 100g in total. This assemblage comprised ten sherds weighing 103g, and included four jar rim sherds, all of which are fairly large and in good condition.

Most of the CP assemblage consisted of St Neots ware (95.7% by weight of the CP assemblage), with the rest being single body sherds of Oxford shelly ware and ?North French greyware. The latter was burnished and is probably a fragment of a jug. No other decorated sherds were noted.

Nine rim sherds occurred, all in St Neots ware. They were nearly all from jars (94.8% of the CP assemblage by EVE) apart from a single fragment of an inturned-rim bowl, a typical product of the tradition (Denham 1985, 54). All but one of the jar rims had a diameter of 140mm or greater. This suggests that much of the St Neots ware dates to the later part of the late Anglo-Saxon period, probably the 11th century, as earlier vessels of this type in this fabric tend to be small (ibid.).

Ceramic Phase SN: early–late 11th century

A total of 24 contexts produced pottery of this date, with an average of 4.3 sherds per context and an average sherd weight of 10.4g. The latter value is again reasonably large for the period and suggests that much of the material is fresh and reliably stratified. All but three groups yielded ten or fewer sherds (Table 3.4), and the same number produced less than 100g of material. The largest group, comprising 41 sherds (490g), was from fill 4865 of pit 4864, and is the only group of this date with more than 20 sherds. The other fill of the pit, 4879, produced 11 sherds (62g) of the same date, meaning

Table 3.9: Medieval Oxford ware jar rim diameter data per tenement, ceramic phases M1 and M2

	M1			*M2*		
Tenement	*EVE*	*Mean diameter (mm)*	*SD (mm)*	*EVE*	*Mean diameter (mm)*	*SD (mm)*
A	1.65	225.0	54.4	5.05	232.0	60.6
B	3.05	238.6	49.8	3.08	225.0	46.5
C	0.94	228.9	52.1	1.14	232.9	55.8

this single feature produced over half of the pottery of this date from the site.

The CP assemblage is typical of the period in that it consists mostly of Cotswolds-type ware (54.3% by weight of the CP assemblage) and St Neots ware (32.4%). These aside, the only other contemporary pottery was two sherds of Michelmersh ware (25g) and a single sherd of Stamford ware (3g). The latter sherd is in the fine white fabric typical of the 11th–12th-century products of the tradition (Kilmurry 1980). Four sherds (114g) of residual Romano-British pottery were also noted.

In total, 13 rim sherds were noted, six of which were jars (45.5% of the CP assemblage by EVE), six more were bowls (43.6%) and the other a Cotswold-type ware pitcher (EVE 0.11). Of the jars, four were St Neots ware types (EVE 0.29) and two were Cotswold-type ware (EVE 0.17). Similarly, four bowls were St Neots types (EVE 0.29) and two were Cotswold-type ware (EVE 0.15). All the St Neots ware jar rims had a diameter of 140mm or greater, and the St Neots bowls were inturned-rim types. This is very typical of the tradition. No decorated sherds were noted.

Ceramic Phase M1: late 11th–12th century

A total of 247 contexts produced pottery of this date, with an average of 8.0 sherds per context. The average sherd weight is 13.3g, which is fairly typical of assemblages of the period and indicates that much of the material is in good condition and reliably stratified. Nearly a quarter of the context-specific assemblages comprised more than ten sherds, and three of them consisted of over 50 sherds (Table 3.4). These groups, contexts 3336, 3956 and 10420, produced a combined total of 194 sherds with an average sherd weight of 9.3g. Context 3336 is the fill of grave 3337, and the average sherd weight for the pottery from it is particularly low (6.9g), suggesting it is all residual. The other two groups are pit fills.

Some of the pottery from other features was in very good condition, with six vessels (three bowls and three jars) surviving to a full profile, and other well-represented vessels were present. Three contexts produced over 1kg of pottery with one, fill 4638 of pit 4485, yielding 3567g, or over 13.5% of the entire CP assemblage by weight, but just 36 sherds, meaning the group had an average sherd weight of nearly 100g. It included some of the well-represented vessels, including a full profile of a medieval shelly coarseware jar (Fig. 3.1, no. 1), three full profiles of bowls (Fig. 3.1, nos 4–6), and a near-complete medieval Oxford ware tripod pitcher (Fig. 3.1, no. 2). The tripod pitcher had cross-fitting sherds to context 4671, fill of ditch 4672. Context 4671 also produced a full profile of a small medieval Oxford ware jar (Fig. 3.1, no. 3), with the context-specific assemblage consisting of 12 sherds weighing 1246g. The other context to produce over 1kg of pottery was fill 6228 of pit 6277, which produced 24 sherds weighing 1066g, but none of the vessels survived to a full profile. These three contexts, all in Tenement B, produced over 22% (by weight) of the entire CP assemblage, and had an average sherd weight of 81.7g, suggesting they are primary deposits. The only other vessel from contexts of this date to survive to a full profile was a Cotswold-type ware small jar (Fig. 3.1, no. 7).

The fabric occurrence is fairly typical of sites of the period in the city, being dominated by medieval Oxford ware (67.6% of the CP assemblage by weight) and Cotswold-type ware (24.1%), along with small quantities of Kennet Valley A ware (3.4%), shelly coarseware (2.2%), St Neots ware (1.9%) and Ashampstead-type ware (0.4%). The only other contemporary pottery present were six sherds of Stamford ware (35g), all in late fabrics, and single sherds of Worcester-type sandy ware (3g) and Bath 'A' ware (4g). Two residual Romano-British sherds weighing a total of 6g were also noted.

The rim assemblage consists of jars (123 examples; 81.9% of the CP rim assemblage by EVE), bowls (17 examples; 8.1%), pitchers/jugs (11 examples; 9.0%) and a single fragment of a pedestal lamp (1.1%), with the last of these quite well represented (Fig. 3.1, no. 8). It has a thick patch of sooting on one side of the inner rim which may represent the position of the wick. All the pitchers/jugs and the lamp were medieval Oxford ware types. Three of the pitchers had long tubular spouts, which is fairly typical of the tradition (eg Mellor 1994, fig. 22).

Of the jars, 66 (EVE 7.09) were in medieval Oxford ware, 42 were Cotswold-type ware (EVE 3.62), seven each were in St Neots ware (EVE 0.58) and Kennet Valley A ware (EVE 0.85) and one in shelly coarseware (EVE 0.27). Ten of the medieval Oxford ware jars (EVE 0.89) and seven of the Cotswold-type ware ones (EVE 0.69) had thumbed 'piecrust' rims. These are fairly typical of the 12th–13th-century products of both industries (eg Mellor 1994, figs 10 and 18). Eleven of the bowls were Cotswold-type ware types (EVE 0.75), five medieval Oxford ware types (EVE 0.35), and the other St Neots ware (EVE 0.12). The two medieval Oxford ware bowls which survived to a full profile were both internally glazed and also had heavily sooted outer surfaces (Fig. 3.1, nos 4 and 6). Two of the Cotswold-type ware bowls, including the example which survived to a full profile, had thumbed 'piecrust' rims.

Fifteen jug handles were noted, all of which were medieval Oxford ware strap types from tripod pitchers. Many of them were decorated, mostly with either inlaid twisted, plaited or thumbed strips typical of the tradition (Mellor 1994, fig. 22), although a single stabbed example was noted. One of the examples, which was still attached to the rim, was very unusual in that it had an applied strip in the thumb groove in a red-firing clay (Fig. 3.1, no. 10). The vessel also had such strips on the body, along with others in the body clay. Both types on the body were thumb impressed.

Decorated sherds were quite rare, with just 47 (1699g) noted. Of these, 34 sherds (1245g) were

fragments of glazed medieval Oxford ware tripod pitchers with rouletting or incised wavy lines, many of which also had horizontal and/or vertical applied strips. Such decorative schemes are not untypical of such vessels (eg Mellor 1994, fig. 21). Most of the rest of the incised sherds were in Cotswold-type ware (8 sherds, 339g) or Kennet Valley A ware (4 sherds, 112g), with the only other example being a small fragment of a rouletted jug in Worcester glazed sandy ware (from context 3748) which cross-fitted to the other sherd from a CP M2 context (3800 (CP M3/M4); Fig. 3.3, no. 21). Of the Cotswold-type ware sherds, one small sherd had a fragment of a grid-stamp (Fig. 3.1, no. 12), Stamped sherds in this fabric are rare, but the motif of this example is very similar, if not identical, to a sherd from another Oxford site, 55–8 Cornmarket, which was dated to the early to mid-11th century (Mellor 1994, fig. 13 no. 18). Here, the other incised sherds in this fabric consisted of three with square-notched rouletting (including a jar rim), two with stabbed decoration, and a rim sherd from a fairly large vessel with a thumbed 'piecrust' rim and the base from a much smaller jar with combed decoration (Fig. 3.1, nos 9 and 11). The four sherds of Kennet Valley A ware all had wavy line decoration which is reasonably well-attested on such pottery (eg Mellor 1994, fig. 14).

Forty-three sherds were noted with applied strip decoration. They all came from glazed medieval Oxford ware tripod pitchers except from two body sherds from unglazed jars, probably large storage vessels, and one from a Kennet Valley A ware vessel.

A few fragments of tripod pitcher bases with feet attached were also noted. A large fragment (from context 4286) cross-fitted to CP M2 context 4279. Others were noted from contexts 4638 and 6344. A base from a fairly large and otherwise unglazed medieval Oxford ware jar had splashes and drips of green glaze showing that it had been fired with glazed vessels such as tripod pitchers.

Catalogue of illustrated pottery (Fig. 3.1)

1 **Jar**, full profile. Fabric OXBK. Orange-brown fabric with grey core. Outer surface fairly heavily smoke-blackened and sooted below the shoulder and on the base. Also patches on the inner surface and base. Ctx 4638, pit 4485, Pit Group 6, Tenement B, Phase 3.

2 **Tripod pitcher**, non-joining rim and body. Fabric OXY. Uniform light orange fabric, clear yellow glaze on the outer surface of the body, rim and handle. Ctx 4638, pit 4485, Pit Group 6, Tenement B, Phase 3 and 4671, ditch 4672, Tenement B, Phase 2.

3 **Small jar**, full profile. Fabric OXY. Grey fabric with light brown inner surface. Outer surface smoke-blackened and sooted. Ctx 4671, ditch 4672, Tenement B, Phase 2.

4 **Bowl**, full profile. Fabric OXY. Light grey fabric with darker, smoke-blackened and sooted outer surface. Dull and degraded olive-green glaze on inner surface. Ctx 4638, pit 4485, Pit Group 6, Tenement B, Phase 3.

5 **Bowl**, full profile. Fabric OXAC. Grey fabric with browner surfaces. Ctx 4638, pit 4485, Pit Group 6, Tenement B, Phase 3.

6 **Bowl**, full profile. Fabric OXY. Light grey fabric with darker, smoke-blackened and sooted outer surface. Dull olive-green glaze on inner surface. Ctx 4638, pit 4485, Pit Group 6, Tenement B, Phase 3.

7 **Small jar**, full profile. Fabric OXAC. Uniform black fabric, some sooting on outer surface. Ctx 5003, pit 5004, Pit group 2, Tenement A, Phase 2.

8 **Pedestal lamp**. Fabric OXY. Light grey fabric with darker surfaces. Thick patch of sooting on the inner rim. Ctx 9246, pit 9247, Pit Group 9, Tenement B, Phase 2.

9 **Rim sherd with incised decoration on the body**. Fabric OXAC. Grey fabric with orange surfaces. Ctx 6243, posthole 6244, Structure 4, Tenement C, Phase 2.

10 **Tripod pitcher**, rim and handle. Fabric OXY. Pale orange fabric with a grey core, yellow-green glaze. Applied strips in both the body clay and a red-firing type. Ctx 4671, ditch 4672, Tenement B, Phase 2

11 **Base of small jar with combing on the body**. Fabric OXAC. Grey fabric with browner surfaces. Ctx 3937, pit 3935, Pit Group 3, Tenement A, Phase 3.

12 **Stamped sherd**. Fabric OXAC. Light grey fabric with a darker outer surface. Ctx 4765, Grave 4766, Phase 3.

Ceramic Phase M2: 13th–14th century

A total of 624 contexts produced pottery of this date, with an average of 11.2 sherds per context. The average sherd weight is 12.7g. Just under 75% of the groups comprised ten or fewer sherds, with 21 contexts producing more than 50, six of which had over 100. Thirteen contexts produced over 1kg of pottery each. Four of these yielded over 2kg, two of which produced over 3kg (Table 3.4). The largest group, from context 3450, a layer in Building 4 in Tenement A, consisted of 371 sherds weighing 4759g. It did not produce any well-represented vessels, and the average sherd weight (12.8g) is quite moderate, suggesting it is all the product of secondary deposition. As well as the usual jars, bowls and jugs, it also produced fragments of skillets, lamps and tripod pitchers and seems likely to represent part of a scattered domestic midden. Pit 3901 in Tenement B had three fills (3902, 3903 and 4259) which yielded a total of 335 sherds weighing 3833g, giving an average sherd weight of 11.4g, and had a similar range of vessel forms present, although

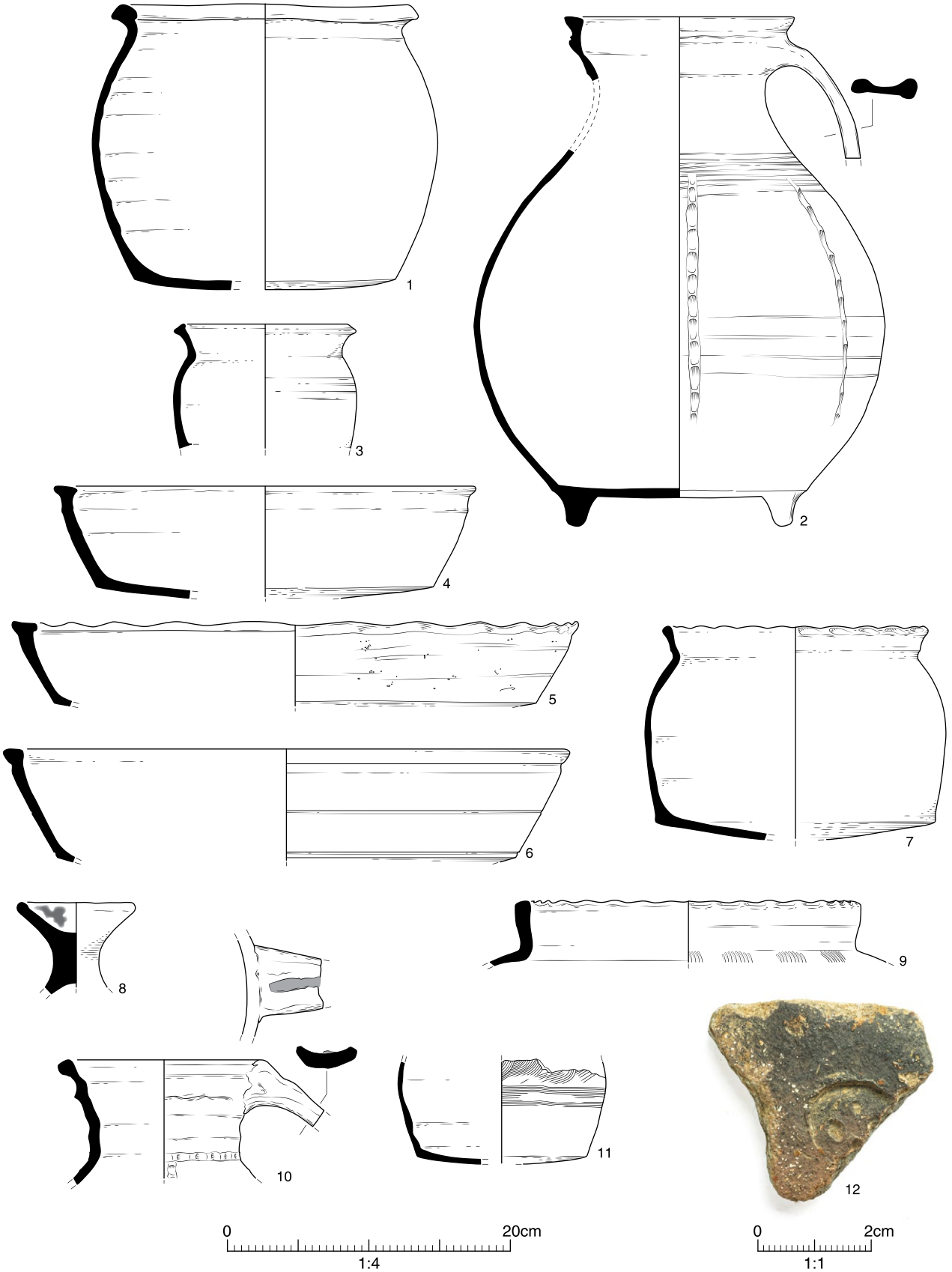


Fig. 3.1 Medieval pottery Ceramic Phase M1, late 11th–12th century, nos 1–12

it also produced the only sherd of Spanish green-glazed ware from the site, possibly from a drug-jar (Fig. 3.2, no. 16), as well as a piece of a condiment pot or salt-pig (Fig. 3.2, no. 17). It too appears to be a secondary deposit from a domestic midden or the like. Layer 4396 in Building 7 in Tenement B produced 181 sherds (2574g), and while the average sherd weight is not exceptional (14.2g), it did produce several well-represented vessels, although they were all too fragmented to reconstruct a full profile. They consisted of a Kennet Valley A ware jug with combed decoration over most of the body (Fig. 3.3, no. 18) and two Brill/Boarstall ware jugs. Context 4937, the silt deposit above path surface 4938 in Tenement A, produced just seven sherds, but they weighed a total of 3777g, and included two near-complete Brill/Boarstall ware jugs. One of these had very worn surfaces and a lead-plug repair (Fig. 3.2, no. 13) while the other, a small vessel, had a heavily chipped pedestal base (Fig. 3.2, no. 14). The chips were all old, and thus both vessels appear to have had long use-lives. Two large fragments of two further Brill/Boarstall ware jugs were also present, although they were not complete to a full profile. The only other vessel to survive to a full profile from the whole CP assemblage was a medieval Oxford ware jar from fill 3930 of pit 3829 (Fig. 3.2, no. 15). The feature produced very little other pottery (3 sherds, 41g). Given the extremely large amount of material that came from the CP, the number of well-represented vessels is rather small, and further suggests that much of the material is the product of secondary deposition and may be the result of domestic middens having been used as backfill material during reorganisation of the site.

The pottery occurrence is fairly typical of sites of the period in Oxford. The dominant fabric type is Brill/Boarstall ware (54.8% of the CP assemblage by weight), with most of the rest of the assemblage made up of medieval Oxford ware (25.6%), Cotswold-type ware (10.5%) and Kennet Valley A ware (6.9%). Small quantities of Ashampstead-type ware (0.8%) and shelly coarseware (0.4%) were also present. The rest of the contemporary material consisted of small quantities of non-local and imported wares in the form of Saintonge polychrome (1 sherd, 3g; Fig. 3.3, no. 19), Bath 'A' ware (1 sherd, 7g), Worcester glazed sandy ware (1 sherd, 13g; Fig. 3.3, no. 21), Spanish green-glazed ware (1 sherd, 4g; Fig. 3.2, no. 16), Minety-type ware (1 sherd, 5g) and Surrey whiteware (6 sherds, 32g). Residual pottery was present in the form of St Neots ware (0.7%), Romano-British wares (four sherds, 45g), Rhenish greyware (three sherds, 46g), Oxford shelly ware (two sherds, 27g) and Stamford ware (1 sherd, 3g).

The rim assemblage was dominated by jars (246 examples, 37.7% of the CP assemblage by EVE) and jugs (158 examples, 48.4%), with bowls relatively scarce (30 examples 3.3%). However, a fairly wide range of other vessels were also present. A total of 28 rim sherds from lamps (EVE 4.69; 8.5%) and 14 from Brill/Boarstall ware skillets (EVE 0.78; 1.4%) were also present, along with a single fragment of a conical Brill/Boarstall ware lid (EVE 0.18; 0.3%; Fig. 3.3, no. 20), another from a bottle in the same fabric (EVE 0.16; 0.3%), and the probable salt-pig noted above (EVE 0.48). A number of body sherds from a very similar salt-pig were noted in context 8008 and may be from the same vessel, but there were no cross-fits. A single small rim sherd from a Brill/Boarstall ware dripping dish was also noted. All the skillets were quite small, as is often the case (eg Blinkhorn 2003a, fig. 7.20, nos 167–74), although one fragment of a larger example was also noted (Fig. 3.3, no. 22). It is also unusual in having a hollow handle which is pierced, presumably to allow the air to escape during firing.

Of the jars, 118 were in medieval Oxford ware (EVE 10.18), 59 in Cotswold-type ware (EVE 3.77), 31 in Brill/Boarstall ware (EVE 3.59), 22 in Kennet Valley A ware (EVE 1.86), four in shelly coarseware (EVE 0.27), and one was Ashampstead-type ware (EVE 0.10). Of these, 16 medieval Oxford ware types (EVE 0.99), four in Kennet Valley A ware (EVE 0.25) and four in Cotswold-type ware (EVE 0.20) were thumbed 'piecrust' forms. There were also eleven residual jar rims, ten in St Neots ware (EVE 0.89) and one in Oxford shelly ware (EVE 0.05).

Ten of the bowls were Cotswold-type ware types (EVE 0.53), eight were Brill/Boarstall ware (EVE 0.45), six in medieval Oxford ware (EVE 0.31) and one each in Kennet Valley A ware (EVE 0.04) and shelly coarseware (EVE 0.06). The last of these was a thumbed 'piecrust' type. There were also four residual St Neots ware examples (EVE 0.44). One of the Brill/Boarstall ware examples was a somewhat unusual 'basket' form with an upright decorated loop handle (Fig. 3.3, no. 23), and one of the Kennet Valley examples survived to a full profile (Fig. 3.4, no. 32). Of the jugs/pitchers, 130 were Brill/Boarstall ware (22.75), 23 were medieval Oxford ware (EVE 3.11), three were Ashampstead-type ware (EVE 0.30) and two were Kennet Valley A ware (EVE 0.43). All the lamps were Brill/Boarstall ware types except for a single example in medieval Oxford ware (EVE 0.21).

A total of 114 handles were noted, of which 92 were Brill/Boarstall ware, 18 were medieval Oxford ware, two were Kennet Valley A ware and one each were Ashampstead-type ware, shelly coarseware and Cotswold-type ware. The Brill/Boarstall ware types were largely from jugs (87 examples), of which 66 were strap types and 21 rods, and three were horizontal skillet types, with the other being the loop type on the bowl noted above. All the medieval Oxford ware types were straps, nine of which had inlaid twisted applied strips. The Ashampstead-type examples had a thumbed applied strip running down the thumb groove, the two Kennet Valley examples had combed edges and the shelly coarseware handle was plain. Seventeen rims retained their pouring mechanisms, mostly in the form of pulled lips, although two long tubular spouts from medieval Oxford ware jugs were noted.

All the lips were from Brill/Boarstall ware jugs other than one from a lamp. Fragments of ten bases from medieval Oxford ware tripod pitchers with at least one foot still attached were also noted. A somewhat unusual foot with a decorated base or, perhaps more likely a stub handle, was also noted in Kennet Valley A ware (Fig. 3.3, no. 24).

Non-rim fragments worthy of comment were also noted, some of which are quite unusual finds. Eight stems and three bases from Brill/Boarstall ware lamps were noted, along with a fragment of a jug in the same ware with possible anthropomorphic decoration (Fig. 3.3, no. 25), and Brill/Boarstall ware bottles were represented by body sherds in contexts 3753 and 9161 and bases in contexts 4789, 6129, and 7605. Others noted were a rather worn sherd with a poor-quality, partly unvitrified glaze, applied scales, stamped slip-pads and a small fragment of a handle terminal from the rear of an aquamanile, probably originally in the form of a sheep (Fig. 3.3, no. 26), a well-represented small cruet (Fig. 3.3, no. 27), and three fragments of roof-finals (Fig. 3.4, nos 28–30). Sherds from one of the finials (Fig. 3.4, no. 28) occurred in two contexts (6080 and 9052).

Handles with applied and/or incised decoration aside, decorated sherds were not that common other than glazed jugs with slip decoration in Brill/Boarstall ware and medieval Oxford ware. One fragment of a Brill/Boarstall ware jug from context 7183 had a rather unusual incised face-mask on an applied pad (Fig. 3.4, no. 31) and the conical lid noted above had a freehand incised cross (Fig. 3.3, no. 20). A reasonably well-represented Brill/Boarstall ware jug also had, for the tradition, unusual wavy line decoration (Fig. 3.4, no. 33). Sherds of it were noted in two contexts of this date (3505 and 4110) and there were cross-fits to a CP M3 deposit (3494). Otherwise, decoration was mostly limited to incised wavy lines on unglazed Kennet Valley A ware and was somewhat scarce (34 sherds, 694g) other than the well-represented jug noted above (Fig. 3.3, no. 18), with the only other unglazed vessels with such decoration being Cotswold-type ware (six sherds, 37g). Such decoration also occurred on a number of medieval Oxford ware glazed jugs/pitchers (13 sherds, 352g), with fragments of the same vessel noted in contexts 9715 and 9718, both of which were fills of pit 3721. Six sherds (67g) of such vessels had square-notched rouletting. Two Cotswold-type jars had slashed rims.

Applied decoration was quite rare. Other than the anthropomorphic jug fragment and the face-mask noted above, it was largely limited to decoration on glazed vessels, such as the applied scales on the aquamanile (Fig. 3.3, no. 26) or applied strips on jugs, with the only unglazed vessel with such decoration being a well-represented large jar, probably a storage vessel (rim diameter 440mm), from context 9190, fill of pit 9185.

There was no evidence from the pottery of any sort of industrial activity other than a single medieval Oxford ware body sherd which had an inner surface which was dyed a purplish-red and may be evidence of dye-production from madder. Specialist vessels such as crucibles were entirely absent.

Catalogue of illustrated pottery (Figs 3.2–3.4)

13 **Jug**, near complete. Fabric OXAM. Light grey fabric with pale orange surfaces. Trailed slip decoration in an iron-rich slip. Clear glaze on outer which appears green over the body clay and brown over the slip stripes. Lead-plug repair at the waist. Glaze and outer surface of the pot very worn below the waist, probably from use. Glaze has opacified in places on the upper body. Ctx 4937, layer overlying path surface 4938, Tenement A, Phase 4.

14 **Small jug**, near complete. Fabric OXAM. Uniform light orange fabric. Decorated with alternate strips of body clay and iron-rich red slip. Copper-speckled clear glaze which appears yellow over the body clay and reddish-brown over the slip stripes. Some opacification of the glaze over the slip stripes. The edge of the pedestal base is heavily chipped. The damage is old, and happened during the use-life of the pot. Ctx 4937, layer overlying path surface 4938, Tenement A, Phase 4.

15 **Jar**, full profile. Fabric OXY. Uniform grey fabric. Outer surface fairly heavily smoke-blackened and sooted below the shoulder and on the base. Ctx 3930, pit 3829, Pit group 11, Tenement A, Phase 4.

16 **Sherd from the neck of a drug-jar?** Fabric SPGR. White fabric with pale turquoise glaze on both surfaces. Ctx 4259, pit 3901, Tenement B, Phase 5.

17 **Condiment jar/salt-pig rim**. Fabric OXAM. Pale orange fabric with darker surfaces, copper-speckled, bright green glossy glaze on outer. Ctx 3903, pit 3901, Tenement B, Phase 5.

18 **Jug**, non-joining fragments from the rim, upper body and handle. Fabric OXBF. Incised decoration. Grey fabric with orange-brown outer surface. Ctx 4396, stone surface, Building 7, Room 2, Tenement B, Phase 6.

19 **Jug**, body sherd Fabric SAIP. White fabric with brown and green painted decoration on the outer surface, clear glaze over all. Ctx 4242, Phase 4 slumped layer into pit 4141, Pit Group 3, Tenement A, Phase 3.

20 **Conical lid**. Fabric OXAM. Pale orange fabric with rich glossy green glaze on the outer surface, patches on the inner. Ctx 3952, drain 3951, Tenement A, Phase 5.

21 **Jug**, rouletted body sherd. Fabric WORC. Grey fabric with orange inner surface, dull, green partly unvitrified glaze on the outer surface. Ctx 3748, levelling layer, Phase 4,

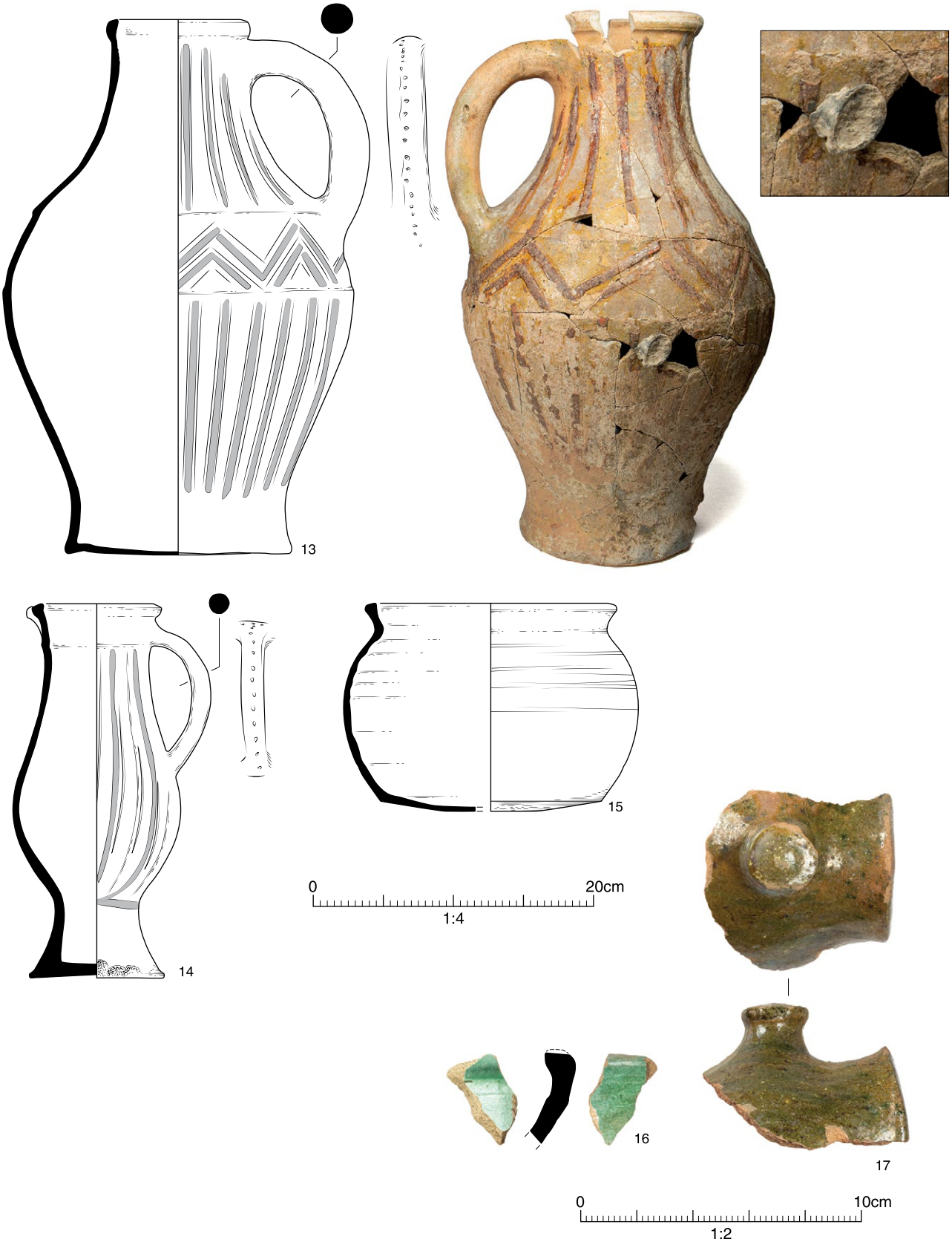


Fig. 3.2 Medieval pottery Ceramic Phase M2, 13th–14th century, nos 13–17

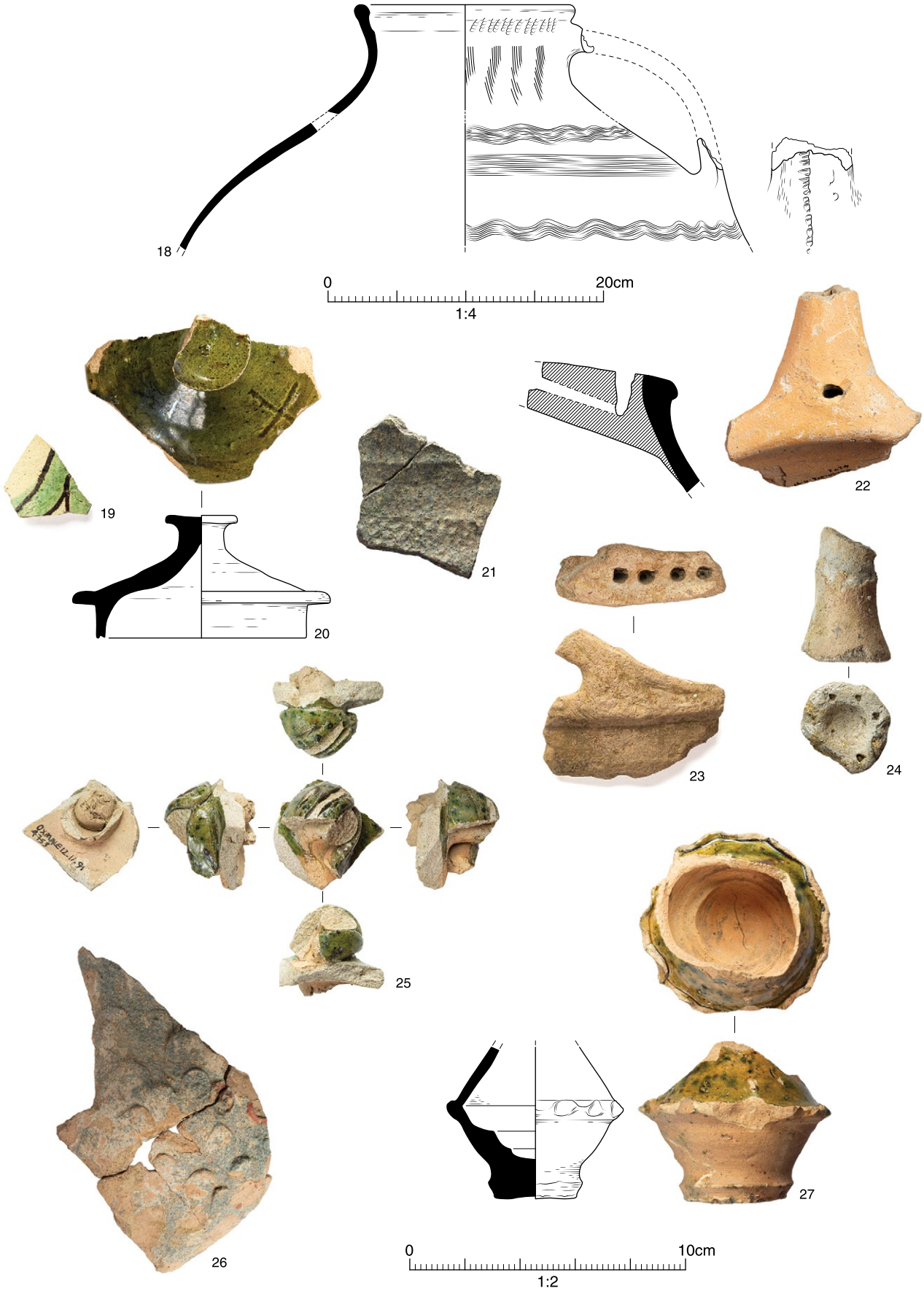


Fig. 3.3 Medieval pottery Ceramic Phase M2, 13th–14th century, nos 18–27

Tenement A and 3800, robber trench 3777, Phase 6, Tenement A.

22 **Large skillet**, rim and fragment of a hollow handle. Fabric OXAM. Buff fabric with pale orange surfaces, spots of thin, clear glaze on the inner surface. Ctx 4242, Phase 4 slumped layer into pit 4141, Pit Group 3, Tenement A, Phase 3.

23 **Bowl**, rim with decorated upright loop handle on the rim-top. Fabric OXAM. Pink-buff fabric with grey core. Ctx 6511, accumulation layer, Tenement B, Phase 6.

24 **Foot or stub handle with incised decorated on face**. Fabric OXBF. Light grey fabric with light orange-brown patches on the outer surface. Ctx 3708, pit 3698, Pit Group 3, Tenement A, Phase 3.

25 **Decorated body sherd**. Fabric OXAM. Applied ?anthropomorphic decoration. Light grey fabric with buff surfaces, glossy, copper-speckled green glaze on outer. Ctx 4753, wall, Building 5, Tenement A, Phase 5.

26 **Aquamanile**, fragment. Fabric OXAM. Grey fabric with dark buff surfaces, partly unvitrified glaze, stamped red slip pellets at the handle terminal. Ctx 3771, pit 3808, Pit Group 11, Tenement A, Phase 4.

27 **Cruet**, base and part of the upper body. Fabric OXAM. Pale orange fabric with slightly darker surfaces. Copper-speckled, glossy green glaze on the upper outer surface, thin green glaze on the lower. Ctx 6585, demolition layer, Tenement B, Phase 6.

28 **Finial**, non-joining sherds. Fabric OXAM. Light orange fabric with a grey core. Glossy, variegated glaze on the outer surface. Ctxs 6080, bedding layer, Tenement B, Phase 6 and 9052, occupation layer, Building 7, Tenement B, Phase 6.

29 **?Finial**, fragment. Fabric OXAM. Orange fabric with glossy green glaze on the outer surface. Ctx 10200, garden soil, Tenement B, Phase 5.

30 **Finial** fragment. Fabric OXAM. Orange fabric with mottled dark green glaze on the outer.

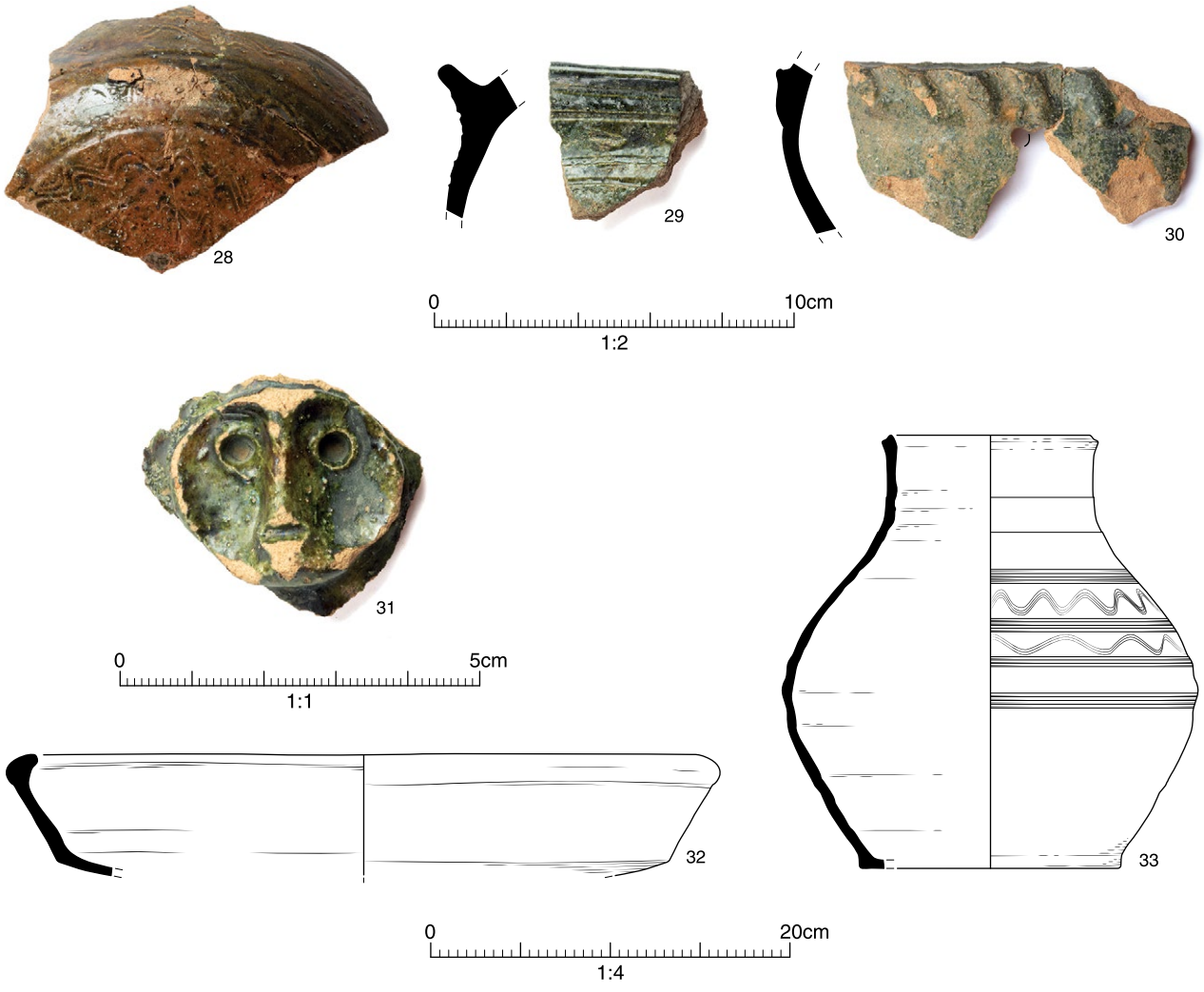


Fig. 3.4 Medieval pottery Ceramic Phase M2, 13th–14th century, nos 28–33

Pre-firing hole pierced below the applied thumbed strip. Ctx 3771, pit 3808, Pit Group 11, Tenement A, Phase 4.

31 **Applied face-mask**. Fabric OXAM. Uniform pale orange fabric with darker surfaces, dark green glossy glaze on the outer. Ctx 7183, pit 7187, Tenement C, Phase 3.

32 **Bowl**, full profile. Fabric OXBF. Grey fabric with brown patches on both surfaces. Ctx 4789, bedding layer, Tenement A, Phase 5.

20 **Decorated jug**, rim, body and base sherds. Fabric OXAM. Grey fabric with orange surfaces, patchy copper-speckled green glaze on upper body and neck. Ctx 3494, garden soil, Tenement B, Phase 6, 3505, cobbled yard, Tenement B, Phase 6 and 4110, occupation layer, Tenement A, Phase 5.

Ceramic Phase M3: early–late 15th century

A total of 210 contexts produced pottery of this date, with an average of 8.4 sherds per context. Nearly a quarter of them produced more than ten sherds, and three of them over 50, with one producing over 100 (Table 3.4). The average sherd weight is 16.9g, which indicates that much of the material is in good condition and reliably stratified. Three contexts produced over 1kg of pottery. Of these, one context (21810) produced a well-represented squat jar which may possibly be a distilling base (Fig. 3.5, no. 34), and no other pottery. The largest group (238 sherds, 3806g) came from context 3494, a garden soil in Tenement B. It did not produce any complete or reconstructable vessels although a well-represented but heavily fragmented Kennet Valley A ware jug was noted, along with a few fragments of the more unusual vessels that were also noted in the CP M2 contexts, such as a condiment dish (eg Fig. 3.5, no. 37). Ditch fill 4427 in Tenement B produced 31 sherds weighing 2655g. All but one sherd of pottery came from the bases of two large and well-represented but unreconstructable late Brill/Boarstall ware cisterns. The possible distilling base is the only vessel from this CP which survived to a full profile, suggesting much of the pottery is the product of secondary deposition, and some of the material which was still theoretically current, such as Brill/Boarstall ware, may be residual. Certainly, there is a sharp increase in the proportion of pottery that is definitely residual in this CP, with nearly 5% by weight of the assemblage being redeposited earlier wares. Disturbance created by the construction of new buildings is one obvious explanation for this.

The stratified material is almost entirely Brill/Boarstall ware (37.0% of the CP assemblage by weight) and its late variant (46.7%), along with small quantities of Surrey/Hampshire Tudor green ware (0.7%). The only other pottery types present that were still current were six sherds (132g) of Minety-type ware and four sherds (40g) of Surrey whiteware. This is very typical of sites of the period in the city.

The rim assemblage was dominated by jugs (36 examples, 50.1% of the CP assemblage by EVE), along with smaller quantities of jars (24 examples, 22.7%) and bowls (21 examples, 10.1%). However, rim sherds from a fairly wide range of other vessels were also present: six from Brill/Boarstall ware lamps (EVE 1.59; 12.8%), the same number from 'Tudor green' lobed cups (EVE 0.43; 3.5%), a single small fragment of a Brill/Boarstall lid (EVE 0.06; 0.5%) and another from a late Brill/Boarstall cauldron (EVE 0.04; 0.3%; Fig. 3.5, no. 35). A fragment from a dripping dish in the same fabric also occurred.

Nine of the jars were late Brill/Boarstall ware types (EVE 1.07) and three were Brill/Boarstall ware (EVE 0.16). The rest were residual: Cotswold-type ware (two examples; EVE 0.24), Kennet Valley A ware (three examples; EVE 0.59), medieval Oxford ware (six examples; EVE 0.47) and Ashampstead-type ware (1 example, 0.28g). Two of the late Brill/Boarstall ware jars, including the possible distilling base, had developed bifid rims which are typical of the late medieval period. Two others, from contexts 8907 and 8910 (both layers in Room 3 of Building 2 in Tenement B) cross-fitted. Nine of the bowls were late Brill/Boarstall ware types (EVE 0.55), four were Brill/Boarstall ware (EVE 0.25) and two were Tudor green ware (EVE 0.17). The rest were residual: Cotswold-type ware (three examples; EVE 0.17), medieval Oxford ware (two examples, EVE 0.08) and one shelly coarseware type (EVE 0.03). Twenty-five jugs were Brill/Boarstall ware (EVE 4.18), nine were late Brill/Boarstall ware (EVE 1.80) and one was Tudor green ware (EVE 0.05). The only other was a residual shelly coarseware type (EVE 0.17).

A total of 32 handles were noted. One of them was a round-sectioned, elbowed example from the late Brill/Boarstall ware cauldron (Fig. 3.5, no. 35) and another a residual but extremely unusual Cotswold type from a skillet or dripping dish, a very rare vessel form in this fabric (Fig. 3.5, no. 36). Five others were 'Tudor green' types, all from lobed cups apart from a single fragment from a jug. Sixteen were from Brill/Boarstall ware jugs, with two being round-sectioned rods and the rest straps. As well as the example from the cauldron, there were five more late Brill/Boarstall ware types from jugs or cisterns, with one a rod type and the rest straps, and also a single horizontal handle from a dripping dish or skillet. The other handles were residual, being one each in medieval Oxford ware, shelly coarseware and Stamford ware. Two jugs in Brill/Boarstall ware and one in late Brill/Boarstall ware had pouring mechanisms in the form of simple pulled lips, and there was also one of the former with an unusual 'parrot beak' spout, a type which was common on French pottery of the period, and also material made and used in Bristol. Other Brill/Boarstall jugs with close similarities to examples from Bristol and France have been noted in the past (Mellor 1994, 114). Four cistern bungholes were present, three in shelly coarseware and one in Brill/Boarstall ware,

one of which was on one of the well-represented vessels from context 4427 noted above. A residual fragment of a long tubular medieval Oxford ware spout was also noted.

A number of non-rim fragments are worthy of comment. Two Brill/Boarstall ware lamp stems were noted, along with two body sherds and a base from bottles in the same ware. Other fragments in this fabric included a small piece of the base and dividing wall of the condiment dish noted above (Fig. 3.5, no. 37) and a cauldron base with the stump of a leg still attached (Fig. 3.5, no. 38). The latter is from a different vessel to the handle and rim noted above. The interior of the leg is covered in stabbing, presumably to aid firing as it would not have been visible when the vessel was in use.

Incised decoration was very scarce, with the only other sherds noted other than those already mentioned being three from glazed Brill/Boarstall ware jugs and six from residual Kennet Valley A ware and Cotswold-type ware vessels, all with incised wavy lines, along with a single sherd of medieval Oxford ware with square-noted rouletting. Applied decoration was similarly scarce. One of the late Brill/Boarstall vessels with a bifid rim had a thumbed applied collar, and a body sherd in the same fabric had a vertical strip. One late Brill/Boarstall jug body sherd had applied plastic decoration which is possibly anthropomorphic (Fig. 3.5, no. 39).

Catalogue of illustrated pottery (Fig. 3.5)

34 **Squat jar (distilling base?)**. Fabric OXBX. Buff fabric with pale orange surfaces, apple-green, copper-streaked glaze on inner surface. Base-pad scorched, sooting and smoke-blackening on outer surface. Ctx 21810, stone latrine 21808=22710, Tenement A, Phase 6.

35 **Cauldron**, rim and handle fragment. Fabric OXBX. Light grey fabric with buff surfaces, yellow glaze with sparse copper flecks on the inner surface of the body. Ctx 6102, yard surface, Tenement B, Phase 6.

36 **Skillet or dripping dish handle**. Fabric OXAC. Grey fabric with brown surfaces. Ctx 4469, pit 4418, Pit group 14, Tenement A, Phase 5.

37 **Condiment dish**, base and dividing wall. fabric OXAM. Pale orange fabric with a grey core, copper-speckled green glaze on the upper surface. Ctx 3494, garden soil, Tenement B, Phase 6.

38 **Cauldron**, base and leg-stump. Fabric OXBX. Buff fabric with pale orange surfaces, glossy orange glaze on inner surface. Outer surface scorched and sooted, inner is lime-scaled. Ctx 4194, occupation deposit, Building 7, Tenement B, Phase 6.

39 **Decorated jug**, body sherd. Fabric OXAM. Applied ?anthropomorphic decoration Light



Fig. 3.5 Medieval pottery Ceramic Phase M3, early–late 15th century, nos 34–39

orange fabric with a slightly opacified mottled green glaze on the outer surface. Ctx 6714, pit 6715, Tenement A, Phase 6.

Ceramic Phase M4: late 15th–mid-16th century

A total of 131 contexts produced pottery of this date, with an average of 7.3 sherds per context. The average sherd weight is 21.3g. Just over 77% of the groups comprised ten or fewer sherds, with just one context producing more than 50. Five contexts each produced over 1kg of pottery, including one which produced over 3kg (Table 3.4). Residuality was moderate, with *c* 10% of the assemblage by weight consisting of redeposited earlier material (Table 3.3).

Much of the pottery from this CP came from a single feature, latrine Structure 11 in Tenement B. It produced 168 sherds weighing 11,345g, or 55.4% of the entire CP assemblage, with its various fills, especially contexts 6480–6485, producing a number of very well-represented vessels, some of which survived to a full profile (eg Fig. 3.6, nos 40–5). The group was mostly large bowls but there were also fragments of cups, jugs, a dripping dish, and cisterns. There were cross-fits between most of the fills of the pit, indicating that they were all contemporary, and that it represents a single dump of material.

The main fabric types and their occurrence is fairly typical of sites of the period in Oxford other than a few fragments of imported Dutch and Spanish pottery. The stratified material is mostly from Brill/Boarstall in the form of late Brill/Boarstall ware (65.7% of the CP assemblage by weight), Brill/Boarstall 'Tudor green' ware (3.2%) and Brill/Boarstall ware (14.3%), along with small quantities of Raeren stoneware (4.1%), Cistercian ware (1.9%) and Tudor green ware (0.2%). The only other pottery which may be contemporary is a single small sherd of South Netherlands maiolica (1 sherd, 2g), another of Langerwehe stoneware (4g) and five sherds (55g) from a single Andalusian lustreware vessel. The sherds of maiolica and Langerwehe stoneware both occurred in the fills of ditch 3399 (Ditch 5).

The rim data is skewed by the presence of the well-represented vessels in latrine Structure 11, as bowls make up the largest group in the CP by EVE (22 examples, 31.9%), although a high proportion of large bowls is not uncommon in late medieval assemblages. Jugs (seven examples, 26.6%) and jars (22 examples, 24.1%) also fairly significant. As the data suggests, a number of jug rims were very well represented. The rest of the rim assemblage was made up of cups/mugs (19 examples, 17.4%) and a single late Brill/Boarstall ware dripping dish (Fig. 3.6, no. 46).

Nine of the jars (EVE 1.36) were OXBX types. The rest were residual, with seven being medieval Oxford ware and two being Kennet Valley A ware, with a small medieval Oxford ware example surviving to a full profile (Fig. 3.7, no. 47). Eighteen bowls were in late Brill/Boarstall ware (EVE 3.21), one was Tudor green ware (EVE 0.04) and the rest residual Cotswold-type and Surrey whiteware examples. Three of the jugs were late Brill/Boarstall ware (EVE 2.09), three more were Brill/Boarstall ware (EVE 0.69) and the other Cotswold-type ware (EVE 0.07). Two of the late Brill/Boarstall ware jugs were rather small and were probably drinking vessels. Of the cups/mugs, 13 were Brill/Boarstall 'Tudor green' ware (EVE 1.18), four were Cistercian ware (EVE 0.56) and one each was Tudor green ware (EVE 0.07) and Raeren stoneware (EVE 0.05). One of the Cistercian ware vessels survived to a full profile (Fig. 3.7, no. 48).

A total of 22 handles were noted. One came from the Cistercian ware cup/tyg, one from a late Brill/Boarstall ware mug, and one from a dripping dish or skillet in the same fabric. Five of the others were late Brill/Boarstall ware strap types, at least one of which came from a cistern, and two were rod types in the same fabric and appear to be from drinking jugs. Four were Brill/Boarstall 'Tudor green' ware handles from cups/mugs (eg Fig. 3.7, no. 49), and included one which was a copy of a lobed Surrey/Hampshire type. Six were from Brill/Boarstall ware jugs and the other two were residual medieval Oxford ware and Cotswold-type examples. Three cistern bungholes were noted (eg Fig. 3.6, no. 42) and one of the late Brill/Boarstall ware jugs had a pulled lip.

Some non-rim sherds worthy of comment were also noted. A large fragment of the base of a Brill/Boarstall 'Tudor green' ware mug occurred in context 22207 along with another from a Raeren mug. A fragment of the base and walls of a late Brill/Boarstall condiment dish (Fig. 3.7, no. 50) and the tiny fragment of maiolica from a ring vase (Fig. 3.7, no. 51) occurred in fills 3433 and 3434 of Ditch 5. The five sherds of Andalusian lustreware from this CP all came from the base and lower body of a jug (Fig. 3.7, no. 52). One of the body sherds had a ground edge, indicating the vessel may have been reused after initial breakage. A fragment from another Brill/Boarstall 'Tudor green' ware lobed cup was also noted, and another cup, possibly an imitation of Cistercian ware, was very well represented (Fig. 3.7, no. 53).

Decorated sherds were quite scarce, including much of the glazed pottery, as Brill/Boarstall wares were generally plain by this time. Three fragments from Brill/Boarstall 'Tudor green' ware mugs had fragments of applied face-masks (eg Fig. 3.7, nos 54 and 55), with the only other contemporary decorated sherds being a small fragment of a Cistercian ware cup with a stamped slip pellet and another Brill/Boarstall vessel, possibly an imitation of a Cistercian tyg, with a stamped applied pellet of body clay (Fig. 3.7, no. 56). A single residual sherd of Cotswold-type ware with combed wavy lines was also present.

Catalogue of illustrated pottery (Figs 3.6 and 3.7)

40 **Large bowl**. Fabric OXBX. Pale orange-pink fabric with darker surfaces. Outer surface heavily sooted for *c* 75% of the circumference.

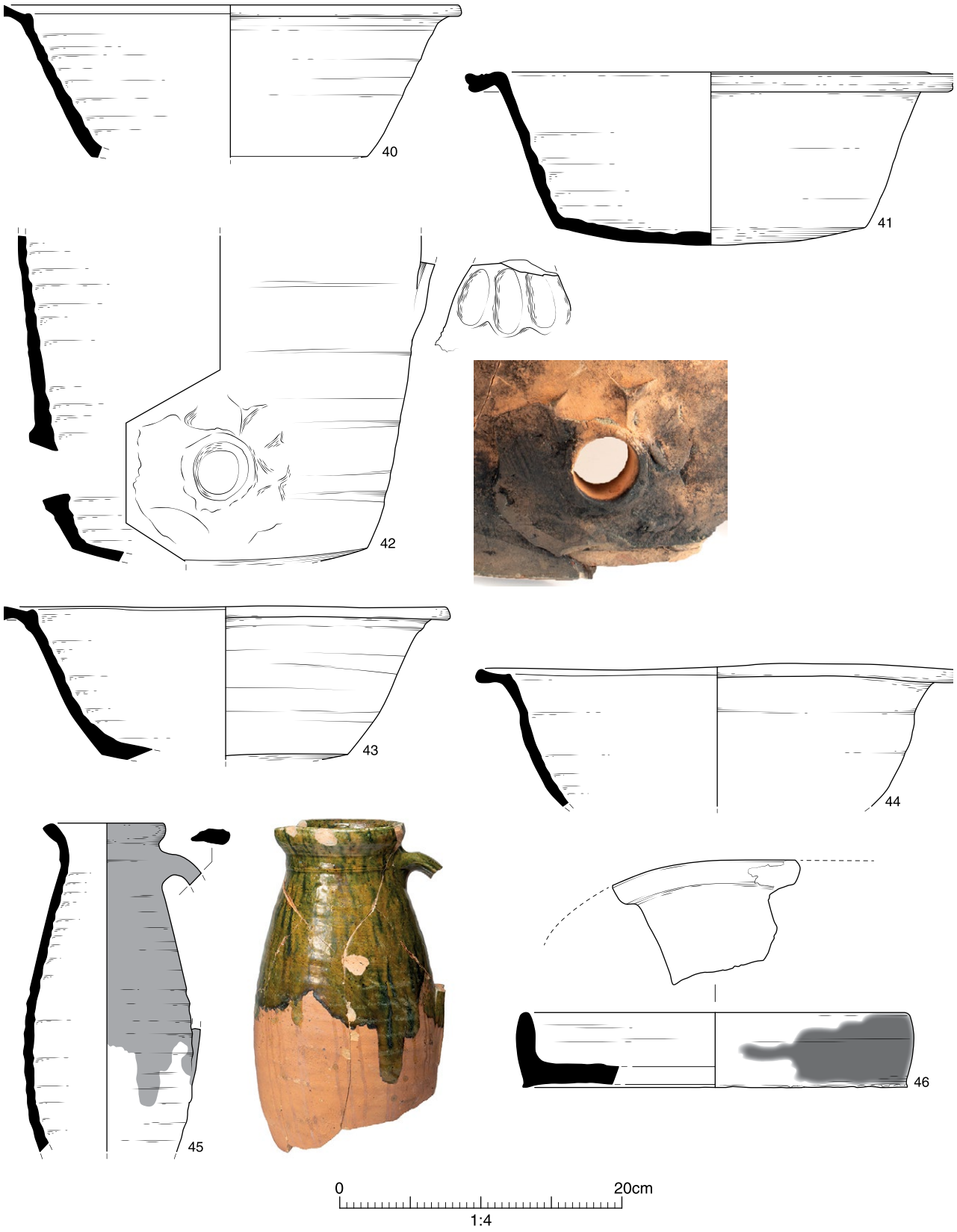


Fig. 3.6 Medieval pottery Ceramic Phase M4, late 15th–mid-16th century, nos 40–46

Ctx 6480, 6482, 6483, and 6485, latrine Structure 11, Tenement B, Phase 6.

41 **Large bowl**. Fabric OXBX. Pale orange-pink fabric with darker surfaces. Outer surface heavily sooted for *c* 60% of the circumference. Ctx 6482, 6483, 6484, 6485, 6486, and 6487, latrine Structure 11, Tenement B, Phase 6.

42 **Bunghole cistern**, lower part. Fabric OXBX. Pale orange-pink fabric with darker surfaces. Outer surface heavily sooted, rare spots of green and clear glaze on both surfaces. Ctxs 6481, 6483, 6485 and 6487, latrine Structure 11, Tenement B, Phase 6.

43 **Bowl**. Fabric OXBX. Pale orange-pink fabric with darker surfaces. Outer surface lightly



Fig. 3.7 Medieval pottery Ceramic Phase M4, late 15th–mid-16th century, nos 47–56

sooted, base extensively spalled. Ctxs 6483, 6484, and 6485, latrine Structure 11, Tenement B, Phase 6.

44 **Large bowl**. Fabric OXBX. Pale orange-pink fabric with darker surfaces. Outer surface heavily sooted. Splash of green glaze on rim. Ctxs 6484, 6485, and 6487, latrine Structure 11, Tenement B, Phase 6.

45 **Jug**, upper part. Fabric OXBX. Buff fabric with orange-pink surfaces, thick, glossy, copper-streaked green glaze on upper outer surface. Ctx 6482, latrine Structure 11, Tenement B, Phase 6.

46 **Dripping dish**, rim and base. Fabric OXBX. Grey fabric with buff surfaces, copper-speckled yellowish-green glaze on the inner. Outer surface of the wall fairly heavily sooted. Ctx 6482, latrine Structure 11, Tenement B, Phase 6

47 **Small jar**, full profile. Fabric OXY. Light grey fabric with darker surfaces, lower outer body evenly smoke-blackened, inner base scorched. Ctx 9691, pit 9674, Building 2, Tenement B, Phase 4.

48 **Cup**, full profile. Fabric CSTN. Purple fabric with dark greenish-brown glaze on both surfaces. Thick white residue internally, possibly from post-breakage deposition. Ctx 6462, latrine Structure 11, Tenement B, Phase 6.

49 **Cup**, rim and handle. Fabric OXBC. Buff fabric with light yellowish-green glaze on both surfaces. Ctx 3434, Ditch 5, Phase 6.

50 **Condiment dish**, base and walls. Fabric OXBX. Light orange fabric, copper-speckled green glaze on all surfaces. Ctx 3433, Ditch 5, Phase 6.

51 **Ring vase**, body sherd. Fabric SNTG. Pale buff fabric with white tin-glaze on both surfaces, blue-painted decoration on the outer. Ctx 3434, Ditch 5, Phase 6.

52 **?jug**, base and non-joining body sherds. Fabric ANDA. Buff fabric with decayed white tin-glaze on both surfaces, blue-painted decoration on the body sherds. Ctx 6089, occupation layer, Building 3, Tenement C, Phase 6.

53 **Cup or tyg**, body and handle terminal. Fabric OXBC. Orange fabric with dark orange glaze on both surfaces. Ctx 6462, latrine Structure 11, Tenement B, Phase 6.

54 **Mug with applied fabric-mask**, rim sherd. Fabric OXBC. Orange fabric with green glaze on both surfaces. Ctx 6412, deposit above hearth 6381, Tenement B, Phase 6.

55 **Mug with applied fabric-mask**, body sherd. Fabric OXBC. Light orange fabric with green glaze on both surfaces. Ctx 8856, occupation layer, Building 2, Tenement B, Phase 6.

56 **Stamped cup/tyg**, base and body. Fabric OXBC. Light orange fabric with green glaze on both surfaces. Ctx 6056, bedding layer, Building 3, Tenement C, Phase 6.

Ceramic Phase PM1: mid–late 16th century

A total of 45 contexts produced pottery of this date, with an average of 6.9 sherds per context. The average sherd weight is 30.9g. Just over 86% of the groups comprised ten or fewer sherds, with just one context producing more than 50 (Table 3.4). Two contexts (3939, the fill of robber trench 3940, and garden soil layer 4118) each produced over 1kg of pottery and between them comprised one-quarter of the pottery from the CP by weight. Residuality was fairly high, with over 18% of the CP assemblage by weight consisting of redeposited medieval material (Table 3.3). Cross-fitting fragments from a late Brill/Boarstall ware vessel occurred in contexts 3753 and 3754 in pit 3752 and 3760 in pit 3759.

The assemblage was dominated by late Brill/Boarstall ware (37.4% by weight of the CP assemblage), with the other main pottery types being post-medieval redware (15.2% by weight) and German stonewares in the form of Raeren (9.3%) and Frechen/Cologne types (12.9%). The rest of the contemporary material was made up of small quantities of Surrey/Hampshire border wares (green-glazed 1.9%; yellow-glazed 4.0%), Cistercian ware (1.1%) and post-medieval blackwares (0.1%). A single sherd of Midland purple ware (29g) was also noted. The residual material was largely unremarkable other than a single sherd of Brill/Boarstall ware which had a worn, rounded edge that suggests it had been used for rubbing or grinding (Fig. 3.8, no. 59).

The contemporary vessel forms were a very typical mixture of utilitarian earthenwares and drinking pottery in the form of stonewares. The former, as well as including the usual bowls and jars, included fragments of specialist cooking pottery in the form of a green-glazed border ware pipkin handle, post-medieval redware dripping dishes, and a possible skillet in late Brill/Boarstall ware. One of the late Brill/Boarstall ware jars had a bifid rim. The stoneware drinking pottery included two well-represented Raeren mugs (Fig. 3.8, nos 57 and 58), a neck of a Frechen jug or bottle with a Bartmann mask, a prunt with a moulded armorial from another example (Fig. 3.8, no. 60), and further one with a Bartmann mask and multiple armorial prunts, two of which partly survive to the extent that they can be seen to have been made with the same die (Fig. 3.8, no. 61).

Catalogue of illustrated pottery (Fig. 3.8)

57 **Mug**, near complete. Fabric RAER. Grey fabric with patchy brown iron-wash on outer surface, clear salt-glaze over all. Ctx 21614, infill, watching brief Tr 216, Tenement A, Phase 7.

58 **Mug**. Fabric RAER. Grey fabric with clear salt-

glaze over all. Brown inner surface. Patches of a post-depositional brown substance on outer surface. Ctx 21614, infill, watching brief Tr 216, Tenement A, Phase 7.



Fig. 3.8 Post-medieval pottery Ceramic Phase PM1, mid–late 16th century, nos 57–61

59 **Body sherd** with one worn edge. Fabric OXAM. Buff fabric with orange outer surface. Ctx 3872, garden soil, Tenement B, Phase 7.

60 **Armorial prunt** from jug/bottle. Fabric FREC. Grey fabric with light brown mottled salt-glaze on outer surface. Ctx 3213, redeposited garden soil, Tenement B, Phase 7.

61 **Bottle or jug** with Bartmann mask and armorial prunts. Fabric FREC. Grey fabric with brown, salt-glazed outer surface. Ctx 3756, pit 3752, Pit Group 17, Tenement B, Phase 7.

Ceramic Phase PM2: early–mid-17th century

A total of 12 contexts produced pottery of this date, with an average of 8.8 sherds per context. The average sherd weight is 14.6g. Just over 83% of the groups comprised ten or fewer sherds, with just one context producing more than 20. None of them produced over 1kg of pottery (Table 3.4). Residuality was moderate, with nearly 17% of the assemblage being redeposited earlier material (Table 3.3).

The assemblage was dominated by post-medieval redware (34.7% of the CP assemblage by weight) and late Brill/Boarstall ware (25.1%), with most of the rest of the contemporary material being Frechen stoneware (6.7%), tin-glazed earthenware (5.8%) and green-glazed border ware (3.8%), along with small amounts of metropolitan-type slipware (fabric METS; 0.9%), Westerwald/Cologne stoneware (1.0%), brown-glazed border ware (0.2%) and post-medieval black-glazed redware (0.3%). The only other contemporary pottery present was a sherd of Martincamp-type earthenware (6g) and a sliver of Chinese export porcelain (< 1g) although this seems likely to be intrusive.

Much of this was drinking pottery, including some of the English tin-glazed ware and the green-glazed border ware. For example, a single small fragment of a manganese-sponged English tin-glazed mug occurred in context 3338, a backfill of well 3328. Such vessels are generally dated to *c* 1630–80 (Orton 1988, 321). The brown-glazed and green-glazed border ware mugs included cross-fitting sherds in both fabrics from context 6013 of pit 6014 (Phase 10, post-tenements) and garden soil 6020. Such vessels were made from *c* AD 1625–75 (Pearce 1988, 99). Context 6020 also produced a sherd from a Frechen stoneware mug with 'Adam and Eve' decoration (Fig. 3.9, no. 62). The only other possible contemporary material was two sherds of Cistercian ware (5g). The contemporary earthenwares were a largely unremarkable collection of utilitarian vessels other than a fragment of a rim sherd from a late Brill/Boarstall ware chafing-dish (Fig. 3.9, no. 63).

Catalogue of illustrated pottery (Fig. 3.9)

62 **Sherd from a mug with 'Adam and Eve' decoration**. Fabric FREC. Grey fabric with

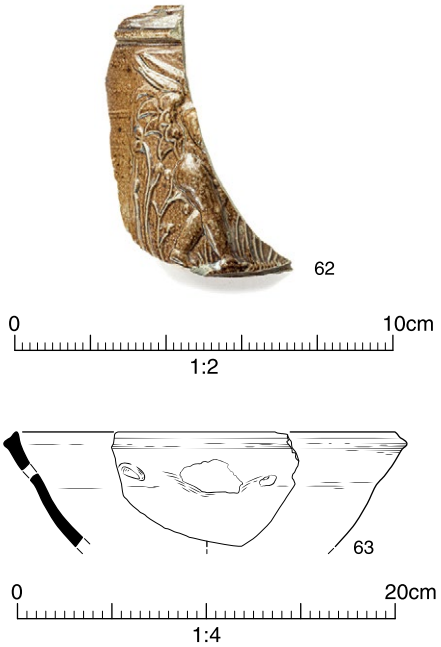


Fig. 3.9 Post-medieval pottery Ceramic Phase PM2, early–mid-17th century, nos 62–63

brown salt-glazed surfaces. Ctx 6020, garden soil, Tenement C, Phase 7.

63 **Chafing-dish**, rim and handle terminal scar. Fabric OXBX. Orange-pink fabric with glossy, copper-streaked green glaze on both surfaces. Ctx 8424, makeup layer, Building 11, Tenement B, Phase 9.

Ceramic Phase PM3: mid–late 17th century

A total of five contexts produced pottery of this date, with an average of 25.2 sherds per context. The average sherd weight is 29.6g. It all occurred in the fills of a single feature, pit 3772/6383 in Tenement B. Residuality was very high, with around half of the assemblage being redeposited earlier material. There were a number of cross-fits between the various fills, indicating they are all broadly contemporary or at least represent material which is mostly from a single source. Residuality was very low, with less than 1% being redeposited earlier material.

The main fabric type was late Brill/Boarstall ware (46.2% of the CP assemblage by weight), with much of the rest made up of Frechen stoneware (14.9%), post-medieval redware (11.2%), metropolitan slipware (9.6%) and Border wares (yellow-glazed 6.9%; green-glazed 2.4%; brown-glazed 1.8%), along with small quantities of post-medieval black-glazed redware and Staffordshire-type slipware (0.5%). The data is probably somewhat distorted by the small assemblage size and the presence of some well-represented vessels. For example, the sherds of metropolitan slipware are all from a single vessel, a bowl which occurred in contexts 3818, 3820, and 3822 (Fig. 3.10, no. 65).

The assemblage is once again notable for a high proportion of pottery associated with drinking. The Frechen jugs and bottles aside, one of the sherds of green-glazed border ware is from an encrusted mug typical of the mid- to late 17th-century products of the tradition (eg Pearce 1988, pl. 3), the brown-glazed ware is mostly represented by a single incised mug of a similar date (ibid.), the Staffordshire-type slipware is a small sherd from the rim of a posset cup, the sherds of post-medieval black-glazed redware are all from a single tankard, and the late Brill/Boarstall assemblage includes two non-joining sherds from the rim and shoulders of a lugged costrel (Fig. 3.10, no. 64). Most of the rest of the pottery was utilitarian pancheons, although fragments of a late Brill/Boarstall ware strainer were also noted.

Catalogue of illustrated pottery (Fig. 3.10)

64 **Lugged costrel**, two non-joining sherds from the rim and shoulders. Fabric OXBX. Orange fabric with a grey core, glossy yellowish-orange glaze on the outer surface. Ctx 3822, pit 3772, Pit Group 17, Tenement B, Phase 7.

65 **Large bowl or pancheon**. Fabric METS. Orange fabric with slightly darker surfaces, areas of a white slip covered by a clear glaze on the inner surface. Glaze appears yellow over the slip, orange on the body clay. Ctx 3818, 3820, and 3822, pit 3772, Pit Group 17, Tenement B, Phase 7.

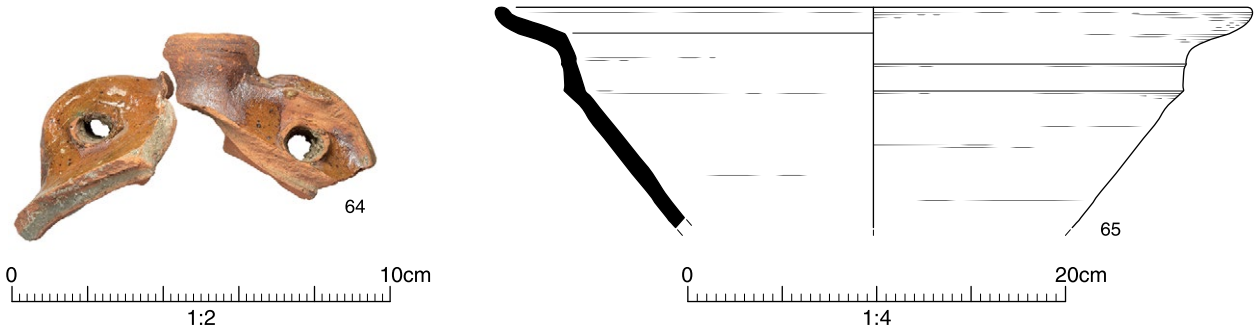


Fig. 3.10 Post-medieval pottery Ceramic Phase PM3, mid–late 17th century, nos 64–65

Ceramic Phase PM4: early–mid-18th century

A total of 12 contexts produced pottery of this date, with an average of 12.0 sherds per context. The average sherd weight is 25.7g. Exactly 75% of the groups comprised ten or fewer sherds, with just one context producing more than fifty (Table 3.4). Eight of them produced less than 100g of pottery, but two, 3768 (19 sherds, 1788g) and 4131 (87 sherds, 1068g), produced over 1kg each, and represent over 77% of the pottery (by weight) from the entire CP. Residuality was high, with nearly a third of the assemblage being redeposited earlier material (Table 3.3).

The assemblage was dominated by fragments of flowerpots (27.6% of the CP assemblage by weight) and post-medieval redware (22.0%), with the rest of the material being English brown stoneware (ENGS; 6.9%), tin-glazed ware (6.6%), white salt-glazed stoneware (1.7%), green-glazed border ware (1.2%) and Westerwald-type stoneware (0.2%). Four sherds (30g) of Chinese porcelain and one of Derby stoneware (12g) were the only other contemporary wares present.

The fragments of flowerpot all occurred in contexts 3768 and 3769, both fills of pit 3767. There were cross-fits between the two. None of the vessels were particularly well represented, but there were seven rim sherds, all of which had hooked forms (eg Fig. 3.11, no. 66) typical of such vessels in the 18th century (Currie 1993, 238). Only three base sherds were noted. One had a central hole (Fig. 3.11, no. 67), while another did not but did have holes around the outer edge of the base-pad (Fig. 3.11, no. 68). The former had virtually nothing of the vessel walls remaining so it could not be ascertained whether it had side-holes. The third example was missing the centre of the base, but did have a hole in the lower wall (Fig. 3.11, no. 69) and was in a different fabric to the other two, a buff sandy ware reminiscent of the products of the Brill industry, whereas the others were similar to post-medieval redware. Flowerpots with side drainage holes were current from *c* 1600–1730, while those with central holes became common from *c* 1730 onwards (ibid., 239). It is possible, therefore, that the buff flowerpot is earlier than the rest, but they all could be broadly contemporary given the CP date. Some of these sherds also had the odd splash of glaze, suggesting they were fired with other glazed vessels.

Most of the rest of the CP assemblage again consisted of a mixture of utilitarian earthenwares and stoneware drinking pottery. The latter included a sherd from the rim of an English stoneware tankard which retained a partial, two-line inscription reading '…White at…' '…y-hound…' (Fig. 3.11, no. 70), a fragment from a brown-dipped Staffordshire white salt-glazed stoneware type, and there were also tea-drinking wares present in this fabric such as tea- and sugar/slop-bowls (Fig. 3.11, nos 71 and 72). A fragment of shell-edged plate in the same fabric was also noted, along with a sherd from a white tin-glazed flower vase.

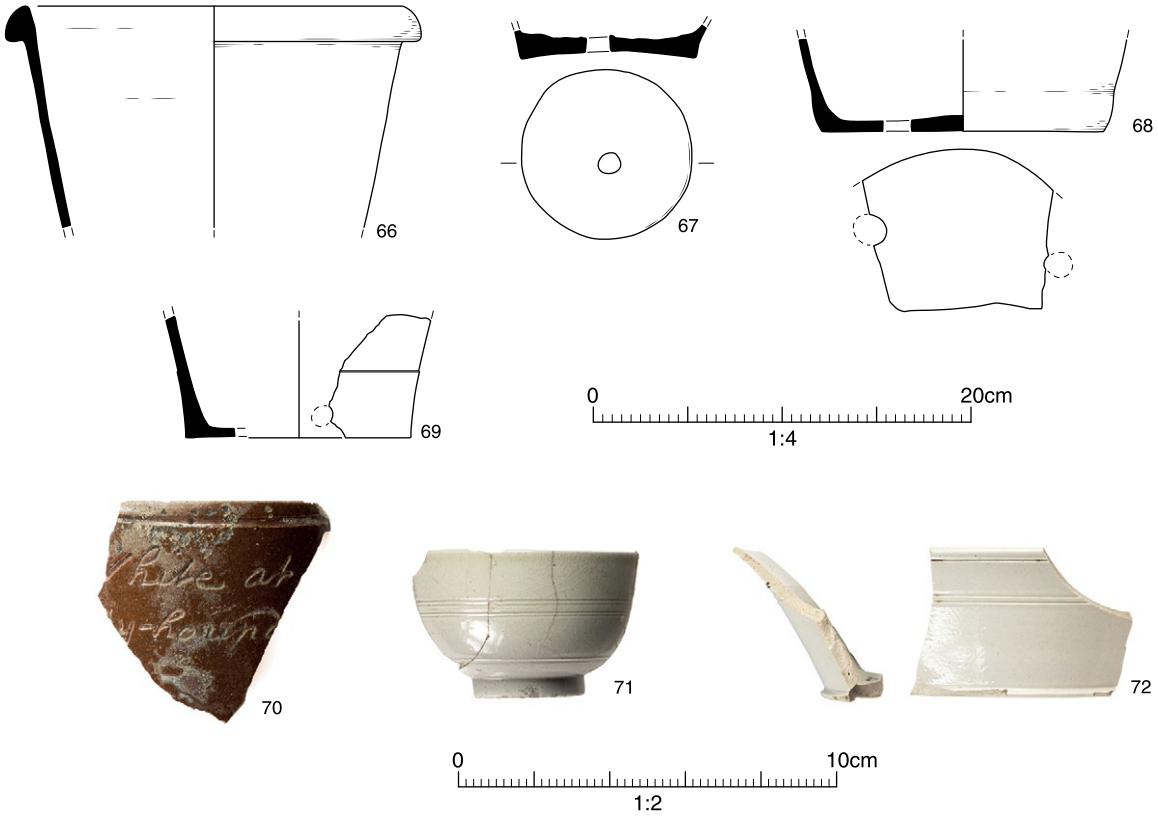


Fig. 3.11 Post-medieval pottery Ceramic Phase PM4, early–mid-18th century, nos 66–72

Much of the residual material (49 sherds, 680g) consisted of Brill/Boarstall ware, with seven fairly large fragments of lamps noted.

Catalogue of illustrated pottery (Fig. 3.11)

66 **Flowerpot rim**. Fabric HORT. Uniform light orange fabric. Ctx 3768, pit 3767, Tenement B, Phase 9.

67 **Flowerpot base**. Fabric HORT. Orange-red fabric with dark greyish-brown surfaces. Ctx 3768, pit 3767, Tenement B, Phase 9.

68 **Flowerpot base**. Fabric HORT. Orange-red fabric with darker surfaces. Small pool of glossy green glaze on the outer base. Ctx 3768, pit 3767, Tenement B, Phase 9.

69 **Flowerpot base**. Fabric HORT. Orange fabric with buff surfaces. Ctx 3768, pit 3767, Tenement B, Phase 9.

70 **Tankard rim with partial inscription**. Fabric ENGS. Grey fabric with brown surfaces. Ctx 6543, topsoil, Phase 10.

71 **Tea bowl**, full profile. Fabric SWSG. Uniform white fabric. Ctx 8421, floor, Building 11, Tenement B, Phase 9.

72 **Sugar/slop-bowl**, full profile. Fabric SWSG. Uniform white fabric. Ctx 8421, floor, Building 11, Tenement B, Phase 9.

Ceramic Phase PM5: mid–late 18th century

A total of 14 contexts produced pottery of this date, with an average of 4.2 sherds per context. The average sherd weight is 35.1g. Nearly 93% of the groups comprised ten or fewer sherds, with just one context producing more than fifty (Table 3.4). Half of them produced less than 100g of pottery, and none produced over 1kg. Residuality was again high, with nearly a third of the assemblage being redeposited earlier material, some of which were quite large sherds, such as the complete neck of a FREC bottle.

The stratified pottery mostly consisted of post-medieval redware (30.9% of the CP assemblage by weight) and creamware (fabric CREA; 23.3%), with the rest being Staffordshire white salt-glazed stoneware (5.6%) and English tin-glazed ware (1.9%). The range of vessel forms was generally unremarkable, and was again a mixture of table wares, mostly in the form of creamware, and stoneware drinking pottery, including a fairly large fragment from the base of a Staffordshire white salt-glazed stoneware tankard. The English tin-glazed ware assemblage included a partially complete ointment pot in a plain white glaze (eg Orton 1988, fig. 131 nos 1248–1253).

The residual material included a sherd of Martincamp-type earthenware (49g) and a small fragment of a colander in green-glazed border ware.

Ceramic Phase PM6: late 18th–early 19th century

A total of seven contexts produced pottery of this date, with an average of 21.9 sherds per context. The average sherd weight is 77.3g. Only one context produced less than 100g of pottery, with the rest all producing more than 500g, and two, layer 3189 (31 sherds, 5280g) and backfill 3377 of well shaft 6135/3313 (42 sherds, 3841g), producing over 3kg each. Residuality was very low, with less than 2% of the assemblage being redeposited earlier material. None of it was medieval.

The stratified pottery mostly consisted of post-medieval redware (62.7% of the CP assemblage by weight) and English stoneware (12.3%), along with small quantities of pearlware (5.3%), creamware (4.5%), English tin-glazed ware (3.7%), horticultural earthenware (2.7%), metropolitan slipware (2.0%) and Westerwald-type stoneware (0.1%), with seven sherds (118g) of Chinese porcelain, five sherds of Derby stoneware (66g) and two of black basalt ware (407g) also present. The last of these was mostly a single well-represented but highly fragmented teapot and lid. A number of well-preserved Staffordshire white salt-glazed stoneware vessels were noted, so although such pottery had ceased to be made by this time, it seems some long-lived or very late vessels of this type were still in use (see below).

The assemblage again consisted of a mixture of utilitarian and finer wares. The post-medieval redware comprised mostly large bowls or pancheons, some of which were largely complete, although an unusual and heavily sooted small jar which survived to a full profile was also noted (Fig. 3.12, no. 74), as was a small handled jar in metropolitan slipware (Fig. 3.12, no. 73). The rest of the material, the flowerpots aside, was almost entirely drinking pottery. Most of the English stoneware consisted of a large, well-represented jug or flagon, but there were also a number of fragments of inscribed tankards, although the inscriptions were incomplete on all of them. The most complete (Fig. 3.12, no. 75) had a two-line inscription which was largely missing, with just 'F…e' and 'G…nd' surviving. Another base sherd (Fig. 3.12, no. 77) had a single letter 'e' surviving, and a rim sherd (Fig. 3.12, no. 76) had an illegible fragment which may be part of a monogram. Tea-wares were well represented. As well as the black basalt ware teapot, there were fragments of others in pearlware, tea bowls in Staffordshire white salt-glazed stoneware (eg Fig. 3.12, no. 78) and pearlware (Fig. 3.12, nos 79 and 80), and a saucer in the latter (Fig. 3.12, no. 81). All the pearlware had 'Chinese house'-style decoration typical of the late 18th to early 19th century (Miller and Hunter 2001, 151) other than a small fragment of a broadly contemporary green shell-edged plate. One of the Staffordshire white salt-glazed stoneware vessels is from a small sauceboat (Fig. 3.13, no. 82) There was also a full profile of a plain tankard in this ware (Fig. 3.13, no. 83). Other pearlware table wares such as plates were also present in small quantities.



Fig. 3.12 Post-medieval pottery Ceramic Phase PM6, late 18th century, nos 73–81

The fragments of English tin-glazed ware were in the main from plain white- or light blue-glazed utilitarian vessels such as ointment jars and chamber pots. One sherd was noted from a bowl with a manganese-sponged exterior and a blue-painted interior. It is very similar to a vessel from the Norfolk House pothouse in London (Tyler *et al*. 2008, fig. 151) which ceased production during the 1770s (ibid., 96), and so is likely to be residual. The horticultural earthenware assemblage consisted of chronologically undiagnostic fragments.

Catalogue of illustrated pottery (Figs 3.12 and 3.13)

73 **Small handled jar**, near complete. Fabric METS. Uniform pinkish-orange fabric, vertical white slip stripes on inner. Clear orange glaze over all, alternate stripes covered with a clear green glaze. Patches of a thick white residue on the outer surface and rim. Ctx 3190, backfill, Building 9, Tenement B, Phase 9.



Fig. 3.13 Post-medieval pottery Ceramic Phase PM6, late 18th century, nos 82–83

74 **Small jar**, near complete. Fabric PMR. Uniform orange fabric, inner surface covered with a clear orange glaze. Outer surface thickly sooted, base-pad burnt. Ctx 3190, backfill, Building 9, Tenement B, Phase 9.

75 **Inscribed tankard**, full profile. Fabric ENGS. Buff fabric with thin brown wash on the interior and top of the exterior, clear glaze over all. Ctx 3377, backfill well 6135/3313, Tenement B, Phase 9.

76 **Inscribed tankard**, rim sherd. Fabric ENGS. Uniform grey fabric, dark brown iron-wash on both inner surfaces. Ctx 6621, levelling, Building 12, Tenement A, Phase 10.

77 **Inscribed tankard**, base sherd. Fabric ENGS. Uniform grey fabric, brown iron-wash above the lettering and on the inner surface. Ctx 3377, backfill well 6135/3313, Tenement B, Phase 9.

78 **Tea bowl**, complete. Fabric SWSG. Uniform white fabric. Ctx 3189, demolition layer, Phase 10.

79 **Tea bowl**, near complete. Fabric PEAR. White fabric, clear bluish glaze over blue-painted decoration. Ctx 3189, demolition layer, Phase 10.

80 **Tea bowl**. Fabric PEAR. White fabric, clear bluish glaze over blue-painted decoration. Ctx 3279, demolition layer, Phase 10.

81 **Saucer**. Fabric PEAR. White fabric, clear bluish glaze over blue-painted decoration. Ctx 3279, demolition layer, Phase 10.

82 **Sauceboat**, fragment. Fabric SWSG. Uniform white fabric. Ctx 3377, backfill well 6135/3313, Tenement B, Phase 9.

83 **Tankard**, full profile. Fabric SWSG. Uniform white fabric. Ctx 3279, demolition layer, Phase 10.

Ceramic Phase MOD: early 19th century+

A total of 33 contexts produced pottery of this date, with an average of 14.4 sherds per context. The average sherd weight is 39.9g. Two-thirds of the groups comprised ten or fewer sherds, with just one producing over 100 (Table 3.4). Just over 42% produced less than 100g of pottery, with five producing over 1kg. Two of these had over 3kg. Residuality was fairly high, with nearly 20% of the assemblage being redeposited earlier material (Table 3.3).

The contemporary pottery consisted of a typical mix of refined whitewares, stonewares and red earthenwares. The whitewares were mainly table wares such as plates and cups, the stonewares consisted of blacking- and ink-bottles and rum jars along with a few fragments of glazed black basalt



Fig. 3.14 Post-medieval pottery Ceramic Phase MOD, early 19th century, no. 84

ware teapots, and the red earthenwares were mostly fragments of large pancheons.

The residual material reflected the general pattern shown in earlier CP groups, with the medieval material including the base of a Brill/Boarstall ware bottle and a large fragment of a late Brill/Boarstall costrel (Fig. 3.14, no. 84). Fragments of Brill/Boarstall 'Tudor green' cups were also present. The post-medieval material included a large fragment of a Staffordshire white salt-glazed stoneware teapot and fragments of shell-edged creamware plates with early 'buttery' glazes.

Catalogue of illustrated pottery (Fig. 3.14)

84 **Upper part of costrel**. Fabric OXBX. Light grey fabric with pale orange surfaces, glossy variegated orange and green glaze on the outer surface. Ctx 3261, backfill, Structure 14, Tenement B, Phase 10.

Overview and discussion

This large group of pottery offers an insight into the wealth and status of this area of Oxford from the late Anglo-Saxon period to virtually the present day, with the range of pottery types present showing there was more-or-less unbroken activity here from the 10th century. The peak of pottery deposition (Table 3.2) was during the medieval period, ceramic phases M1–M4 (late 11th–mid-16th century), with just over three-quarters of the post-Roman pottery from the entire site by weight (75.6%) dating to that time. There were no obvious differences in the pottery from the smithy (Tenement A) when compared with the material from the other two tenements, other than perhaps the much higher occurrence of lamps there during CP M3. It has been shown that the presence of large numbers of lamps at a site can be associated with craft activity (Blinkhorn *et al*. 2017), although here, as noted above, the imbalance in the assemblage sizes may be causing this apparent difference. In addition, the mid-13th- to mid-14th-century pottery assemblage from 4a Merton Street, Oxford also featured a fairly high proportion of lamp fragments (Blinkhorn 2006, table 10), but this was at that time the dwelling-place of a prosperous family with no evidence of industrial activity having taken place.

The earliest post-Roman activity is represented by 25 small but apparently stratified groups of late Anglo-Saxon pottery, all but two of which produced only three or fewer sherds, and none more than ten, reinforcing that this area of Oxford was somewhat liminal at that time, and lay outside the area of the burh. However, over half of the St Neots ware from the site (143 sherds, 1257g) was redeposited and occurred as residual material in medieval contexts, with all but 12 sherds (105g) of this occurring in features of CP M1 and M2 date, so it seems that there was considerable disturbance of late Anglo-Saxon deposits then, presumably due to the construction of the tenements, The largest stratified group of late Anglo-Saxon date, ten sherds, was from roadside Ditch 1 context 9367. They were in good condition and appear reliably stratified. They mostly consisted of fragments of jars and bowls in St Neots ware, which is fairly typical of sites of this period in Oxford (eg Blinkhorn 2002a), although a single sherd of imported North French greyware also occurred. Such pottery is known from a small number of sites in the city, particularly All Saints Church (Mellor 2003a, 340), and reflects Oxford's importance as a market centre at that time. Other imported wares, in the form of three sherds from a Rhenish greyware vessel, were found as residual material in a CP M2 context. It is worthy of note that only three sherds of Oxford shelly ware occurred here, so it is entirely possible that the late Anglo-Saxon activity here all dates to around the early/mid-11th century, the time at which such pottery fell from use (Mellor 1994, 41). It has been noted in the past that peripheral areas of the late Anglo-Saxon burh mainly produce St Neots ware, with Oxford shelly ware more common in the central areas (Mellor 1997, 23), so this may be another example of that phenomenon, although the St Neots rim sherds were all from larger vessels, which tend to be the later, 11th-century products of the tradition (Denham 1985, 54). Thus, it is likely that much of this pottery is of 11th-century date and, due to the small assemblage sizes, lacks the defining wares.

The 11th-century, Saxo-Norman assemblage (CP SN) is a little larger, but most of the groups were again quite small and comprised less than ten sherds. The bulk of the material came from pits but

is in reasonably good condition and seems well stratified. The range of pottery types is again fairly typical, with pottery from the region to the west of the city, Cotswold-type ware, being the main fabric type, and St Neots ware falling from use during this time. The only other pottery present comprises a few sherds from more distant sources: Stamford ware and Michelmersh ware. The former is quite well known at sites in Oxford at that time (eg Blinkhorn 2002a), as it is at many sites all over the British Isles (Kilmurry 1980), but Michelmersh ware is less common here. Over half of the pottery came from a single pit (4864), suggesting that the area was still largely liminal at this time, but it is possible that the same activity which disturbed some of the late Anglo-Saxon groups also disturbed assemblages of this date, but as Cotswold-type ware was used well into the medieval period, it is not possible to identify residual material of this type in CP M1 and CP M2 groups.

Ceramic Phase CP M1 (late 11th–12th century) saw the construction of the tenements, with the corresponding increase in activity producing a large pottery assemblage (1980 sherds, 26.3kg), and although none of the groups were particularly large in terms of sherd numbers, some very well-represented vessels were present (eg Fig. 3.1, nos 2–6). As is usually the case for this period in Oxford, the assemblage is dominated by medieval Oxford ware, in the form of jars, bowls, and glazed tripod pitchers, along with a few lamps. This pottery type was probably made in the area somewhere to the north of the city, but the rest of the assemblage, Cotswold-type ware aside, comes from more distant sources, such as the Kennet Valley near Newbury, Reading (Ashampstead-type ware), the Northamptonshire/Bedfordshire border region (shelly coarseware), Stamford, Worcester and Bath. While this represents the general pattern for sites of this period in Oxford, the Bath 'A' ware is the first to be recorded in the city, while Worcester glazed sandy ware has only previously been recorded from Rewley Abbey (Cotter 2007); these rare finds may perhaps be evidence of mercantile activity. They both occurred in features in Tenement A. No pottery that could be said to be definitely associated with metalworking was present.

Ceramic Phase M2 (13th–14th century) is also fairly typical in terms of the pottery consumption patterns. The assemblage is dominated by Brill/Boarstall ware, along with the continued presence of Cotswold-type ware, Kennet Valley A ware and medieval Oxford ware, but small amounts are of rare fabrics, both English and imported. There were further sherds of Bath 'A' ware and the Worcester glazed sandy ware, and these, along with Minety-type ware, suggest links of a mercantile nature to western England. The Saintonge polychrome sherd was amongst the large group of pottery in pit 3901 in Tenement B (context 4259) whilst a sherd of Spanish green-glazed pottery (SPGR) occurred in the fill of a pit (4141, context 4242) in Tenement A. The sherds of Worcester ware and Bath 'A' ware came from pits in Tenement A, while the Minety ware came from a pit in Tenement B. There were also a few sherds of Surrey whitewares, all in features in Tenement B.

The sherd of Saintonge polychrome is an unusual find in Oxford, and at inland sites in England generally. For example, it is unknown in Northampton. A few sherds have been noted in the city in the past, mostly from relatively wealthy households such as at Roger De Cumnor's tenement at North Osney and at 31–34 Church Street (Mellor 1996, 204). The reason for this is probably that such pottery is closely associated with the wine trade, and large quantities of it have been noted at the ports of entry for such goods, such as Southampton (Brown 2002, 27). It is known from the documentary record that French wine was being shipped directly to royal sites in Oxfordshire via Southampton in the 13th century, and also that Henry III had wine cellars in Oxford (Farley 1982, 117). Its presence here could actually be further evidence of links to western England, as it occurs at sites in Bristol (eg Ponsford 1998), although it is also known in London (Vince 1985, fig. 22). However, simple wealth and social status may not be the sole reason for the presence of the imported wares. Imported pottery has been noted at sites with evidence of manufacturing, including industrial-scale ironworking, in other areas of the country where they are otherwise also quite rare. For example, in Northamptonshire, where imported earlier medieval pottery is very rare, the site at Deene End, Weldon, a late 12th–13th-century ironworking complex, produced Rhenish imports in the form of Paffrath-type 'Blaugrau' ladles and Pingsdorf ware (Blinkhorn 2003b). More recently, a site at Angel Street in Northampton with evidence of large-scale bone working, including chess-piece manufacture, produced a similar range of Rhenish imports as well as French and Spanish pottery which included Andalusian lustreware similar to that from here (Blinkhorn 2021), with the total number of sherds of imported wares from the site being greater than that from the whole of the rest of the medieval town combined. The reason for this would seem to be that the manufactories were part of a regional and perhaps even international trade network, and so it seems likely therefore that the products of the ironworks at this site may have had access to markets well beyond the town and was profitable enough for the inhabitants to afford luxury imported goods such as wine.

The range of vessels present in CP M2 deposits, and to some degree, their occurrence, is unusually broad for Oxford at this time, and the vessel occurrence data in Table 3.5 shows that their presence is at the expense of jars which are usually the most common vessel form by some distance at this time (eg Blinkhorn 2002a, table 7). There were also some unusual and/or very well-represented vessels, such as a bowl with an upright loop handle (Fig. 3.3, no. 23), and two near-complete jugs, with the latter perhaps skewing the vessel occurrence data to a degree. One of the jugs had a very worn outer

surface and a lead-plug repair (Fig. 3.2, no. 13) and another (Fig. 3.2, no. 14) had a heavily chipped pedestal base, indicating that both had long use-lives. A few jars and bowls also survived to full profiles. The proportion of jar rims (37.7%) is low for assemblages of this date in Oxford, but other sites in the city have produced similar data, such as 4a Merton Street (Blinkhorn 2006, table 10). That site also produced a similar proportion of lamps to that in assemblages of this date (Table 3.5). Here, during CP M2, small numbers of fragments of rims of Brill/Boarstall ware bottles, a dripping dish, a lid, a 'cruet' and skillets were noted, but also a fragment of what appears to be a salt-pig (Fig. 3.2, no. 17) and an aquamanile, a vessel usually used for washing the hands during formal dining (Fig. 3.3, no. 26). Vessels such as these, and also the condiment dishes and the 'cruet', are unlikely to have been used in ordinary households and are relatively rare finds. The latter is a vessel form which is a copy of metal examples, and which is traditionally believed to have had religious connotations, but they often occur in domestic contexts in Oxford (Mellor 1997, 32). The assemblage bears comparison with the large pottery assemblage from Eynsham Abbey. There, relatively large quantities of small skillets and bottles (Blinkhorn 2003a, figs 7.18 and 7.20), and dripping dishes (ibid., fig. 7.15) were all noted. The only major difference appears to be an almost complete lack of lamps from Eynsham, with just a single fragment noted (ibid., table 7.22), so a different lighting regime must have been in place there. Large quantities of Brill/Boarstall jugs along with bottle and lamp fragments were also noted amongst the pottery from the 'hospital levels' during the previous excavations to the east of this site (Mellor 1991a, 50). This all suggests that there was some form of formal dining and perhaps even mass catering taking place in or near to this site during CP M2, possibly related to the nearby presence of the hospital.

A fairly large number of cross-fits were noted between CP M1 and CP M2 contexts, which suggests that a number of CP M1 groups may be later than the range of pottery types present suggests, but given the relatively large assemblage sizes, it is more likely that there is a higher amount of residual pottery in CP M2 contexts than the bare data indicates. Many of the vessels that did have cross-fitting sherds were in fabrics which were current in both CP M1 and CP M2, so identifying residual material is not really possible.

During CP M3 (early to late 15th century), a similar pattern was noted, with Brill/Boarstall ware dominating the assemblage, and fragments of condiment dishes and the like occurring. Lamps were even more common than in the previous CP, making up 12.8% of the rim assemblage (Table 3.5). Jars were again relatively rare, and jugs the most common vessel form. The presence of a possible distilling base (Fig. 3.5, no. 34) suggests possible alcohol production, but such vessels were also used for the production of mineral acids for assaying precious metals and the like (McCarthy and Brooks 1988, 120), so given the industrial nature of part of the site, such a use is possible here. Also present were two large fragments of cisterns and four bungholes from other vessels of this type, specialist pots used for the brewing and transportation of ale and beer. The 'large pot for storing ale or carrying water' which was purchased by the college for 4d in 1481–2 (Mellor 1997, 32) is very likely to have been such a vessel. The surviving portion of one of them here is virtually identical to a late Brill/Boarstall vessel from the Oxford Clarendon Hotel site which was dated to the 15th century (Mellor 1994, fig. 66 no. 4). Given cisterns can only really be recognised by the presence of handles or bungholes, their true proportion here may have been much higher. Such vessels may be evidence of mass catering, but drinking pottery also often occurs in fairly large quantities at sites with a significant industrial component, where heavy manual work was taking place (eg Blinkhorn 2000). A few fragments of pottery associated with cooking, dripping dishes and cauldrons were present (Table 3.5), but drinking pottery such as jugs, cisterns and also 'Tudor green' lobed cups was by far the most common type. It is also worthy of note that there was a sharp increase in residuality in this phase, which may be evidence of building work causing disturbance to underlying strata.

The rebuilding of the tenements and the founding of Magdalen College broadly corresponds with the beginning of CP M4 (late 15th–mid-16th century). Pottery-wise, the general picture during this CP is similar to that from the later phases of the tenements, with Brill/Boarstall products by far the main type, with jars once again relatively rare and fragments of condiments and dripping dishes, and cisterns all noted. However, it is perhaps worthy of note that the end of industrial activity at the site also sees the almost complete disappearance of lamps from the archaeological record here, with no rims noted (Table 3.5). Cups were also much more well-represented than before, making up over 17% of the rim assemblage. These could be evidence of mass catering or related to building work. Three of the fragments of Brill/Boarstall mugs showed evidence of having modelled face-masks (eg Fig. 3.7, nos 54 and 55), a speciality of the industry (eg McCarthy and Brooks 1988, fig. 271). The main vessel type (by EVE) was bowls rather than jugs. While this is not unusual for the later medieval period, most of them, and indeed over half of the pottery by weight from this phase, came from a single feature, latrine Structure 11. All the well-represented vessels from the pit (eg Fig. 3.6, nos 40–6) apart from a single jug were all heavily sooted and probably represent a dump of kitchen waste. There were cross-fits between most of the fills of the pit, indicating that the material is mostly contemporary, and the result of a single action. It is perhaps significant that the cisterns were sooted as such vessels were not designed for cooking, and rarely, if ever, show

evidence of being heated, and similar comments apply to the large bowls, so this pottery may be evidence of a conflagration. Three cistern bungholes were noted in other features.

This CP also produced the sherd of South Netherlands maiolica and the fragments of the Andalusian lustreware vessel. The latter is either residual or is from a curated vessel. The maiolica, as well as a sherd of Langerwehe stoneware, one of the rarer imports of this type, occurred in the same feature, ditch 3399 (Ditch 5), probably the boundary to college land to the north of the rebuilt tenements. The presence of fragments of ring-handled vases, also known as 'altar vases', both here and in the earlier excavations to the east (Mellor 1991a, fig. 12, nos 8 and 9), is worthy of comment. Such pots are associated with Christian worship, and it is not uncommon for them to have an 'IHS' monogram painted on the belly as the examples from the earlier excavation do. Tin-glazed jugs and vases, sometimes with the 'IHS' monogram, were often depicted in the art of the period, often holding irises, the symbolising the Virgin, and lilies, a symbol of purity and chastity, such as in Hans Memling's *Flowers in a Jug*, painted *c* 1485. The earlier excavations at the Hospital of St John also produced a lot of drinking pottery, some of which was imported, including a large piece of an Iberian Merida-type costrel (ibid., fig. 12, no. 5), another costrel, of Surrey whiteware type (ibid., fig. 12, no. 11), and large quantities of Rhenish stonewares in the form of globular tankards, including a number of mugs with unusual, stamped rims (ibid., fig. 13). Fragments of two white tin-glazed cups were also present (ibid., fig. 13, nos 20 and 21).

Imported wares were also noted amongst the later medieval material from Eynsham Abbey, including a Spanish lustreware albarello (Blinkhorn 2003a, fig. 7.19), and a Martincamp-type flask, with drinking pottery in the form of mugs and cups very common in the late medieval period (ibid., table 7.22). Many of the jugs of this date from there were small, and probably also drinking vessels (ibid., fig. 7.18). The site also produced a number of large fragments of a horse-and-rider aquamanile (ibid., fig. 7.10).

The earliest post-medieval assemblages, from CP PM1 (mid–late 16th century), show something of a drop in activity in terms of pottery deposition, although a reasonably large amount of pottery (9623g) was present. A quarter of it by weight came from a robber trench fill (context 3939) and a garden soil (4118), showing that much of the material is the product of secondary deposition, and 18% of all the pottery from the CP is residual.

The assemblage shows something of a change in character to what went before, with cooking pottery much more common, although drinking wares, particularly German stonewares, in the form of Raeren and Frechen wares, are still dominant. These make up nearly a quarter of the CP assemblage by weight (Table 3.3). Such pottery, almost entirely drinking wares, is well known in Oxford, and sometimes occurs in large quantities. For example, at Tom Quad at Christ Church it makes up from around a quarter to nearly half of the pottery from assemblages of the mid-16th–later 17th century (Blinkhorn 2012, table 1). This period there saw the establishment of Christ Church and an influx of students, a visit by Queen Elizabeth and her court, a further enlargement of the college, and finally Charles I making the place his headquarters during the Civil War followed by further building work (ibid., 117). Given the proximity of a college and an inn at this time, a similarly large assemblage of stoneware drinking pottery should perhaps be expected.

Pottery deposition dropped off dramatically during CP PM2–PM5, with all the assemblages quite small and from just a few features, and with a fairly high residual component, reflecting what appears to have been something of a period of stability at the site once the seven tenements were reduced to five. Most of the material was either utilitarian earthenwares, particularly large bowls, or drinking pottery. In CP PM2 (early–mid-17th century), the latter type was still dominant, and included manganese-sponged tin-glazed earthenware, Border ware and German stoneware mugs. These included a fragment of a Frechen stoneware vessel with moulded 'Adam and Eve' decoration, an example of which also occurred at Eynsham Abbey (Blinkhorn 2003a, fig. 7.11). The example from here (Fig. 3.9, no. 62) is 17th century whereas the one from Eynsham has parallels with an earlier vessel, from *c* 1540 (ibid., 184). The only cooking pottery noted here was a fragment of a chafing-dish, a type of portable stove. This pattern continued into the mid–late 17th century in CP PM3, with the drinking pottery in a similar range of fabrics, and there were also sherds from a late Brill/Boarstall costrel, a type of vessel usually used for transporting personal supplies of liquid, and mostly found at inns or ports. A very similar vessel is known from a 17th-century kiln in Brill (Farley 1979, fig. 8). The only other sherd of note from CP PM3 is a small fragment of a post-medieval redware strainer, which could have had numerous possible uses.

The CP PM4 (early–mid-18th century) assemblage is mainly notable for the assemblage of fragments of earthenware flowerpots which made up over a quarter of the pottery from it by weight (16 sherds, 1021g). It all occurred in Tenement B, in the fills of pit 3767. Such pottery is quite a rare find in Oxford before the 19th century, and this assemblage, although relatively small is one of the largest published groups. A much larger assemblage (318 sherds, 11,537g) of flowerpots from 17th–early 18th-century formal gardens was recently excavated at Trinity College (Blinkhorn 2023), but other than that, horticultural pottery of such date is quite rare in Oxford. A few fragments were present alongside pottery of early to mid-18th-century date (and thus broadly contemporary with this group) at 24a St Michael's Street, leading to the suggestion that the

inhabitants at that time were 'comparatively well-to-do' (Mellor 2003b, 310), and a single, near-complete plant-pot with glaze splashes and a central drain hole occurred in a late 18th-century context at Market Street (Blinkhorn 2002b, fig. 18 no. 86), but most of the larger post-medieval assemblages, such as that from St Ebbe's (Mellor and Oakley 1984) did not produce any vessels of this type. Here, a sherd from a white English tin-glazed ware flower vase was also noted.

The source of the plant pots is unknown. Brill is a possibility, and one of the vessel forms here is in a Brill-type fabric. Certainly, the potteries there were producing 'big wares' such as planters in very large quantities in the 19th century (Farley and Hurman 2015, 183), but there is very little archaeological or documentary evidence of earlier, 17th–18th-century flowerpot production in the village other than a few isolated fragments, such as a single base with unusual triangular side-holes from the 18th-century kiln at Prosser's Yard (Cocroft 1985, fig. 13, no. 1). A possible source for most of the flowerpots from here may be Woolwich in London, where a kiln was producing unglazed flowerpots with side drain holes in the second half of the 17th century (Pryor and Blockley 1978) and there is evidence from here of a trade in pottery from London in the late 17th–18th century in the form of the English stonewares, which were also made at Woolwich (ibid., figs 11 and 18). Certainly, the fabrics of the bulk of the flowerpots from here and Trinity College is much closer to the Woolwich vessels than Brill wares.

Some of the drinking pottery from CP PM4 showed evidence of the presence of the Greyhound Inn, which was built in the 16th century and demolished in 1845 (Gardiner 2003). In the case of the inscribed sherd from the English stoneware tankard with the partial, two-line inscription reading '… White at…' '…y-hound…' (Fig. 3.11, no. 70), it is very likely that the first line is the name of the innkeeper (Chapter 6). Certainly, stoneware mugs with the name of the innkeeper and the inn, sometimes with dates, are known from elsewhere in Oxford, such as John Green, who kept the Crown in Cornmarket in 1730, and Charles Field of the Red Lion in the High Street (Mellor and Oakley 1984, 216). Here, there were also tea-drinking wares present in the form of white stoneware tea- and sugar/slop-bowls. Other vessels noted included a fragment of shell-edged plate in the same fabric. The CP PM5 assemblage showed a similar picture other than not producing any flowerpot fragments.

The late 18th–early 19th-century CP PM6 assemblage was very large by weight in comparison to the other post-medieval groups, with the average sherd weight very high (77.3g) and very little residual material, showing that a lot of it was well preserved. More drinking pottery which had links to the Greyhound was noted, with the most complete (Fig. 3.12, no. 75) having a two-line inscription of which just 'F…e' and 'G…nd' survived. Tea-drinking pottery was again fairly well represented, with white salt-glazed stoneware, Chinese porcelain, pearlware and black basalt ware vessels all present, and table wares such as tankards, sauceboats and plates. White salt-glazed stoneware had largely ceased to be made by this time, so they may well have been long-lived vessels, and the pearlware vessels were imitating the superior Chinese porcelain types in terms of the decoration and form. A few sherds of flowerpots were also present. Where it was possible to link them to a tenement, they all occurred in Tenement B, and the overall picture with this and the more mundane pottery from this CP is of a moderately well-to-do urban household of the period. The modern pottery (CP MOD) included little material that would be out of place is a typical household of the period and consisted of a typical mix of refined whiteware table wares and utilitarian stonewares and red earthenware.

FIRED CLAY *by Cynthia Poole*

Introduction

A modest assemblage of fired clay amounting to 856 fragments weighing 9337g was recovered by hand excavation and from sieved samples from a range of features and deposits, including pit and ditch fills, hearths and layers of burning, and floor surfaces (Table 3.10). A high proportion (806 fragments, 7902g) was recovered from sieved samples. None of the fired clay is intrinsically dateable and is reliant on other dated artefacts for its phasing. Fired clay occurs from the prehistoric to medieval period, rapidly declining thereafter, and structural fired clay remains similar in character throughout this extended time span. A small fragment of possible loomweight is of Anglo-Saxon/early medieval date.

All the material is fragmentary and the only complete dimension sometimes surviving is thickness. The mean fragment weight of 11g is average for fired clay. Abrasion was most frequently moderate, though ranging from unabraded to high.

Methodology

The fired clay has been fully recorded in accordance with guidelines set out by the Archaeological Ceramic Building Materials Group (ACBMG 2007), which whilst not specifically designed for fired clay provide appropriate guidance. The record includes quantification, fabric type, form, surface finish, organic impressions and dimensions, supplemented by a general description where appropriate. Fabrics were characterised on macroscopic features and with the aid of x20 hand lens.

Fabrics

The fabrics divide into three broad groups. The majority of the fired clay was made in a coarse sandy clay, fabric Q, containing frequent medium

Table 3.10: Fired clay quantification of forms

Phase	*Date*		*Object*	*Furnace*	*Wattle structure*	*Structural*	*Indet.*	*Total*
Phase 1	10th–mid-11th C	Frags		1	387	3	27	418
		Wt (g)		13	4410	97	45	4565
Phase 2	Late 11th–mid-12th C	Frags			7	5	10	22
		Wt (g)			221	47	59	327
Phase 3	Late 12th–early 13th C	Frags		5	109	1	57	172
		Wt (g)		80	2792	18	266	3156
Phase 4	13th C	Frags	1	49	1	33	13	97
		Wt (g)	16	307	121	76	27	547
Phase 5	14th-15th C	Frags		3		56	7	66
		Wt (g)		33		206	62	301
Phase 6	Mid 15th–mid-16th C	Frags		3		42	34	79
		Wt (g)		7		267	127	401
Phase 7	Late 16th–mid-17th C	Frags					1	1
		Wt (g)					33	33
Phase 8	Late 17th–early 18th C	Frags					1	1
		Wt (g)					7	7
Total		Frags	1	61	504	140	150	856
		Wt (g)	16	440	7544	711	626	9337

and coarse quartz sand, occasionally with small limestone-derived grits and flint pebbles. This is the standard fired clay fabric found in Oxford and no doubt derives from natural alluvial deposits found in the city. It occurred throughout all phases at which fired clay was present accounting for over three-quarters of the assemblage and was the only fabric in use during the Saxon period. A smaller proportion (*c* 12%) of the fired clay was designated as fabric L, which was characterised by moderate to high densities of small calcareous inclusions of limestone or fossil shell up to 8mm usually in a fine-medium sandy clay matrix with occasional flint up to 13mm. A few pieces were intermediate between fabrics Q and L. A small quantity of fired clay was made in a pink or reddish pink smooth clay, fabric A, which sometimes was streaked with fine cream laminations. In two records this had been mixed with fine organic temper of chaff or crushed straw (fabric AV). Both fabrics L and A occurred from Phase 2 to 6, not appearing till after the Saxon period.

Forms

Portable oven/hearth furniture

Fired clay generally divides into structural material and portable items. Only one piece was identified as a possible portable object. This had a roughly moulded, undulating, rather lumpy surface with curved edge indicative of a diameter of 80mm, which may indicate this is a fragment of loomweight. However, it has been heavily fired and vitrified with a vesicular cindered texture, so may be some form of oven furniture associated with the furnace material.

Structural fired clay

The remainder of the assemblage is probably all structural in origin though much of it consists of indeterminate fragments, amorphous in form or with a single deliberately moulded surface. Structural material is generally interpreted as deriving from ovens or hearths or similar structures rather than buildings. Building daub requires an intense house fire to be preserved and where no evidence exists for such an event the fired clay is presumed to derive from ovens, hearths or kilns.

Fragments with wattle impressions were found in 13 contexts from Phases 1 to 4 (late Saxon to 13th century). This material is characterised by a flat, rough, hand-moulded outer surface often with indistinct grass or organic impressions and with interwoven wattle impressions on the back surface. On some pieces both the outer surface and the surface of the wattles was heavily blackened. Most fragments ranged from 10–45mm thick, with just a few thicker than this at 50–61mm. The wattles comprised horizontal rods ranging in size from 7–25mm diameter, woven around upright sails measuring 15–30mm diameter. Four sizeable groups with wattle impressions were recovered, two from Phase 1 late Saxon deposits and two from Phase 3 features. The Saxon material came from a layer of burnt debris 9194 (1.3kg) in feature 9196 and Ditch 1 fill 9367 (3.12kg). The two later contexts of late 12th- to early 13th-century date occurred in the fill 6355 of pit 6370 (533g) on Tenement C and fill 9193 (2.3kg) of Pit Group 6 on Tenement B. The fired clay from context 9193 is very similar in character to that from 9194 and may have been disturbed from the Saxon deposit

by the later pit digging. A sparse scatter of wattle-supported structure was also found in Saxon Ditch 1 and in fills of Pit Groups 2, 6, 9 and 10 ranging through Phases 2, 3 and 4 on Tenements A and B.

The pattern of wattle size distribution for all the groups has produced a rather uneven distribution with a bimodal curve – with one peak at 11m or 12mm and another at between 14mm and 16mm – rather than the more common standard distribution curve such as produced by the fired clay from a late Saxon crop-dryer at Springhead, Kent (Poole 2011a, fig. 7) and from Saxon deposits at East Kent Access (Poole 2015, fig. 12.3c). This difference could be an artefact of the relatively small sample size of the Magdalen College fired clay (30–45 rods in each group). At Southampton French Quarter the pattern is slightly uneven, though tending to a unimodal standard distribution (Poole 2011b, fig. 5.12). In Oxford sample groups are all much smaller, but Oxford Castle also produced a similar pattern for wattle sizes (Poole 2019, 286) to the Magdalen College material. This slightly bimodal distribution may reflect coppice obtained from different woodland sources, possibly subject to slightly different length coppice cycles or growth rates.

Fired clay with wattle impressions occurs as a consistent low-level component of assemblages in Oxford most commonly in Saxon and early medieval deposits. It has been variously interpreted as debris from wattle and daub walling for buildings or as remains of chimneys or ovens. Walling usually has a smooth very well-finished flat surface and at the Clarendon Hotel (Jope 1958, 78) the presence of a grey paint or wash confirmed such a function. However, a fairly rough, moulded surface is more common, often with finger marks, and the association with carbonised grain in some instances points to a function associated with crop processing. Large deposits of wattle-supported structure have been found within crop-dryers at a number of Saxon and early medieval sites, including Thame, Oxfordshire (Poole 2024), Bexhill, Sussex (Poole forthcoming), Springhead, Kent (Hardy and Andrews 2011, 285) and Shorne, Kent (OA 2021b), or dumped in Saxon features in association with carbonised grain as at East Kent Access (Poole 2015, 312). In all these cases the fired clay has been interpreted as the remains of the drying floor of a crop-processing oven on which the grain was placed for drying or malting. At Magdalen College both of the larger Saxon groups and also the Phase 3 fired clay from 9193 were associated with rich assemblages of carbonised grain including wheat and rye, which suggests this type of fired clay formed part of the structure of a crop-drying oven or malting kiln probably forming the drying floor on which the crop was spread. Such structures could be used for both parching and malting, which could be indicative of brewing or baking at either a domestic or commercial level.

Furnace structure

Fragments of furnace lining were identified from the glassy vitrified or slagged surface. Below this was a black vesicular cindered margin a few millimetres deep, which usually formed a fairly abrupt boundary to pink or bright red-orange fired clay at a depth of 5–8mm. Most pieces were 5–20mm thick, more rarely up to 34mm thick. It is probable that the exterior of the furnace wall was not fired through and has eroded away leaving only the inner fired skin. The furnace lining was made in fabric Q, apart from one piece that was in fabric L and a small quantity in fabric A.

Most of the furnace lining was concentrated in Tenement B, apart from one small scrap from Tenement C from Phase 4 (13th century) feature 6313 associated with oven 6325 in Building 3 (Room 1), and another from Tenement A from backfill in a Phase 5 (14th to early 15th century) possible cesspit 4301. The major concentration occurred in Phase 4 (13th century) with the largest group derived from pit 9332 (275g) associated with Building 2 (Room 2) in Tenement B. Further fragments were found from this building in Phase 5 and 6 (14th–mid-16th century) deposits. In this latest period the furnace lining comprised three small pieces associated with a burnt clay floor (8887) which also produced pieces of slag. Fragments of the actual floor surface were also collected and consisted of tabular slabs of sandy clay with a flat surface fired red to a depth of 3–4mm giving way to unfired yellow clay below. The evidence is consistent with the other indications of metalworking over several centuries from the mid-12th to mid-16th century (Phases 3–6) on Tenement B associated with Building 2. The single fragment of furnace lining from the late Saxon pit 9361 in this area hints that metalworking may have been a long-lived tradition on the site.

Conclusion

This is one of the larger fired clay assemblages produced by a site in central Oxford. Clay was an essential fireproof material used in a variety of structures for domestic cooking, food processing and artisan activities during the Saxon and earlier medieval periods, though its use declined during the later medieval period as other materials, particularly tile, became more readily available. The fired clay provides evidence of metalworking activity in the form of furnace structure concentrated in Tenement B extending from Phase 3 through to Phase 6, from the mid-12th to mid-16th century. A single fragment of possible furnace structure may hint that metalworking was taking place as early as the Saxon period.

The fired clay also provides structural evidence in the form of wattle-supported structure, that is best interpreted as the drying floor of crop-processing ovens or kilns for drying or malting grain, which may indicate baking or brewing was

carried out. This concentrated on the southern edge of the site in the area of Tenements B and C during the Saxon and early medieval phases, with the most prolific evidence occurring in the late Anglo-Saxon period and the late 12th to early 13th century.

MORTAR AND PLASTER *by Cynthia Poole*

A modest quantity of mortar and plaster amounting to 119 fragments weighing 2187g was collected during hand excavation of features, with a further small quantity of material identified from sieved samples. The mortar and plaster was not sampled directly from any structures and was all recovered as residual waste in layers, pits or other features, except for the mortar waste in possible mortar-mixing pit 6213. Some of the mortar and plaster can be related to buildings and structures and was most prolific in relation to Buildings 1 and 2 during Phases 4–6 from the 13th to early 16th century. The range of material is typical of a site with masonry structures.

Mortar waste from the basal fill (6210) of 14th- to early 15th-century pit 6213 consisted of very irregular and very light amorphous and porous scraps and lumps of waste mortar with large voids, which possibly resulted from decayed organic material caught up in it. The fabric only contained crushed fossiliferous limestone grit. Some of the larger pieces appear to have rounded lumps of fine-grained sandstone or sandy mudstone embedded in the mortar. There was also some bone mixed in: one definite bone fragment was noted, and some other pieces appeared to have the structure of decayed bone.

The wall plaster and render indicate the buildings had simple plain interior décor of white-washed walls. Other coloured paint only appears in the 19th century. The full report on the mortar and plaster can be found in Appendix 1.

CERAMIC BUILDING MATERIAL *by Kirsty Smith*

Introduction

A large quantity of ceramic building material (CBM) was recovered from the site amounting in total to 3142 fragments weighing 249.2kg. The assemblage included medieval and post-medieval floor tile, roof tile, brick and miscellaneous CBM. The vast majority of the CBM (2644 fragments, 84% by count) consisted of roof tile. The majority of the assemblage comprised broken fragments with few complete dimensions apart from thickness, except for three whole post-medieval bricks and a small number of peg tiles with a complete width surviving. In general abrasion was moderate, though about a third of the assemblage was highly abraded. The mean fragment weight (MFW) is fairly high at 79.3g. Distribution and provenance of the material is discussed in more detail below along with forms and fabric types.

Around 65% of the CBM by fragment count dated to the later 12th–14th century (in terms of object date rather than context date) and the majority of this came from Tenement A (Table 3.11). Around 30% dated to the 15th–early 17th century with the majority of these originating from Tenement B. A small proportion of the fragments (133) were dated as mid-17th–early 19th century and only 20 fragments were dated as mid-19th century or later. However, medieval material is much less dominant by weight, reflecting the fact that it was more fragmented than later material. The mean fragment weight was just 54g in the 12th–14th century, compared to 104g in the 15th–early 17th century.

CBM spot-dated as later 12th–14th century was predominantly found within Phase 6 (mid-15th to mid-16th century) contexts (Fig. 3.16). This is indicative of a lag time suggesting that some substantial buildings may have remained extant for several hundred years before being demolished. The majority of the CBM dated as 15th to early 17th

Table 3.11: Quantification of ceramic building material by spot-date and tenement

Spot-date		*Tenement A*	*Tenement B*	*Tenement C*	*Other areas*	*Total*	*% of total*
Late 12th–14th C	Frags	1126	441	145	332	2044	65.0
	Wt (g)	61,599	25,244	4854	17,964	109,661	44.0
15th–early 17th C	Frags	138	503	82	222	945	30.0
	Wt (g)	15,955	50,157	6077	26,050	98,239	39.4
Mid-17th–early 19th C	Frags		53	15	65	133	4.2
	Wt (g)		3917	2381	31,345	37,643	15.1
Mid-19th C+	Frags	2	3	4	11	20	0.6
	Wt (g)	61	1517	268	1832	3678	1.5
Total	Frags	1266	1000	246	630	3142	
	Wt (g)	77,615	80,835	13,580	77,191	249,221	

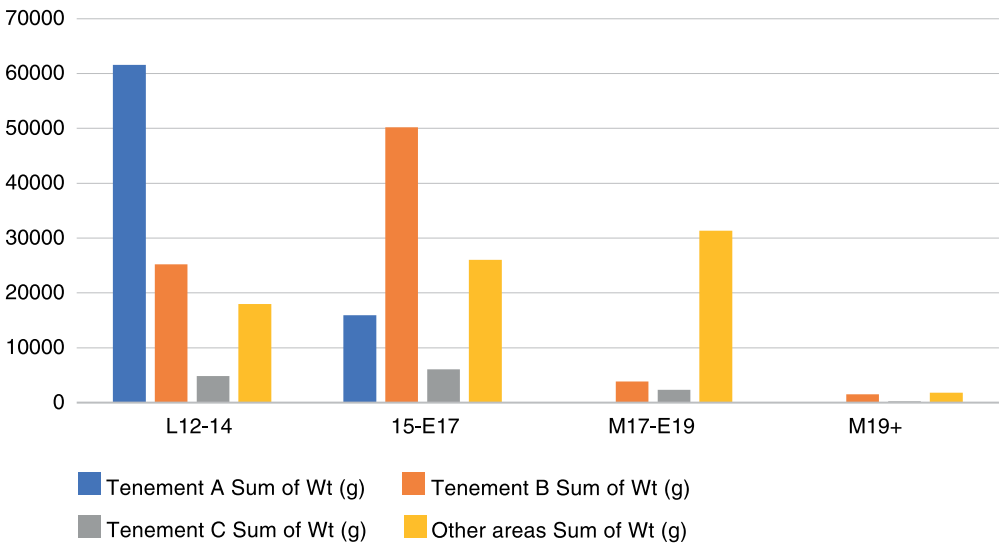


Fig. 3.15 Weight (g) of CBM fragments by spot-date and tenement area

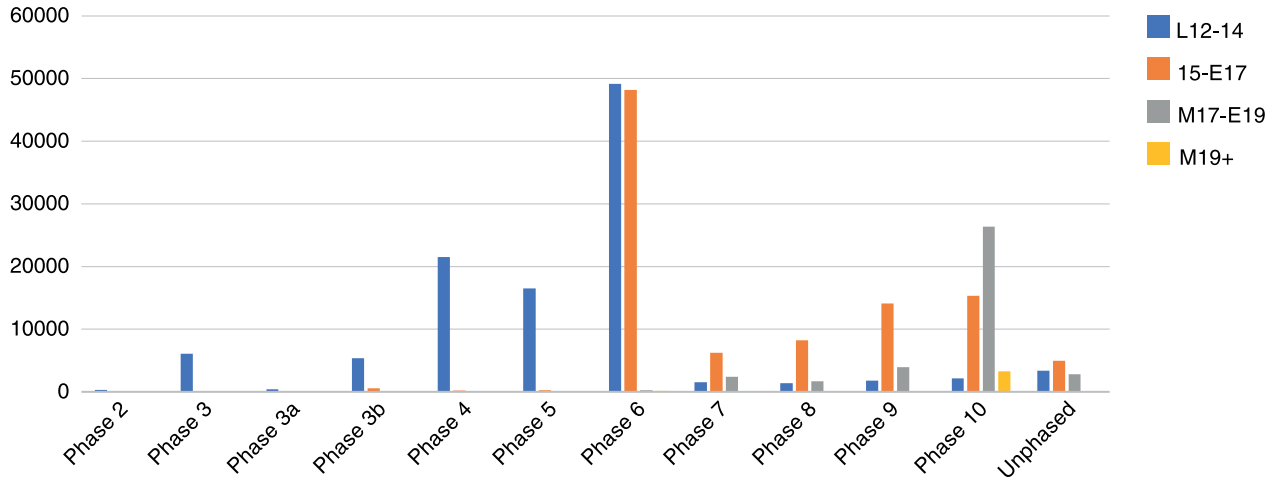


Fig. 3.16 Weight (g) of CBM fragments by spot-date and phase

Table 3.12: Quantification of ceramic and stone roofing tile by stratigraphic phase

Material	*Phase*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*Unphased*	*Total*
Ceramic	Fragments	6	150	489	352	1242	98	41	42	76	87	2583
	Weight (g)	142	8634	21,776	15,735	91,386	7465	4789	5376	9212	6773	171,288
	% by weight	0.1	5.0	12.7	9.2	53.4	4.4	2.8	3.1	5.4	4.0	100
Stone	Fragments	-	8	11	42	65	1	7	17	26	3	180
	Weight (g)	-	1475	141+	21,490	31,250	205	4335	11,029	8146	1268	79,339
	% by weight	-	1.9	0.2	27.1	39.4	0.3	5.5	13.9	10.3	1.6	100

century was also recorded in Phase 6 contexts. This is significant as it suggests a possible clearance event where medieval and early post-medieval buildings were demolished at some point in the mid-15th to mid-16th century. Phases 7–10 contained an increasing amount of 15th–early 17th-century material. A small quantity of post-medieval CBM recorded in medieval Phases 2–5 represents intrusive material. The provenance and distribution of the CBM by tenement and phase is discussed in more detail at the end of this report.

Stone roofing tile was also recovered in significant quantities (see Hayward below), and it seems likely that buildings roofed with ceramic tile and others roofed with stone tile were present on and near the site through much of the medieval and

post-medieval periods. The peak in the deposition of both ceramic and stone tile falls in Phase 6 (mid-15th to mid-16th century; Table 3.12) and may represent demolition associated with the change in use of the site in the 1480s recorded in the documentary evidence (Chapter 1). The subsequent fall-off in CBM and stone tile deposition reflects the decline in pit digging in later periods as well as the greater degree of truncation of post-medieval deposits.

Methodology

The assemblage has been fully recorded on an Excel spreadsheet in accordance with guidelines set out by the Archaeological Ceramic Building Materials Group (ACBMG 2007). The record includes quantification, details of fabric type, form, surface finish, markings, and evidence of use/reuse (mortar, burning etc). The assemblage was divided into paving and flooring, roof tile and brick along with miscellaneous categories of pipe and wall tile. Fabrics were characterised on the basis of macroscopic features supplemented by the use of a x20 hand lens for finer constituents.

Fabrics

Medieval fabrics

The medieval fabrics were assigned using the OA fabric series for the Oxford region. The reference collection housed by OA was originally based on material from the Hamel (Robinson 1980) and has since been used to describe the fabrics from a number of assemblages including the Westgate site (Poole and Smith forthcoming), being expanded over 40 years to include sub-types. The medieval fabrics found on the site are described below.

Fabric IB

This fabric is a light brown or pink-buff colour with a light pink or dark grey core. It contains coarse quartz sand frequent inclusions of fossil shell, ooids and grits derived from oolitic limestone mostly 1–2mm in size though occasionally with coarser grits up to 7mm. Around 51 fragments were assigned as fabric IB (around 1.6% of the total). Around 18 fragments of ridge tile or crested ridge tile were recorded in this fabric and the rest were flat fragments of tile. During the analysis of the Westgate CBM, it was found that fabric IB was used almost exclusively to create ridge tiles. This fabric is dated to the late 12th to early 13th century and is one of the earliest of the medieval fabrics. The majority of the fragments made from this fabric were recorded from Phase 6 walls and pits in Tenement B with a handful recorded within Phase 6 demolition layers in Tenement A.

Fabric IIIA

A light orange fabric with a light grey or cream core containing frequent well-sorted rose or clear fine-medium quartz sand inclusions. Around 113 fragments of this fabric were recorded and most of these were from green-glazed ridge tile. This fabric probably dates to the later 13th and 14th century and probably originated from the Brill/Boarstall kilns in west Buckinghamshire as it is very similar to the pottery fabrics produced here. This fabric was found in Tenements A and B including within Phase 5 pits and garden soils, and Phase 6 pits and demolition layers.

Fabric IIIB

As at Westgate (Poole and Smith forthcoming), the majority of the medieval CBM was made from fabric IIIB which includes 1597 fragments accounting for 50% of the assemblage by count. This is a coarse orange-red sandy fabric which contains a high density coarse white quartz sand and dark ferruginous grits 1–2mm diameter. This fabric has a broad date of the late 12th to 14th century and was used for a number of forms including ridge tile, peg tile and Stabbed Wessex floor tile. It may have been produced at Ashampstead in Berkshire. This ubiquitous fabric had a wide distribution across the site and was recorded in all three tenements in Phases 2–6.

Fabrics IIIE and VIII

A light pink to light brown fabric with a grey core and frequent medium rose quartz, with fine black speckling and sometimes chalk fleck inclusions. This fabric is similar to fabric IIIA and the Brill pottery fabrics and may have originated from the same location. Only 17 fragments of this fabric were found within Tenements A and B in Phases 3–6 and some grave backfills. It may have a similar date to the IIIA fabric. Another 14 fragments of a similar fabric were recorded in fabric VIII, and this was a pink, pale orange biscuit colour with a very fine sandy clay matrix containing very uniform quartz sand inclusions. This may also be a sub-type of the Brill fabric. It was recorded in Phase 3 and Phase 6 pits within Tenement A.

Fabric IVA and IVB

An orange, pinkish red or red-orange laminated matrix with cream streaks. It contains frequent medium-coarse quartz sand, common red ferruginous grits and occasional rounded cream grog 0.5–2mm. This fabric is slightly later than the other medieval fabrics and dates to the 14th–16th century. It may have been produced at Penn or one of the other kiln sites in the Chilterns, an area with prolific pottery, tile and brick manufacturing from the 14th–18th century (Hohler 1941–42, 6–7). A total of 25 fragments were made from this fabric, which was recorded in Tenements A, B and C within Phase 5 to Phase 9 features and floor layers.

Fabric VIIA and VIIB

This fabric varies in colour with VIIA being cream or pale buff and VIIB being a pale orange, pink.

Both types contained clear, white or rose quartz sand and chalk or limestone inclusions 0.5–3mm long. A significant amount of VIIB fragments were recorded (209) and a smaller amount of fabric VIIA (39). This fabric had a wide distribution across the tenements, was present in Phases 3–6 and was also found within the fills of a number of graves within the north-western part of the site. Analysis of CBM from Brewer Street (Cotter 2019) found that fabrics VIIA and VIIB were associated with 13th–14th-century pottery. The CBM may have been in use before the pottery was deposited and perhaps dates from the late 12th to the 14th century.

Post-medieval and modern fabrics

The OA post-medieval CBM fabric series was formalised for the analysis of the CBM from the Westgate excavations (Poole and Smith forthcoming). This series was used to assign post-medieval fabrics for the site, and these are described below.

Fabric OXP1

A red-orange/red-purple fabric with a dark grey core. The matrix is smooth and uniform with fine quartz sand and occasional larger pieces of quartz grits. Around 41 fragments of roof tile were recorded in this fabric. This is recorded in Tenements B and C within Phases 6 to 9 but mostly within Phase 6 (mid-15th–mid-16th century) pits and layers in Tenement B.

Fabric OXP2

OXP2 (equivalent to the code PMF used at some other sites) is reddish orange or pinkish red in colour with a thin, light grey core. The roof tiles in this fabric have a smooth and very fine sandy matrix with no coarse inclusions, but sometimes containing a little mica or fine black speckles. This fabric was identified in 11 fragments including Phase 6–9 features and layers in Tenement B.

Fabric OXP3

A red-orange coarse sandy fabric which often has a thick grey core when used for roof tiles and a red or purple core when used for bricks and floor tiles. It contains medium to coarse quartz sand and dark red-maroon iron oxide grits and calcareous grits up to 2mm. This fabric is similar to but finer than medieval fabric IIIB and may represent a continuation of the latter, although it may have not been produced at the same sites. Around 528 fragments of roof tile, floor tile and brick were recorded in this fabric. It was found within Tenements A, B and C within Phases 3–10. Within Phase 6 features it was recorded in larger groups within a cesspit in Structure 13 of Tenement A and within a pit within Structure 11 of Tenement B. It was also recorded as part of the Phase 9 floor layer of Building 11 of Tenement B along with Phase 7–9 garden soils, rubble and levelling layers within tenements A, B and C. This suggests that it had a broad date range, perhaps overlapping with fabric IIIB in the medieval period and continuing into the 19th century.

OXP1 and OXP2 represent finer versions of the OXP3 fabric and are probably contemporary.

Fabric OXP4

An orange, mixed sandy fabric with streaks of white clay or marl and occasional cream marl clay pellets with red ferruginous clay pellets up to 6mm long. It is similar to fabrics IVA and IVB and may represent a continuation of production in south-east Oxfordshire and the Penn-Chilterns area of Buckinghamshire. Around 115 fragments were made from fabric OXP4 including roof, floor and brick, found in features and layers in Tenements A, B and C from Phases 6 to 9 (mid-15th to early 19th century).

Fabric OXP5

A red or red-orange, fine, sandy fabric with a slight fine speckly effect and occasional red iron oxide inclusions. This local or regional fabric is equivalent to the post-medieval redware fabrics used for pottery (fabric code PMR; see Blinkhorn above) and has previously been recorded at Queen's College and Corpus Christi College for Flemish-style floor tile (Cotter 2014; 2015). Around 57 fragments of brick, roof tile and floor tile were recorded in this fabric, which dates from the early 16th century into the later post-medieval period. This was mostly found within Phase 6–8 pits in Tenement B.

Fabric OXP6

An orange-red, moderately fine fabric with a darker mauve core and medium to fine clear quartz inclusions and calcareous grits 1–3mm long. It was used exclusively for five large fragments of brick which were recorded within fills of Phase 10 construction cuts. This dates to the later post-medieval period.

Fabric OXP7

A red-orange or mauve fabric with distinctive grey streaks or a grey core. It has a dense, uniform, fine sandy micaceous matrix containing a high density of fine-medium quartz sand and rare calcareous grits up to 1mm, abundant mica and clay pellets up to 4mm long. Twenty-six fragments were recorded in fabric OXP7 and most of these were from Phase 6 (mid-15th–mid-16th century) features within Tenements A, B and C.

Fabric OXP9

A yellow, marly, laminated fabric used to make light-coloured bricks in the late post-medieval period. It was subdivided into three sub-types based largely on colour: sub-type 9A is a fine pink laminated fabric with lighter streaks; sub-type 9B a laminated pink and yellow fabric with red iron oxide inclusions; and sub-type 9C a light creamy yellow laminated fine fabric, sometimes with red or

pink mottles or streaks, quartz sand, dark red-black iron oxide grits up to 3mm or fine white flecking. Twenty-nine fragments were recorded in this fabric, found within Phase 7–10 features, made ground and rubble layers.

Fabric OXP10

A brown-red or pinkish brown fabric containing frequent, fairly well-sorted medium quartz sand, a scatter of dark red iron oxide/ironstone grit 0.5–2mm and cream clay pellets up to 5mm. One hundred and thirty-six fragments were recorded in this fabric. It was used for roof tiles, and several fragments had a distinctive S-shape in cross-section suggesting they may have originated from pantiles. It was recorded mainly in Phase 6 (mid-15th–mid–16th century) features within Tenement B including surfaces, pits and garden soils. This fabric has also been recorded at Trinity College (Smith 2023) where it was used for late 16th- to early 17th-century pantiles.

Fabric OXP11

A yellow, pink, or pale orange fabric with grey streaks. It was made from a very fine sandy clay with very uniform sand and contained occasional ferruginous grits less than 1mm. It was used to make 20 fragments of roof tile which were found within a Phase 6 hearth in Tenement B.

Other fabrics

Other fabrics of later 19th- to early 20th-century date include stoneware, used to make drain or sewer pipes (8 fragments), and fine white fabrics used to make wall tiles (5 fragments). This material is not considered further in this report; details can be found in the archive.

The medieval and post-medieval fabrics were probably produced locally in Oxfordshire or regionally. Fabrics such as IIIB and OXP3 and fabrics IVA/IVB and OXP4 have a probable continuation from the medieval into the post-medieval period. For example, post-medieval brick and tile production has been recorded at Brill and Penn in Buckinghamshire (Yeoman 1988; Zeepvat 2009).

Forms

The majority of the assemblage comprised roof tile (Table 3.13). Most of this was flat tile (2127 fragments), which probably represents peg tile, though only 213 fragments had peg holes present. Further diagnostic objects included 247 fragments of ridge tile, 51 fragments of crested ridge tile, two fragments of possible pantile and four fragments of roof finial. Other than roof tile, the assemblage comprised 304 fragments of post-medieval brick, 68 fragments of medieval and early post-medieval floor tile, 15 fragments of brick paviour, 8 fragments of drainpipe, 5 fragments of wall tile and 98 indeterminate fragments.

Most of the roof tile was assigned as late 12th–14th century with decreasing amounts in later centuries. The majority of the brick fragments were dated as 15th–early 17th century, but these were fragmentary with a MFW of 84g; the majority of the bricks by weight were assigned as mid-17th to early 19th century (MFW 312g). Most of the floor tiles were dated as 15th–early 17th century, with a smaller number dating to the late 12th–14th century.

Roof tile

Ridge tile

Ridge tile (298 fragments, 31kg) accounted for 9.5% of the overall CBM assemblage from the site and 11.3% of the roof tile. This is slightly lower than the

Table 3.13: Ceramic building material forms

Form	*L12th–14th C*		*15th–E17th C*		*M17th–E19th C*		*M19th C+*		*Total frags*	*% of total frags*	*Total wt (g)*	*% of total weight*
	Frags	*Wt (g)*	*Frags*	*Wt (g)*	*Frags*	*Wt (g)*	*Frags*	*Wt (g)*				
Brick			190	16,046	107	33,475	7	2528	304	9.68	52,049	20.88
Brick paviour/quarry tiles			13	1717	2	1435			15	0.48	3152	1.26
Drain pipe							8	1019	8	0.25	1019	0.41
Floor	18	1809	49	15,107	1	231			68	2.16	17,147	6.88
Indeterminate	87	381	10	79	1	14			98	3.12	474	0.19
Wall							5	131	5	0.16	131	0.05
Roof – flat	1604	76,857	504	36,611	19	1465			2127	67.70	114,933	46.12
Roof – peg tile	105	9924	106	17,953	2	973			213	6.78	28,850	11.58
Roof – pantile			1	193	1	50			2	0.06	243	0.10
Roof – ridge	197	14,692	50	8878					247	7.86	23,570	9.46
Roof – crested ridge	29	5808	22	1655					51	1.62	7463	2.99
Roof – finial	4	190							4	0.13	190	0.08
Roof total	1939	107,471	683	65,290	22	2488			2644	84.15	175,249	70.33
Total	2044	109,661	945	98,239	133	37,643	20	3678	3142	100	249,221	100

percentage of ridge tile at Westgate and Brewer Street excavations where it comprised 12% and 11.4% of the of the overall assemblages (Poole and Smith forthcoming; Cotter 2019). The majority comprised moderately sized fragments located either side of the apex; there were no complete ridge tiles recorded, nor any complete lengths or widths. The greatest length surviving was 210mm and the greatest width was 115mm.

The ridge tile was 8–24mm thick at the sides. The medieval ridge tiles were mostly in the range of 14–18mm thick whereas the post-medieval ridge tiles tended to be thicker at 16–21mm. The side edges were roughly flat and were hand smoothed or rested on a surface whereas the end edges tended to be wire trimmed and had a sharper edge.

The majority of the ridge tiles were covered in glaze (over 80%), most commonly light green/light brown in colour, sometimes with black or dark green mottles. This was followed by dark green, then amber yellow with white and black being rare. The glaze appeared to be applied more thickly on the apex of the ridge tile and especially on the crested ridge tiles, becoming thinner or petering out towards the bottom of each side edge. The ridge tile made in fabric IIIA (Brill type) was consistently and evenly covered in light green glaze.

Some 79 of the ridge tile fragments could be assigned to a type as defined by the OA ridge tile series. This was initially created to analyse the ridge tile from Beaumont Palace/Whitefriars (Atherton and Mitchell 2001, 72–3) and later expanded through work at 4a Merton Street (Cotter 2006, 300–1). The five types in the series are as follows:

A Hand-moulded crest
B Knife-cut 'coxcomb' crest
C Trapezoidal crest spur
D Uncrested plain angular
E Rounded

Since 2006, a number of sub-types of the type B knife-cut crests have been added to the series and these have been discussed in detail within the Westgate excavation report (Poole and Smith forthcoming).

Type A was one of the earliest forms of crested ridge tile in Oxford. Jope determined that these may date from the early 13th century to the mid- to late 13th century (Jope 1951, 86). The hand-applied crests tend to be *c* 40mm long, 21mm wide and up to 20mm high. These are made exclusively in fabric IB and three of these fragments were recorded within Phase 6 features within the site, one within Room 1 of Building 7 in Tenement B and two within Pit Group 14 of Tenement A (Fig. 3.17, no. 3).

In the late 13th century, Jope suggested that knife-cut crests started to be introduced (ibid.). The knife-cut type B tiles probably date to the late 13th–15th century, but some could be as late as 16th–17th century. The type B crests have knife-cut triangular spurs which vary in size and form with some of the earlier types having larger triangular spurs and deeper troughs than the later examples. At Westgate the sub-types B1 (with flat apex) and B2 (with rounded apex to the crest spur) were found within late 13th- to mid-14th-century contexts (Poole and Smith forthcoming). At the present site, one example of sub-type B1 was recorded and three examples of sub-type B2. The spurs for both types were 40–70mm long, 14–17mm wide and up to 31mm high. Five examples of sub-type B3 were recorded, with contiguous coxcomb triangular spurs with a sharp angular top and base. Three of these were made from fabric IIIB and two of these were made from fabric IB (Fig. 3.17, no. 4), the late 12th–early 13th-century fabric. This suggests there may be further revision required of the fabric series or of the postulated late 13th-century origin date of the knife-cut crests. The dimensions of the B3 spurs were 50–52mm long by 19–22mm wide and around 30mm high.

There is a relatively large number of sub-type B5 ridge tile crests (25 fragments, 3273g). These had a short triangular spur with a long flat apex and measured 30–39mm long x 18–24mm wide x 16–20mm high with concave troughs (Fig. 3.17, no. 5). These also had stab marks on one side below each of the two spurs. One of these also had a semi-circular vent hole 24mm in diameter on the top of the crest. Five examples of type B6 were recorded, with a shallow-cut crest with low triangular spur which was 30mm long, 14mm wide and 10mm high with a long concave trough between. Only one example of a type B7 was recorded, with small spurs 22mm long, 15mm wide and 11mm high. The majority of the type B crested ridge tile fragments were made from fabric IIIB apart from these B5 types, as five fragments were recorded in OXP1 and 16 in fabric OXP3, which suggests the latter may be early post-medieval in date.

The type B crested ridge tiles were recorded in Phase 6–8 features within Tenements A and B with the exception of two fragments (one a sub-type B2 and one generic type B) which were found in a Phase 4 makeup later and a fill of a pit in Tenement A. The sub-type B5 ridge tiles, which may be slightly later in date, were recorded in a Phase 6 accumulation layer in Tenement A along with Phase 7 and Phase 9 rubble and backfill layers in Tenement B.

Ridge types D and E, with plain angular and rounded profiles respectively, accounted for 20 and 12 fragments respectively. Many of the intermediate fragments may have originated as these plainer types of ridge tile. A number of these had a light green or dark green glaze with a handful having a brown glaze. The majority of these fragments came from Phase 6 pits within Tenement A.

Roof furniture

Four fragments of glazed roof finial were recorded in two different contexts. Three fragments of one finial came from a Phase 4 layer, Pit Group 3 in

Tenement A (context 4242, a layer slumped into Phase 3 pit 4141). This finial had a curved body section 8mm thick and a circular loop handle which was 55mm diameter and 21mm thick (Fig. 3.17, no. 1). The finial was covered in a thick brown glaze. The interior of the body section indicated that it was wheel thrown and judging by the curvature it may have been part of a larger item roughly 250mm in diameter. The curved loop handle had been pushed through to the interior body section, creating a protruding rivet on the interior. This item may have been created by specialists who also carried out pottery manufacture. When handles on vessels were created the interior rivet was usually trimmed off and this suggests that this fragment was not part of a vessel. It also had slash marks either side of the handle and a hint of another just below the handle which may have reached the interior. This finial is in Ashampstead fabric IIIB and probably dates from *c* 1250–1400 (John Cotter pers. comm.). It may have originated from the shoulder of a glazed roof louver, which was a decorated chimney for ventilation, mounted on the ceramic roofs of buildings. Decorative knob and loop finials on roof louvers have been recorded in southern and eastern England and previous examples date to the 14th century. They were used as roof ventilators, perhaps to carry away smoke, and were mounted on the top of important buildings in sets of four (Dunning 1966, 74–80). This suggests there may have been a high-status building on or near to the site in the late 13th–14th century.

Another small fragment from Phase 6 pit 4178 of Tenement B (context 4175) may have been from a similar roof finial as it was the same fabric with thick brown glaze.

Peg tile and flat tile

Flat roof tile comprised 2127 fragments weighing 114.9kg, with a mean fragment weight of 54g. This may have originated as peg tile, but no holes were evident on these fragments. The flat tile came from Phase 3–6 features and layers in Tenements A, B and C. Some of these may have also originated from the flat sections of ridge tile. The majority of this flat tile was made from medieval fabric IIIB with smaller quantities made from VIIA, VIIB and these dated to the late 12th–14th century. The medieval flat tile amounted to 1604 fragments. The flat tile made from medieval fabrics tended to be 11–15mm thick and around 10% were covered with a light green, dark green or brown glaze.

A smaller quantity (523 fragments) of post-medieval flat tile was recorded and this was mostly made from fabrics OXP3 and OXP4 with a handful of examples which were made from OXP2, OXP7 and OXP10. These flat tiles tended to be thicker than the medieval tiles and were 14–18mm thick. Around 10% were glazed, with light green and dark green glaze being the most common, with an unusual grey glaze and clear glaze on a handful of fragments.

Peg tiles (213 fragments weighing 29kg) were categorised as such if they had one or more peg holes surviving, otherwise they were assigned as flat roof tile. The peg tiles were an average of 14mm thick and had peg holes which were 10–15mm in diameter. The same medieval and post-medieval fabrics were represented as the flat tile, with the addition of several examples of the speckly dark mauve fabric OXP5. The majority of the peg tiles were not glazed. This may be as they represented the upper parts of roof tiles where the pegs would secure the tile to the rafters. These would be covered by a tile placed on top, so they would not need to be fully glazed. Alternatively, some of these peg tiles may have been wholly unglazed. The majority of the peg tile came from Phase 6 features and layers in Tenements A and B.

There were seven examples of peg tiles with full widths. These were made from post-medieval fabrics with the exception of the fragment from 4468 which was made from fabric IIIB. These full-width tiles ranged from 160–180mm with most being around 165–170mm. There were no full lengths of tile surviving, with the longest being 190mm long. These seven peg tiles had holes which were 10–14mm in diameter, and these were placed roughly 15–20mm from the end edge and 25–40mm from each side edge.

Pantile

Two fragments of possible pantile were recorded in contexts 3528 and 6612, although the latter was small and from a Phase 5 context so can probably be discounted. The fragment from context 3528 (193g) was more diagnostic with an S-shape in cross-section (Fig. 3.17, no. 2). It was in fabric OXP10 and covered in a yellow-brown glaze. The profile and glaze of this fragment are very similar to late 16th- to early 17th-century pantiles recorded at Trinity College (Smith 2023). It came from a Phase 6 fill of ditch 3527. As there was only one certain pantile recorded, and it came from a feature at the northern end of the former cemetery, it is unlikely that pantiles were used in the buildings of the tenements within the site.

Catalogue of illustrated roof tile (Fig. 3.17)

1 **Medieval roof finial**, perhaps from a roof louver, in two pieces with loop and base. Possibly produced in Ashampstead in Berkshire, *c* 1250–1400. Finial has a circular loop 55mm exterior diameter and is 21mm thick. Cut marks on either side of finial loop at the base. Fragment covered in a thick, dark brown glaze. Fabric IIIB. Ctx 4242, Pit Group 3, Tenement A. Phase 4.

2 **Probable pantile**, late 16th–17th century. Fabric OXP10. Ctx 3528, fill of ditch 3527. Phase 6.

3 **Medieval crested ridge tile**. Ridge type A: two hand-applied crests 40mm long, 21mm wide and 20mm high. Trough is 40mm wide. Thumb prints either side of both crests, each 14mm

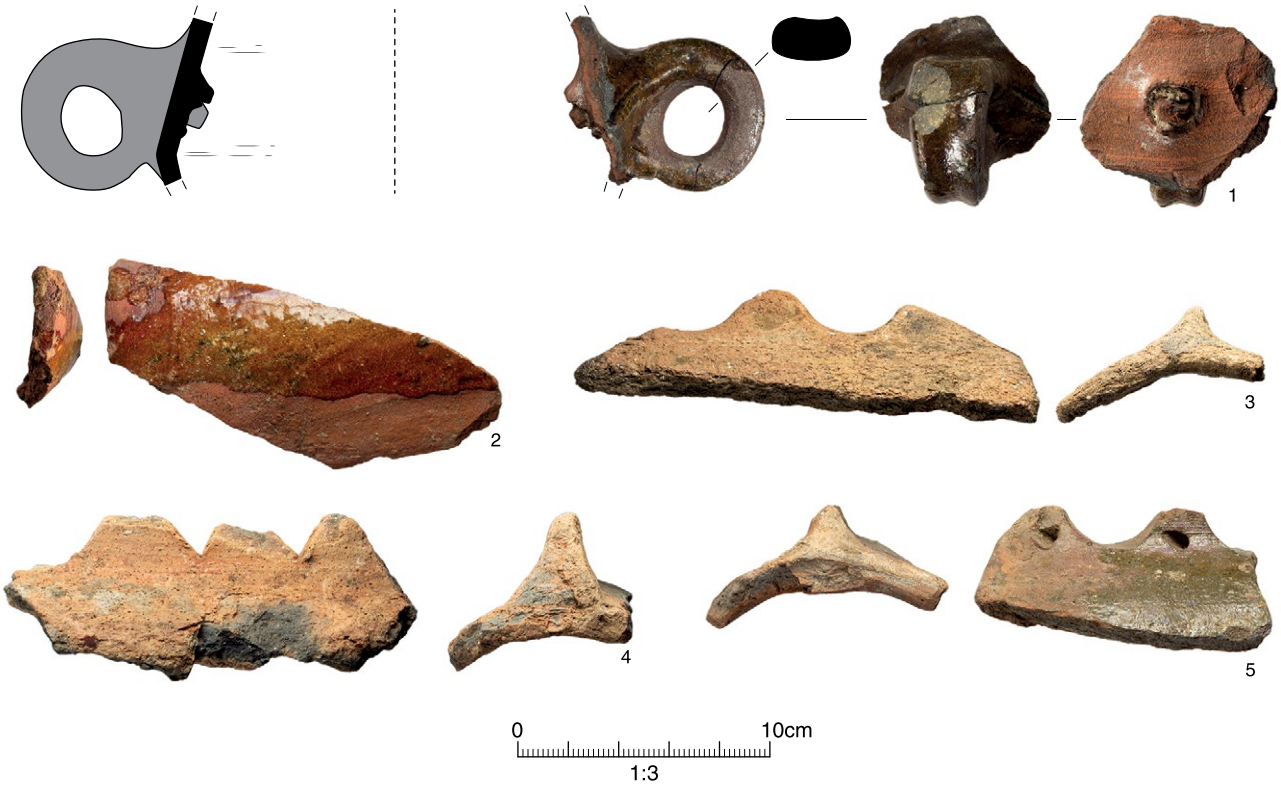


Fig. 3.17 Ceramic roofing tile and finial

diameter. Fabric IB. Ctx 4468, Phase 6 fill in Phase 5 pit 4418, Tenement A, Pit Group 14. Phase 6.

4 **Medieval crested ridge tile**. Ridge type B3, coxcomb with angular contiguous triangular spurs. Spurs 46–53mm long by 16–22mm wide. Most complete spur 33mm high. Patches of green glaze on one side just below spurs. Fabric IB. Ctx 3436, Tenement B, Building 9, wall. Phase 8.

5 **Medieval crested ridge tile**. Ridge type B5 with two complete triangular, short, long flat apex spurs (34mm long, 21–23mm wide and 15mm high), concave troughs either side. Light green glaze. Fabric IIIB. Ctx 3206, Phase 7, fill of drain.

Paving and flooring

Eighteen fragments of medieval floor tile were recorded (1809g), 49 fragments of post-medieval floor and quarry tile (15,107g) and 15 fragments of brick paviour (3152g). Ten fragments of medieval floor tile and two fragments of post-medieval floor tile had inlaid designs which were identifiable. Haberly (1937) and Hohler (1941–42) have previously recorded the medieval and post-medieval floor tiles of the Oxford and Buckinghamshire area; references to Haberly's catalogue numbers are prefixed 'LH' and those to Hohler's catalogue are prefixed 'Hohler'.

Medieval floor tile

The medieval floor tiles were made from fabric IIIB and in the 'Stabbed Wessex' tradition of decorated and plain tiles with stab marks as keying on the base. These tiles are late 13th to mid-14th century in date (Mellor 1991b, 57). Four fragments from contexts 3822 (Pit Group 17), 4118 (garden soil), 4253 and 22322 (both fills of pits in Tenement A) were made from fabric IVA/B, so may be slightly later than the others (14th–16th century in date, from Phase 6–8 contexts). This very small amount of floor tile is typical of secular sites (Cotter 2019) and usually indicates secondary reuse of material. Far larger concentrations of floor tile have been recorded at monastic and college sites in Oxford, with some of the latter remaining *in situ*, such as those at New College which remained preserved under floorboards when Haberly created his catalogue (Haberly 1937, 2, 75–6). The decorated tiles were also inlaid with white or cream clay which stands out against the orange clay background. Haberly notes that the time-consuming process of keying and inlaying of tiles continued in England until the Black Death, around 1350. After this the designs were printed on, then glazed, and the tiles were not keyed on the base (Haberly 1937, 70). Previous excavations to the east of the present site recorded the infirmary and hall of the second Hospital of St John the Baptist which dated from 1231 until it was suppressed in 1457 (Durham 1991, 24). Around 70 fragments of decorated floor tile were recorded (Mellor 1991b),

including design LH XXIV which was also recorded on the present site. This tentatively suggests that at least some of the medieval floor tiles recorded on the site may have come from the hospital, perhaps following its suppression.

These floor tiles were 16–30mm thick, with no complete widths or lengths recorded. Full-size Wessex tiles were usually 115–155mm square. The sides were sharp and knife trimmed and were tapered towards the base so that they could be fixed into a mortared floor. The medieval Wessex-type floor tiles came from Phase 5 and Phase 6 floor layers and in Tenements A, B and a few from Tenement C. Twelve fragments were so heavily worn that the inlaid clay designs could not be identified. The remaining ten fragments (of six tiles) have been identified using Haberly's and Hohler's catalogues.

Catalogue of 'Stabbed Wessex'-type floor tiles (Fig. 3.18)

1 Two club like fronds surrounded by elliptical shapes. Probably LH I, variant with the large pointed five-lobed leaf, as found in Brightwell Baldwin church and Eynsham Abbey (Haberly 1937, 78). Light yellow-brown glaze. Ctx 6646, Tenement B, Building 7, Room 1, floor layer. Phase 6.

2 Two semi-circular shapes in the corner and several larger areas of white clay. Could be Hohler W26 cusped quadrants with oak leaf ornament (acorn?). The full tile may have had human-headed dragons (Hohler 1941–42, 47). Ctx 7115, Tenement C, Building 3, mortar bedding for hearth 7107. Phase 6.

3 Triangular tile inlaid with arc decoration, possibly LH XXVI. This tile has also been found in Dorchester Abbey, Brightwell Baldwin, Oxford Cathedral (Haberly 1937, 98) and in the Westgate excavations (Poole and Smith forthcoming). Ctx 7404, fill of latrine, Structure 6, Tenement A. Phase 6.

4 Fretted or lattice cruciform design attached to dotted circles (quadrants) in corners (LH XXVIII; Hohler W19). Five conical key holes on base of fragment. Ctx 8000, demolition layer, Tenement A. Phase 9.

5 Part of a grotesque figure in a roundel frieze. Part of the human-headed dragon is visible and part of a cusped quadrant (LH XXXIII; Hohler W25). One stabbed key hole obvious on the underside and the rest of base covered in mortar. This tile has been found at St



Fig. 3.18 Ceramic floor tile

Frideswide's Priory, Oxford (Duncan 1988, 47) and Notley Abbey, Buckinghamshire (Haberly 1937, 105). Made from fabric IVA/B, so may be slightly later than the others (14th–16th century). Ctx 3822, pit 3772 fill, Pit Group 17, Tenement B. Phase 7.

6 Four fragments (not illustrated). Floor tile with 30% inlaid with white clay. Keying on the base. Part of a four-tile pattern floriated cross enclosed in a quatrefoil surrounded by a circle and pellets with two concentric quadrants and an annulet in corners. Dark green glaze splashed on edges (LH XXIV; Hohler W38 or W39). The same design was also recorded at the earlier excavation immediately to the east of this site (Mellor 1991b, 57). Ctx 8221, bedding layer, Tenement B, Building 2, Room 4. Phase 6.

Post-medieval floor tile and quarry tiles (post-1350)

The 18 fragments of post-medieval floor tile were made from fabric OXP3 or OXP4 and these have no keying on the base. These are thicker than the medieval tiles at 20–32mm thick. Only one unstratified tile was a full size; this was 24mm thick, 162mm wide and 162mm long. This group included 11 plain glazed tiles with light brown, green, cream or yellow glaze including one yellow plain glazed tile in a triangular shape. These floor tiles were recorded in a variety of Phase 6–9 features and layers in Tenements A, B and C. There were two printed designs which were identifiable and one of these (CLXXXVII; Fig. 3.18, no. 7) has previously been found in Magdalen College Tower which was completed in 1509 (Haberly 1937, 228).

The 31 fragments of undecorated quarry tile (10.7kg) had smooth and flat surfaces and edges and probably date from the 17th–19th century. These were made from fabrics OXP3 and OXP4 and were thicker than the floor tiles (26–44mm thick). Fragments from context 8614, a Phase 9 *in situ* floor in Building 11 of Tenement B, refit to form a full size of 41mm (1.6in) thick by 215mm (8.4in) wide by 217mm (8.5in) long. The majority of these fragments were unglazed, although several had a brown/yellow glaze on the top surface. The majority of the quarry tiles came from floor 8614. These *in situ* quarry tiles are therefore probably contemporary with this later post-medieval building.

Catalogue of decorated post-medieval floor tile (Fig. 3.18)

7 One whole tile, unkeyed and printed, in fabric OXP4 (15th–17th century). This quatrefoil design of four semi-circles features a four-part leaf design in the centre (probably oak) and sets of two leaves in each corner (LH CLXXXVII). This tile has previously been found in Magdalen College Tower and in Lewknor, Pyrton, Marston and Long Wittenham churches, Oxfordshire (Haberly 1937, 228). Unstratified.

8 (not illustrated). One fragment in fabric OXP4. Clear glaze on top of yellow and brown glaze design. This corner fragment has a triple-spiked leaf or flower in white with two curved leaves along both edges of the tile. There are three designs in Haberly (1937) which are similar to this tile including LH CCIV, LH CCXXVII and LH CCLIII (290); all are found at churches in Oxfordshire (Haberly 1937, 243, 266 and 290). Hearth 6381, Building 7, Room 1, Tenement B. Phase 6.

Brick

The 190 fragments of 15th- to early 17th-century brick were made from fabrics OXP3, OXP4 and OXP5. These bricks were red-orange to pink/pale orange with overfired examples being purplish-red/burgundy. These were typically 49–60mm thick with most being less than 55mm thick (just over 2in). Two bricks from context 3992 had full lengths of 215mm and 220mm respectively, and another from context 6384 (pit 6383) had a thickness of 51mm and a width of 97mm. From the 13th century until the mid-17th century bricks were made around 2in (51mm) thick, 4–5in (102–127mm) wide and 8–10in (203–254mm) in length. From the late 17th century onwards, bricks increased in thickness to *c* 2½in (63.5mm) (Harley 1974, 75). The dimensions of these 190 fragments suggest that they predate the mid-17th century. They were also more crudely made and roughly finished than the later post-medieval bricks. A number of these brick fragments were recorded within Phase 6 and Phase 7 pits within Tenement B. A quantity from context 3992 had been used to fill a Phase 10 construction cut.

The 107 fragments of mid-17th- to early 19th-century brick were less fragmented and were made from fabrics OXP3, OXP4, OXP6 and OXP9. These were thicker than the earlier bricks (57–68mm thick) and a number of full widths survived ranging from 102–108mm. Only one full length survived, from context 3992; this may have been a hearth brick which was 59mm (2¼in) thick, 97mm (4in) wide and 205mm (8in) long. These later post-medieval bricks were found in Phase 9 made ground layers and Phase 10 construction layers.

Seven bricks had straighter edges and may be mid-19th century or later in date; two of these had extrusion marks suggesting they were machine made.

Distribution and discussion

The CBM from each phase is discussed below with reference to each tenement plot and the buildings, structures and features where the CBM was recorded. In Tenement A, the highest amount of late 12th–14th-century CBM by weight came from Pit Group 14, followed by Building 1. Structure 13 had the highest amount of 15th- to early 17th-century CBM and there was hardly any later post-medieval material recorded in Tenement A. In Tenement B, the highest amount of

late 12th–14th-century CBM by weight was recorded in Building 2. Aside from the non-grouped features, the largest amount of 15th–early 17th-century CBM was from Building 11 with a smaller amount from Structure 11. In Tenement C, the largest amount of medieval and early post-medieval CBM by weight was from Building 3. Structure 5, Building 8 and Pit Group 8 also contained medieval CBM and Building 8 also contained a moderate amount of 15th–early 17th-century CBM.

Phase 2: late 11th to mid-12th century

During this phase it is probable that there were wooden structures built on the three Tenements (A–C) fronting the High Street, with yards or gardens to the north. The main features recorded from this phase were pits within the garden/yard areas. It is highly likely that the small amount of later 12th–14th-century CBM recorded in these pits is intrusive.

Phase 3: late 12th to early 13th century

Evidence was found for postholes and pits along the southern part of the site, suggesting there were wooden structures within the southern part of each tenement plot including Structures 1, 2, 3 and 5. Further pits were also recorded to the rear of the structures, and those in Tenement A were larger and may have been quarry pits. Within Pit Group 3 of Tenement A, 3802g of late 12th–14th-century CBM was recorded and this material may have been broadly contemporary with the pits. A small amount of CBM dating to the late 12th–14th century was also recorded in Pit Group 6 in the central part of Tenement B (1043g) and Structure 5 of Tenement C (262g).

Around 94 fragments of roof tile (mostly of late 12th–14th-century date) were recorded within the backfills of the graves, totalling 6kg. Most of the graves containing late 12th–14th-century CBM were located within the southern part of the cemetery and cut pits that contained CBM, from which the material was presumably derived. Some of the graves also contained intrusive early post-medieval CBM.

Phases 4 and 5: 13th to early 15th century

A large stone building (Building 1) used as a smithy was constructed in Phase 4 at the southern end of Tenement A. A substantial amount of CBM (12kg) was recorded within Building 1 dating to the late 12th–14th century. The majority of this was flat roof tile made from fabric IIIB (only three fragments of ridge tile) recorded within Phases 4–6 occupation layers, floor layers and rubble. It is possible that some of the CBM recorded in Phase 4 rubble layers and Phase 4–6 occupation layers may have come from Phase 3 buildings predating the smithy, which may have been wooden structures with ceramic roof tiles.

The rear of Tenement A continued to be used for rubbish pits in Phase 4 and 5, especially the western side of the plot. In the late 13th century, Structure 7 was located on the eastern side of the tenement; this produced 1731g of CBM dating to the late 12th–14th century. Buildings 4 and 5 were constructed in the 14th century (Phase 5), and each produced a small amount of roof tile (Building 4: 4183g; Building 5: 3239g). Further roof tile was recorded within Phase 4 features including Pit Group 10 (1604g) within the western part of the tenement and Pit Group 11 (5222g) within the north-eastern part of the tenement. A far larger amount of CBM (24,028g) was recorded in the Phase 5 Pit Group 14 within the north-western part of the tenement. A number of fragments of roof tile, including type A crested ridge tile, was recorded within Building 5, Pit Group 11 and Pit Group 14. This fabric has a late 12th- to early 13th-century date. As with the CBM found in Building 1, this suggests that this early roof tile may have come from Phase 3 wooden buildings. An Ashampstead-type brown-glazed finial dating to *c* 1250–1400 and probably from a ventilation louver was recovered from the fill of a Phase 4 pit in Pit Group 3 (context 4242) and may have come from the gable end of one of the buildings in Tenement A. The presence of this finial and the crested ridge tile suggests there was one or more high-status buildings in Tenement A during the late 13th to 14th century.

During this period a wooden building was created in the western part of Tenement B which was later replaced in stone (Building 2). A moderate amount of CBM (9448g) was associated with Building 2 pits, floor layers and hearths. In the yard of Tenement B one or more stone structures were created (Structures 8 and 9 in Phase 4 then Building 7 in Phase 5) with a number of pits excavated in the areas between the structures (Pit Groups 12, 13). A small amount of late 12th–14th-century CBM was recorded within Building 7 floor layers (1835g) and tiny amounts from Building 6, Pit Group 12 and Pit Group 13.

Tenement C was occupied by one or more stone structures (Building 3) with small hearths suggesting a domestic use. A small amount of roof tile was recorded in Building 3 (393g). In the 14th century further buildings were created (Building 6) which formed as a boundary to Tenement B.

The area of the cemetery to the north-west of the site was left open although a large pit was recorded containing ridge tile and pottery dating to 1250–1400. This suggests that the cemetery was perhaps being used for rubbish disposal at this time.

Phase 6: mid-15th to mid-16th century

In 1481–2, documentary evidence suggests that all three tenements were cleared (Chapter 1) and the structures on them were heavily modified or rebuilt just after this date. Agas's map of 1578 (Fig. 1.2) shows the buildings created after this clearance and shows a series of buildings fronting the High Street with an adjacent large building to the rear. The

frontage buildings extended across Tenements A–C and the large building to the rear probably extended up to Tenement C. Both of these properties appear to have a tiled roof and several chimneys. The map shows gardens to the rear of the buildings surrounded by a boundary wall.

Around 1686g of the 12th–14th-century CBM from Building 1 in Tenement A came from Phase 6 rubble and disuse layers. A slightly larger amount (3507g) of roof tile of 15th–early 17th-century date has been grouped separately though it may have a similar date as there is some overlap with the fabric types. Some of this material may relate to the change of use of the tenements in 1481–2. Building 1 had a change of use in Phase 6 to a more domestic function with internal modifications such as new partitions and floors.

The buildings to the north of Building 1 were also modified during this phase including Building 5 where 3239g of late medieval and early post-medieval roof tile was recorded within accumulation layers. A small rectangular stone-lined pit (Structure 13) was also constructed in the northern part of the plot, and this contained 9271g of CBM dating to the 15th–early 17th century. Around 50 well-preserved flat tiles and peg tiles made from OXP3 and OXP4 fabric were recorded in the fills within the structure. The roof tile from this cesspit had a high MFW of 185g. This suggests that they may have been deposited in the cesspit soon after disuse and were not part of accumulation layers of recycled rubble. This deliberate discard event may also be indicative of the clearance event of 1481–2.

Within Tenement B, frontage Building 2 was substantially altered in this phase and a number of stone hearths were added. Just over 100 fragments (6315g) of CBM dating to the late 12th–14th century were recorded in Phase 6 floor layers and levelling layers. This included two Stabbed Wessex floor tiles in contexts 8221 and 8439 in bedding, mortared floor and levelling layers. Haberly (1937, 70) suggests that the stabbed and inlaid floor tiles date to pre-1350. It is interesting that several pre-1350 floor tiles may have ended up in 15th–16th-century levelling and floor layers of Building 2. The tile from context 8221 was LH design XXIV, a floriated cross enclosed in a quatrefoil with a circle surround. This design was also recorded during the 1987 excavations of the second Hospital of St John the Baptist which was located just east of the site (Mellor 1991b, 57). The hospital was dissolved in 1457 and the presence of this tile suggests that floor tiles may have been taken from this institution and used locally. The Dissolution of the monasteries in the mid-16th century may have also provided another source of second-hand floor tiles (Hohler 1941–42, 1). Several buildings to the north of Building 2 were also remodelled and a moderate amount of later and early post-medieval CBM was recorded within Building 7, Structure 11 and Pit Group 15.

The frontage building (Building 3) on Tenement C was rebuilt in Phase 6, which may correspond with documentary evidence suggesting that a new tenement was built here in the late 15th century. This building may be that shown on Agas' map of 1578 along with the frontage buildings in Tenements A and B (Fig. 1.2). A second building (Building 8) was also created to the rear and may have been separated from Building 3 by a passage. Buildings 3 and 8 both contained a mixture of medieval and early post-medieval CBM within occupation layers. Within Building 3, a Stabbed Wessex floor tile (Fig. 3.18, no. 2) was used in Room 2 as part of a mortar bedding for hearth 7107 (ctx 7115). As with Building 2, this tile may have come from the demolished hospital buildings. This specific design of tile, LH XXXV/Hohler W26, has previously been recorded as originating from the Priory of St Frideswide (Hohler 1941–42, 47).

Within the northern part of the site, the former cemetery area was enclosed by Ditch 5, the basal fill of which contained pottery dating to 1480–1550. The ditch also contained 26 fragments of later medieval and early post-medieval CBM weighing 1888g within its upper fills (3432, 3433, 3434 and 4822).

Phases 7–9: late 16th to early 19th century

The mid-19th-century construction of Magdalen College School and later basement works in the 1930s heavily truncated the majority of the post-medieval structures, layers and features. This meant that few features could be assigned to Phases 7–9, particularly in the areas fronting the High Street.

Phase 7 (late 16th–early 17th century) features included rectangular stone-built structure (Building 9) in the north of Tenement B and pits within the yard area of Tenements B (Pit Group 17) and C (Pit Group 16). All three contained a small amount of mixed later medieval and post-medieval CBM.

During Phase 8 (mid-17th–early 18th century), Building 9 was enlarged and a new building created, used as a wig-maker's shop. Around 3275g of CBM was recorded from the walls of Building 9 and the construction cut of a well. This material had a later medieval and early post-medieval date and included five fragments of ridge tile, and may have derived from demolition or modification of late 15th-century structures. Two of these ridge tile fragments were type B3 crested ridge tile which can be broadly dated to the late 13th–15th century. This suggests that this ridge tile originated from a Phase 4 or 5 building and may be rubble generated from the 1481–2 clearance.

In Phase 9 (mid-18th–early 19th century), new buildings were created in Tenement B and two cellars were recorded. One of these (Building 11) was associated with the frontage building and may have been accessible from the Greyhound Inn in Tenement A. One hundred and thirty-four fragments of unglazed and worn quarry tile and brick paviour (11,865g) were recorded as part of the *in situ* tile floor (8614) of

Building 11. The majority of these were fragmentary although four fragments fit together as a complete tile, and this was 41mm (1.6in) thick by 215mm (8.4in) wide by 217mm (8.5in) long. These tiles would have provided a hard-wearing surface for this possible coal cellar or storage cellar.

Phase 10: mid-19th century and later

When Magdalen College School was built in 1849–51, the structures on the three tenement plots were demolished. Structure 14, a stone-lined latrine to the rear of Tenement B, dates from this period and contained pottery dating to 1830–40. Within its construction cut were six fragments of medieval roof tile weighing 1354g. This included one fragment of crested ridge tile of type B1. This illustrates the recycling of earlier material, probably from the site itself, to create new structures.

STONE ROOFING MATERIAL *by Kevin Hayward*

Introduction

The frequent use of stone-slates or slats for roofing in medieval Oxford reflects the rich and diverse Middle Jurassic to Lower Cretaceous geology of the county (Richardson *et al*. 1946; Arkell 1947b; Horton *et al*. 1995) and adjoining parts of the Cotswolds (Sumbler *et al*. 2000; Horsfield *et al*. 2013). Many different types of fissile, flaggy calcareous sandstones and limestones lie within reach of Oxford, documentary evidence indicating that stone was usually carted to the town from the Cotswolds and elsewhere in the medieval period, rather than transported by river (Bond *et al*. 2019).

The large roofing stone assemblage (180 examples, 79.3kg) recovered from the excavation provides the opportunity to examine the material in detail, particularly the fabric and form. This review principally focusses upon the geological character and sources of the roofing materials used, as well as commenting on the form of the different tile elements. It was hoped to identify the different roofing stone types from specific phases of construction and embellishment, from the tenement buildings from their 12th-century origin until their demolition during the mid-19th century.

Previous work

There is a good overall understanding of the different rock types used in Oxford and the geology of the county through two books by the eminent, Oxford-based Jurassic geologist W.J. Arkell (1947a; 1947b). Geological memoirs for Oxfordshire (Richardson *et al*. 1946; Horton *et al*. 1995; Sumbler *et al*. 2000) and adjoining counties, supplemented by recent work (Powell 2005; Historic England 2017), provide an additional body of data. Angseesing *et al*. (1994, appendix 1) list 52 sources of Cotswold Stone-Slate, 14 of which lie in Oxfordshire, but these only refer to post-medieval and modern outcrops and so only provide an idea of the probable types of roofing stone used in medieval Oxford.

Only recently, however, has there been any serious consideration of the types and sources of roofing stone in medieval Oxford. Hand specimen analysis of the roofing stone uncovered from the Clarendon Centre excavations (Hayward 2015a, table 10, 63) has been successful in distinguishing shelly slate and Stonesfield Slate types and allowing brief comment on their form. Stonesfield Slate both here and at other sites in Oxford (eg Cotter 2006, 304; Shaffrey and Grant 2006, 373–4) has been shown to be the dominant material. There has been no comment on the roofing stone types used in religious institutions in Oxford and only the report on Eynsham Abbey, *c* 15km to the west of the medieval town, makes passing reference to Stonesfield roofing slate in the latter phases of the priory (Hardy *et al*. 2003, 295). Earlier excavations at Magdalen College on the site of the former Hospital of St John the Baptist (Durham 1991) make no mention of stone roofing slate, just ceramic roofing tile.

Recent detailed petrological and morphological investigation of the medieval stone roofing material assemblage recovered from the excavation of the Greyfriars friary at the Westgate Centre site (Hayward forthcoming a) has moved things forward. It provides an important dataset of reference material, with which the Magdalen College assemblage can be compared. The findings from this study show that stone roofing tile of the friary was made from Forest Marble, shelly slate and a sparsely oolitic Stonesfield Slate up to the mid-13th century, and it is only from the mid-13th- to early 14th-century phase that the classic fine Stonesfield Slate is first identified. The Magdalen College excavations provided the ideal opportunity to redress the balance.

Geological setting

Despite the diverse local Jurassic and Cretaceous geology of Oxfordshire (Richardson *et al*. 1946; Arkell 1947a; 1947b; Horton *et al*. 1995; Powell 2005; Horsfield *et al*. 2013; Historic England 2017) nearly all the roofing slate in the county comes from the Middle Jurassic (Bathonian) outcrops which lie 20–40km west and north-west of Oxford (Angseesing *et al*. 1994). The exception is the Pusey Flags (ibid., 229), which are sandy, shelly and oolitic calcareous Upper Jurassic (Oxfordian) sandstones and limestones from the Faringdon to Beckley area, 29km to the south-west of Oxford. In both areas they contain tilestones hard and fissile enough to be split easily into thin pendles or thicker presents (ibid., 228).

From the Middle Jurassic the Taynton Limestone Formation, the source of one-fifth of the freestone from the Greyfriars precinct (Hayward forthcoming a), has also been shown to be a significant contributor to the tilestone in medieval Oxford (Hayward

2015a; Cotter 2006, 304; Shaffrey and Grant 2006, 373–4). One of the closest of these outcrops (20km NNW) and a major supplier of tile to the medieval town is Stonesfield Slate, a very fine-grained calcareous siltstone, suitable for both thin pendles and thicker presents. Forming three laterally discontinuous horizons of tilestone, it can no longer be used as a roofing material as the outcrop does not extend beneath the confines of the modern village (Angseesing *et al*. 1994, 230).

Angseesing *et al*. identify the other key source of Middle Jurassic (Bathonian) for Oxfordshire as the geologically younger Forest Marble in nine later post-medieval quarries (ibid., appendix 1) lying as close as 20km to Oxford with outcrops at Witney (Bradwell; Broadwell; Oxlease) to the west and Burford to the north-north-west. This much tougher and harder shelly oolitic limestone is only suitable to be used as thicker presents (ibid., 232).

Methodology

Roofing stone had been extensively sampled on site, providing an opportunity to examine roofing tile form and to microscopically examine and identify the stone types in detail. The aim was to elucidate the appearance of the medieval buildings and the materials used in their construction from Periods 4–6 in Tenements A–C. A selection of representative petrographic sub-samples was obtained using a small mason's hammer, which also served as an opportunity to photograph and quantify the elements. A sample size of 10–15mm was adequate to identify the rock type using a hand lens (Gowlland x10) or a higher magnification binocular microscope (Leica DMLP). Identifications are listed in the full catalogue, available in the site archive.

Results

Chronological and spatial distribution

Phase 3 (late 12th to early 13th century) was the earliest from which small amounts of stone roofing tile fragments were recovered, recovered from pit 3803 in Tenement A and pits 4336, 8460 and 9192 in Tenement B (Table 3.12). Even during Phase 4 (13th century), quantities remain small with highly fragmentary tiles mainly from pits in Tenement A. Much greater amounts were recovered from Phase 5 (14th–early 15th century; 21.5kg; 27.1%) and Phase 6 (mid-15th to mid-16th century; 31.2kg; 39.4%). Notable accumulations include a Phase 5 makeup layer (3450) in Building 4 in Tenement A, where 12 examples (1.5kg) were recovered. A significant group (11 examples, 17.2kg) was also reused in the walls of the newly constructed Building 5 on Tenement A; several complete or near-complete tiles were identified. Significant Phase 6 groups include 14 large examples (7.2kg) from garden soil 3494 in Tenement B. From Tenement A, 15 examples (9.2kg) were found in Phase 6 fill 4468 of Phase 5 pit 4418 and 8 examples (8.6kg) from fill 7404 of latrine Structure 6. In each case there are complete or near-complete tiles. Incorporation of large groups of stone roofing tile in the later post-medieval deposits is evidenced by 16 examples (5kg) from Phase 9 backfill 3190 and pit 3767 from Tenement B, and especially from the Phase 10 construction cut for Structure 14 (5kg).

Material types

Hand specimen comparative analysis of 180 examples of roofing tile has been successful in identifying a total of seven lithotypes. Their geological character, source, function, and suitability for the purpose for which they are intended are summarised below.

Except for later post-medieval Westmorland slate and North Wales slate from Phase 8 to 10 contexts, all the roofing materials are from the Middle Jurassic (Bathonian) outcrops located 20–40km west and north-west of Oxford. Three materials dominate: Stonesfield Slate (25.4% by weight); Stonesfield Slate with *Trigonia* bivalve fossils (22.6%); and Forest Marble (44%). Much smaller quantities of a distinctive yellow terebratulid shelly oolitic limestone and shelly oolitic slate (Fulwell slate), both also seen at Westgate (Hayward forthcoming a), account for the remaining 8% of the assemblage.

Medieval roofing stone types

Stonesfield Slate (Type 1): Middle Jurassic (Bathonian) Taynton Limestone Formation, Stonesfield

Restricted to a small outcrop centred around the village of Stonesfield, 20km from Oxford (Angseesing *et al.* 1994, 230), this very distinctive fine grey, fissile, micaceous, calcareous siltstone (Arkell 1947b, 39) is omnipresent throughout the excavations but more thick and robust than the thinner, easier to split types from the Westgate excavations (Hayward forthcoming a). This would suggest that the quarry used to supply the roofing tile for the buildings at this site was a different one to that used to supply the stone for Greyfriars.

The second most common roofing stone type from these excavations, a majority are fine pale cream-grey micaceous calcareous siltstone, with lots of silty sized grains of quartz and mica that allow the rock to split into presents, typically thicker 17–35mm partings than those from the Greyfriars (Hayward forthcoming a). Some occasionally have very small bone fragments and sparsely distributed small round calcite grains called ooids. The thicker slates are recovered from shallow quarrying and are often weathered and as such are easy to acquire from outcrop (Angseesing *et al*. 1994, 228). Fragments appear as early as Phase 4 (13th century) pit fills and although present in the Phase 5 (14th to early 15th century) and Phase 6 (mid-15th to mid-16th century) levels, they are

again found generally in much smaller quantities and in a more fragmentary condition than other material types. This would indicate a preference for Forest Marble, Fulwell slate and *Trigonia*-rich Stonesfield Slate in earlier tenement constructions or even from the Hospital of St John, if material was reused from the hospital buildings. Examples include the Phase 5 disuse layer 3450 in Building 4 and Phase 6 garden soil layer 3494. There are also several roofing tiles in this fabric in Phase 8 and 9 contexts in Tenement B. This would indicate the preferential use of this stone type here from the 16th century onwards.

Much finer, thinner roofing elements in Stonesfield Slate which are more easily split into thin (5–15mm) partitions called pendles are conspicuous by their absence from the excavations. Amounting to just four examples from a Phase 3 (late 12th to early 13th century) fill of pit 9192 in Tenement B, pendles are more sought after as they are much easier to split and fashion into roofing elements (Angseesing *et al*. 1994, 228). By contrast, at the Greyfriars, Stonesfield Slate was widely present in the construction of the late 13th- to mid-14th-century friary and later additions and repairs.

Fulwell slate type (Type 2): Fine shelly slate. Middle Jurassic (Bathonian) source Taynton Limestone Formation, north and west Oxfordshire

Present mainly as fragmentary tile from as early as the late 12th to early 13th century (Phase 3 pit 3803), chiefly in Phase 6 (mid-15th to mid-16th century) deposits is this distinctive fine shelly slate with occasional ooids. These are possibly examples of Fulwell slate, quarried just south of Enstone in north-west Oxfordshire (Arkell 1947a, 149) and used from as early as the 1308–9 Treasury at Merton College (ibid.).

Forest Marble (Type 2): Middle Jurassic (Bathonian) Forest Marble Formation, west and north-west Oxfordshire

The most common roofing stone type from these excavations, this is a hard, very shelly, grey to dark grey calcareous mudstone with numerous nacreous oyster fragments, sparse white ooids and finely ribbed rhynchonellid brachiopods. The heterogeneity in the fabric, hardness and thickness of this rock means that it is not so easy to shape the roofing tile into crisply dressed forms. It can therefore only be split into thicker (20–35mm thick) roofing tile elements called presents.

Described elsewhere as shelly slate (Hayward 2015a, table 10, 63) it has been suggested (Philip Powell pers. obs.) that this is a fissile limestone from the Forest Marble or the Charlbury Member. However, Charlbury Member Stone-Slates (including the Eyford Member Stone-Slates) outcrop some distance (50km) from Oxford at Stow-on-the-Wold and Cheltenham. Tilestone from the lithologically comparable Forest Marble Formation lies as close as 20km from Oxford in the Wychwood Forest area with outcrops and nine post-medieval quarries recorded at Witney (Bradwell; Broadwell; Oxlease) and Burford (Angseesing *et al*. 1994, appendix 1). The Forest Marble identified in both the roofing here and from the Greyfriars (Hayward forthcoming a) is comparable to the Wychwood Beds, described by Arkell (1947b, 46) as quite bedded and shaley, and quite suitable for splitting into tilestone.

The earliest examples of this stone type occur in Phase 3 (late 12th to early 13th century) pits 4336 and 8460 in Tenement B. However, it is in Phase 5 (14th to early 15th century) and Phase 6 (mid-15th to mid-16th century) levels and structures where several of these roofing stones are to be found. Examples of reuse in Phase 5 structures include pitched-stone hearth 7122 from Tenement C and structure 4754, Building 4 from Tenement A and indicate derivation from the roofing of an earlier tenement construction.

Golden yellow, fossil-rich limestone (Type 3): Possibly Bradford Fossil Bed or Epithyris *Fossil Bed (Kemble Beds) Forest Marble Formation, Witney or Bladon*

This very distinctive, yellow, shelly oolitic sparry limestone is also characterised by complete smooth terebratulid brachiopods called *Epithyris*. This tilestone is sourced to either the *Epithyris* Fossil Beds or the Bradford Fossil Beds from the Forest Marble of the Wychwood Forest area (Arkell 1947b, 44).

As at the Greyfriars excavations (Hayward forthcoming a), this material type is only occasionally present, and its thickness (20–30mm) made it only suitable to be roughly dressed into pendles. Present in an elongate tapered form from the Phase 5 (14th to early 15th century) structure 4754 in Building 4, Tenement A, their use here may be contemporary to that at the Greyfriars, where they are first identified reused in an early to mid-15th-century wall.

Stonesfield Slate with large Trigonia bivalve fossils (Type 4): Fossil-rich fine grey micaceous calcareous siltstone Middle Jurassic (Bathonian) Taynton Limestone Formation, Stonesfield

One material new to roofing tile stone from Oxford is a durable variant of Stonesfield Slate with large trigonid bivalves, typically 20–30mm across. Probably from the basal *Trigonia signata* bed of the Stonesfield Slate (Arkell 1947b, 52), it splits into thicker presents (15–28mm). There are several complete or near-complete specimens, notably in Phase 5 (14th to early 15th century) structure 4754 in Tenement A, which may indicate reuse from the roofing of an earlier tenement construction.

Post-medieval stone types

With the advent of the canals and then the railways, much finer lighter slates from northern Britain were brought in to southern England from a greater distance, especially from north Wales.

North Wales slate (Type 5): Dark grey metamorphic slate splits with a distinctive fine cleavage, Palaeozoic

Small fragments of north Wales roofing slate were scattered in Phase 10 (mid-19th century and later) deposits and relate to Victorian and modern roofing builds and repairs.

Westmorland slate (Type 6): Blue-green metamorphic slate (volcanic tuff) with a distinctive fine cleavage, Borrowdale Volcanics, Ordovician, Lake District

One piece of blue-green roofing slate identical to Honister Slate or Westmorland slate was recovered from Phase 8 (late 17th to early 18th century) levelling layer 6754.

Forms

Thirty-nine examples of roofing slate are complete or part complete, allowing for a morphology of tile types to be commented on. Most were recovered from Phase 5 and 6 (14th to mid-16th century) features, with other fragments recovered from later Phase 8 to 10 levels. The ten identified forms, their associated stone types and quantity are listed in Table 3.14; the numbering of the forms is based on the series established for the Greyfriars excavations at the Westgate site (Hayward forthcoming a).

Easily the most common forms (31 examples; 79%) are small and medium-size rectangular tiles. There was, however, far more variability in size (five sub-types) than at the Greyfriars excavations, where they were represented by just two standard sizes (small Form 3, medium Form 4). At Magdalen there was also a larger, wider rectangular size (Form 4a), which is the most common of the sub-types (14 examples; 36%), along with a very small rectangular type (Form 3a) and a larger narrower type (Form 4b). These various rectangular forms appear throughout the sequence. Most material types are represented suggesting that form type did not necessarily depend on the material used.

Unique to the excavations from Magdalen College are large, gently curved or tapering forms

Table 3.14: Forms of stone roofing tile

Form	*Description*	*Stone type*	*No.*	*Phases*	*Comments*
3	Small rectangle. Complete examples 180 x 85–130mm wide x 17mm thick	Forest Marble Stonesfield Slate Fulwell slate	7	5, 6, 9, 10	
3a	Very small rectangle. Complete example 125 x 90 x 10mm	Forest Marble	1	9	Not present at Westgate
4	Large rectangle. Complete examples 200–265mm long x 140–180mm wide x 21–32mm thick	Forest Marble Stonesfield Slate	8	6, 8, 9, 10	Nail hole frequently perforated in the centre, towards the top
4a	Wide rectangle. Complete examples mainly 230–270 x 200–220mm wide x 25mm thick (one example 323mm long)	Stonesfield Slate Forest Marble Stonesfield Slate – basal *Trigonia signata* Bed	14	5, 6, 8, 10	Not present at Westgate. Nail hole frequently perforated in the centre, towards the top
4b	Small very narrow rectangular form 220 x 110 x 30mm	Forest Marble	1	5	Not present at Westgate. Two nail holes on one side of the tile: one at the top, the other in the middle
8	Pentagonal 220 x 220 x 200 x 110 x 38mm	Forest Marble	1	5	
10	Irregular six-sided 140mm top flanks 100mm edges sides 245mm base 180mm	Stonesfield Slate – basal *Trigonia signata* Bed	1	9	Single round large nail hole (9mm) at the top centre
13	Large wide rectangular example 350 x 220 x 9mm	Stonesfield Slate	1	unphased	Not present at Westgate
14	Long tapering form. Upper part of tile rounded. Top 270mm long 160–180mm wide tapering to 60 x 25mm	Forest Marble Stonesfield Slate Bradford Fossil Bed	3	5, 8	Nail hole top middle Not present at Westgate
15	Squat rectangular examples 250mm long x 210–220mm wide x 25–30mm thick	Forest Marble	2	6	

of roofing tile (Form 14). These elongate tiles (270mm) gently curve inwards from 180mm to 60mm at the tip, characterised by a single nail hole. They occur from Phase 5 onwards. Other rarer forms include single examples of pentagonal and hexagonal tiles. The diamond-shaped or square forms seen at the Greyfriars (Forms 1, 2, 7 and 11) are not present at this site.

Summary: quarrying and supply of roofing tile to medieval ecclesiastical buildings in Oxford

Hand specimen comparative analysis of the sizable roofing tile assemblage has demonstrated how important the Middle Jurassic (Bathonian) outcrops of tilestone were, with five material types. As at the Greyfriars excavations (Hayward forthcoming a), two major outcrops, Stonesfield Slate and Forest Marble, each located 20–40km west or north-west of Oxford, account for the large majority of the roofing tile. The petrological study also shows that an entirely new type of Stonesfield Slate facies with large *Trigonia* fossils, equating to the basal *Trigonia signata* bed (Arkell 1947b, 52), was primarily used for wide rectangular tiles (Form 4a) found in the Phase 5 (14th to early 15th century) structure 4754 in Tenement A. A fourth material type from the same general geological area was a distinctive yellow rock with complete *Epithyris* brachiopods, which may either be the Bradford or Kemble Fossil Bed, previously identified from Greyfriars (Hayward forthcoming a). It seems likely that the fifth material type, a fine shelly slate identified both here and from the Greyfriars, is the Fulwell Beds from the Middle Jurassic (Bathonian) of Taynton village and related outcrops.

The Phase 3 (late 12th to early 13th century) and Phase 4 (13th century) roofing tile is all highly fragmentary with no forms identifiable. What can be said is that three material types were identified: Stonesfield Slate, Forest Marble and Fulwell Beds, broadly the same as those identified in the early Phase 2 and Phase 3 levels from Greyfriars (Hayward forthcoming a), reaffirming the idea that different exposures were opened very early on to meet the demand of the growing town of Oxford.

Forty part-complete or complete tile stones permitted a thorough investigation into their morphology and comparison with the forms from the Greyfriars excavations (Hayward forthcoming a). In all, ten forms could be distinguished (Table 3.14) with rectangular profiles prevalent (79). These proportions are comparable with the Greyfriars excavations with some overlap in identical forms (Forms 3 and 4). There are, however, differences with a particular wide form (Form 4a) present in large quantity (14 examples, 35% by weight), most notably in Phase 5 (14th century to early 15th century) structure 4754 in Tenement A. These tiles, nearly all from the Stonesfield Slate *Trigonia signata* bed, represent a single consignment, possibly reused from an earlier tenement. Another difference from the Greyfriars, apart from the greater variability in material types, is that almost all the tiles are thicker presents rather than finer, easier-to-work pendles. These heavier, more crudely made tile stones, acquired from a variety of sources including more inferior durable Stonesfield Slate, may reflect a less centralised, more piecemeal operation associated with the roofing of individual secular tenement buildings.

ARCHITECTURAL FREESTONE AND PAVING MATERIALS *by Kevin Hayward*

Introduction

Central to the construction and embellishment of secular and ecclesiastical buildings in medieval and post-medieval Oxford would have been access to suitable sources of freestone. A freestone is defined as a limestone or sandstone with a soft or open porous texture which enables the rock to be worked or carved in any direction, take inscription, yet be hard enough to withstand external work (Leary 1989; Stanier 2000; Sutherland 2003).

Selected elements (23 examples) from the moderately sized architectural stone assemblage provide the opportunity to examine the material in detail, particularly the fabric and form. The major petrological types used in the excavations are reviewed in turn, including their geological character and source as well as their suitability for the purpose for which they were intended. Please refer to the catalogue of the architectural stone, available in the site archive, for a comprehensive petrological review of all the worked stone retained from excavation.

Previous work

There is a good overall understanding of the different rock types used in standing post-medieval buildings in Oxford and the geology of the county (see *Stone roofing material* above). Only recently, however, has there been any serious consideration of the types and sources of architectural stone recovered from excavation of medieval Oxford. There are, for example, descriptions from the excavations at 67–69 St Thomas' Street (Shaffrey and Grant 2006), of the mid-15th-century reredos at All Souls College (Palmer and Shaffrey 2019) and of walling, roofing, paving and architectural stone associated with domestic buildings at the Clarendon Centre (Hayward 2015a). Most recent of all has been a review of the freestone and rubblestone materials used in the construction of the mid-13th-century Franciscan friary at Westgate (Hayward forthcoming b).

Instead, reliance on building accounts such as the first documented use of Wheatley stone in the building of Merton College from 1290–1 (Arkell 1947a, 37–8) and in other colleges during its peak production period of the 14th century is the norm. Accounts also refer to the later use of Headington stone ('stone') and Taynton and Barrington freestone ('*liber petra*') in the 1396–7 New College bell

tower (ibid., 46–7) and Headington stone in All Souls (1438–43) and Magdalen Colleges (1474–80), the latter also describing consignments of rag from Sunningwell and Hinksey and freestone from Taynton and Sherborne (ibid., 47–8). From this it is clear that the colleges played an important role in the control of the Wheatley and Headington quarries, as documented by 15th-century leases from Magdalen and Oriel.

Geological setting

The diverse Middle Jurassic to Cretaceous geology of Oxfordshire (Richardson *et al*. 1946; Arkell 1947a; 1947b; Horton *et al*. 1995; Powell 2005; Historic England 2011; Horsfield *et al*. 2013) includes several geological freestone units that have been used since Roman times for construction not only in the county but throughout England. The closest are the open-textured Upper Jurassic (Oxfordian) fragmentary coral-rich freestones, Headington stone (2.5–3km east) and Wheatley stone (7km east). Used as early as the late 1st century in Roman monumental architecture from Southwark (Hayward 2019a) and more locally in a nearby villa (Jope 1956), Wheatley stone can be carved into quite ornate architectural elements. However, the poorer quality Headington stone with a much higher overall porosity (Leary 1989) and greater susceptibility to weathering and prolonged exposure was more suitable for ashlar.

Better-quality dimension stone therefore had to be brought in from further afield. The role, for example, that older Middle Jurassic (Bathonian) limestones from the NE–SW trending South Cotswold escarpment had in architectural embellishment in Oxford should not be downplayed. A plethora of limestones that outcrop along the valley sides of the River Windrush, most notably Taynton stone and Burford stone (20–25km to the west) as well as those slightly further away at Barrington (27–30km) and Sherborne (30–35km), were economically viable material choices. Further downstream, at Reading, Taynton stone accounts for an estimated 90% of all the surviving architectural elements used to embellish the 12th- and 13th-century abbey (Hayward pers. obs.). That some of these outcrops would have also supplied some of the tilestone for roofing in medieval Oxford is seen in domestic buildings (Hayward 2015a) and merely enhances the value that these exposures had.

Although lying much closer (15–20km to the north-west), the role that Bladon stone would have played in construction and embellishment in medieval Oxford is likely to have been small as nearby streams were not navigable. One further candidate material to consider is Forest Marble. Technically a condensed fossiliferous limestone rather than a freestone, the Middle Jurassic outcrops which lie in the Wychwood Forest area 20km north-west have provided an ideal source of paving stone.

Suitable sources of heavy, not easy to work rubblestone lie very close by. The hard Coral Rag and associated Calcareous Grit outcrop within the same geological formation as the Upper Jurassic (Oxfordian) Wheatley Limestone (7km) and Headington stone (2.5–3km). Indeed, it is highly likely that both rubblestone and freestone would have been extracted from the same exposure.

Methodology

This study is based on the petrological investigation of a selection (23) of architectural elements, picked out from a rapid assessment of the entire architectural stone assemblage as having art-historical, stylistic and petrological attributes. This preliminary investigation which succinctly examined, catalogued, and reported on 73 items of architectural stone, most in a fragmentary state, identified the lithological character in hand specimen of the more important elements as being of particular interest. As set out in the revised research aims (OA 2019, 51), this current investigation sought to identify the materials used in the earliest (Norman to medieval) stone tenement constructions and characterise their appearance. Specifically, what can the stone materials used in the hearths of tenements A and B contribute to an understanding of the character of metalworking activities?

To fully understand the petrological character and source of the stone assemblage from the Magdalen College excavation, a considered scientific approach was implemented with the same level of detail as that adopted in a successful petrological investigation of the architectural stone from the Westgate Greyfriars excavation (Hayward forthcoming b). The results from this study began to answer questions relating to an understanding of the chronology of building stone use in medieval Oxford.

The chosen technique, hand specimen comparative analysis supplemented by thin section petrography, initially found success in distinguishing between and sourcing 13 freestone outcrops used in early tombstones and monumental architecture of southern Britannia (Hayward 2009). Subsequently, the technique has been adopted widely in sourcing sculpture in Roman London and south-east England (Hayward 2015b), stone and mortar types in medieval Livonia and Poland (Hayward 2019b), Bermondsey Abbey (Hayward forthcoming c) and Tudor-dated stone from Somerset House (Hayward 2017).

A selection of representative petrographic subsamples was obtained from this sizable assemblage using a small mason's hammer and chisel from the rear or unobtrusive part of the architectural element, which also served as an opportunity to photograph and quantify the elements. A sample size of 10–15mm was adequate to identify the rock type using a hand lens (Gowlland x10), or at a higher magnification binocular microscope (Leica DMLP). These were then compared with a hand specimen reference collection of outcrop samples

and monumental blocks from earlier research (Hayward 2009; 2015b) to pinpoint a geological outcrop or region for each lithotype. A good understanding of the stone types used in medieval Oxford had already been gained in 2015 at the Clarendon Centre excavations (Hayward 2015a) and Greyfriars (Hayward forthcoming b).

It is found that different types of freestone are particularly hard to distinguish in hand specimen, because they are frequently made up of tiny crushed shelly and rounded carbonate grains called ooids. A rock thin-section slide, ground to 30 microns thick, can be examined at much greater magnification (x400) using a polarising microscope, distinguishing different types of microfossils, binding calcite cements and calcite grains that can then be compared with a reference collection of over 100 slides obtained from Jurassic and Cretaceous freestone outcrops in southern central England and northern France to provide a successful match. In this instance it was unnecessary to prepare thin sections from samples of architectural stone at Magdalen College as the stone types are broadly the same as those identified (and thin sectioned) in the stone mortars and stone lamp from this site (Appendix 2). Photomicrographs of the stone mortar thin sections were used to illustrate the different architectural stone material types from this site using a camera (Leica DFC 320 Digital Camera) and a polarising microscope (Leica DMLP).

Petrology

Hand specimen comparative analysis of the 23 examples of architectural stone has been successful in identifying a total of just four lithotypes of freestone. Their geological character, source, function, and suitability for the purpose for which they are intended are summarised below. The proportion of each by number of elements and weight are summarised in Table 3.15.

Upper Jurassic (Oxfordian) coral limestones

Approaching two-thirds of the architectural stone assemblage (60.8% by fragment count) can be sourced to local Wheatley limestone outcrops, which lie roughly 7km to the east of the centre of Oxford. Based on hand specimen comparative analysis, two sub-types can be identified. The unique petrological character of each influenced the purpose to which they were put.

This dimension stone centres around Wheatley village and is exposed today at Lye Hill Quarry (SP 592068), where it and redundant exposures (eg Gaol House Quarry, SP 595 059) were the subject of recent detailed investigation (Horton *et al*. 1995, 45–51).

Wheatley stone variant 1: Open-textured, light cream-grey shelly intraclast-rich limestone Stanford Formation

The architectural elements worked from this pale, open-textured variant seem to suffer some weathering and degradation. They have been carved in the main into standard roll-holl moulds, shafts, cornices and flat, gently curved moulds associated with the hearths, which would suggest that they are an inferior material to finer variant 2. In hand specimen the rock contains (10mm) angular carbonate grains called intraclasts, echinoid and bivalve-rich grains and some coarsely crystalline poikilotopic cement, present because of the abundance of large platy crinoids and echinoids.

A thin-section sample of a stone mortar in this material from the Phase 6 upper fills or levelling of Phase 5 (mid-15th- to mid-16th-century) pit 4418 illustrates the main petrological features of this shelly intrasparite (Folk 1959; 1962). It has very large, dark grey intraclast lumps (eroded angular limestone chunks), some with a grapestone texture typical of hardgrounds (or periods of non-deposition in the geological record). It contains an example of a large ribbed Ctenostraetum or pectinid bivalve (Arkell 1947a) identified in thin section from worked Wheatley stone elsewhere (Hayward 2019a, fig. 9.47, nos 3 and 4).

Wheatley stone mouldings appear as early as Phase 4 (13th century) in the fill of pit 3779 in Tenement A. This is broadly similar to the time that enormous quantities (250kg) are found in the earliest period 4.2 (late 13th to mid-14th century) inception of the Franciscan Priory at Westgate (Hayward forthcoming b), and just before its period of peak production during the 14th century (Arkell 1947a). The vast majority, however, is present in Phase 6 (mid-15th to mid-16th century) features such as blacksmith's hearth 8663 in Building 2, Room 3 and as reused cornices in wall 9039, Building 6.

Table 3.15: Lithotypes of freestone

Type	*Lithotype*	*No.*	*% no.*	*Wt (kg)*	*% wt*
1	Wheatley stone, open-textured, poor quality	13	56.5	99.7	37.8
2	Wheatley stone, fine golden yellow, good quality	1	4.3	18.0	6.8
3	Taynton stone	2	8.7	19.5	7.4
4	Burford-Barrington stone	3	13.0	26.7	10.1
5	Fine Box/Athelstan oolite	4	17.4	99.7	37.8
Total		23	100	263.6	100

Wheatley stone variant 2: Finer textured, yellow to golden brown shelly intraclast-rich limestone Stanford Formation

A very high-quality, fine, golden yellow variant of Wheatley stone, seen previously in some quantity from the later medieval levels at the Franciscan friary at Westgate (Hayward forthcoming b), was identified in a very complex element with a plastered veneer in a Phase 10 (mid-19th century and later) fill (7002) of construction cut 7003 for the present library building. The fine homogeneous texture (and lower porosity), which made this stone less susceptible to weathering also resulted in a crispness of carving that was atypical of the open-textured variant 1. The golden yellow colour was comparable with some of the high-quality Lincolnshire limestones such as Weldon and Ketton stone from Northamptonshire and Rutland, which have round oolitic grains rather than skeletal grains and are also frequently painted or plastered over. This quality stone appears to have been worked out in its entirety from the quarry face and finds no parallels with existing reference collections and is very different to harder, whiter Headington Hard stone (Arkell 1947a) which also contains cavities.

The use of this stone elsewhere is intricately linked with several crisply executed and finely plastered cusped window elements and cornices from the Franciscan friary at Westgate (Hayward forthcoming b), nearly all of which are in mid-16th- to mid-17th-century contexts but with some examples found as early as period 4.2. Further afield it has recently been identified in high-quality 12th-century abacus mouldings and window mouldings used in old St Mary's Church, Stoke Mandeville, Buckinghamshire (site code 1C18SMABS from the HS2 excavations; Hayward pers. obs.).

Middle Jurassic (Bathonian) limestones of west Oxfordshire

A second group of freestones, accounting for five examples, can be sourced to the Middle Jurassic (Bathonian) outcrops further afield in west Oxfordshire. Two sub-types can be identified.

Taynton stone: Orange to yellow-brown, open-textured, banded shelly oolitic limestone

The characteristic earthy-brown Taynton stone, sourced to the Middle Jurassic (Bathonian) riverside exposures at Taynton, west Oxfordshire, is present in the two earliest examples of carving from these excavations. Both highly weathered, they include a 10kg quoin from Phase 2 (late 11th to mid-12th century) pit 7875 (fill 7874) and a guttering element from Phase 3 (late 12th to early 13th century) pit 3981 (fill 4116). The early use of Taynton stone elsewhere in Oxford can be shown at Westgate (Hayward forthcoming b) in a late 11th- to 12th-century complex Romanesque element. This suggests that in both cases they derived from an earlier Saxo-Norman ecclesiastical building in the vicinity.

In hand specimen this stone has prominent white ooids which are round to sub-ovoid carbonate grains up to a maximum of 2mm. Many of these have weathered out giving the rock a distinctive 'pitted' appearance. The more sub-ovoid grains are the result of a layer of fine carbonate cement forming around small bivalve mollusc shell fragments. The shell fraction is high with grey shell fragments which may be laminated as well as some pink/red iron-rich echinoid or crinoid plates.

A thin section sample of a stone lamp in this material from Structure 11 illustrates the main petrological features of this echinoid-rich bio-oosparite (Folk 1959; 1962). It has a characteristic fine microcrystalline bonding cement typical of Middle Jurassic (Bathonian) freestones of the south Cotswolds set within well-formed ooids (Hayward 2009). In detail the fauna consists of thick laminated oysters and thinner shell with a thin algal coating as well as iron-infiltrated porous red echinoid spines and plates, which in places gives the rock a thicker poikilotopic cement.

The Taynton quarries, which are mentioned in the Domesday book (Arkell 1947a, 55), support an early date for their use in Oxford, and chronologically are in accordance with the use of this stone in other major 11th- to 12th-century ecclesiastical buildings at London and Reading. In London, they form an integral part of the freestone decoration in surviving fragments from medieval St Paul's (Blows and Worssam 2011), appear in the pre-Norman Pyx Chamber at Westminster Abbey (Hayward pers. obs.) and in the Saxo-Norman 'new and beautiful church' at Bermondsey Abbey (Hayward forthcoming c). They account for an estimated 90% of all the architectural stone remaining *in situ* and from archive from the very large early to mid-12th-century Reading Abbey (Hayward pers. obs.).

Burford-Barrington type stone: Variable open-textured cream-yellow to grey banded shelly oolitic limestone

Petrologically, these materials are best defined as Middle Jurassic 'Taynton-type stone' from valley-side exposures of the River Windrush in west Oxfordshire. Specifying a more precise geological source such as an individual quarry or outcrop is hampered by subsequent post-medieval quarry infill, removing any trace of the original quarry scar, the lithological similarity between exposures at Barrington, Sherborne and Burford as well as lateral variability of a single geological unit within an individual quarry. They appear in two gently undulating hearth moulds from stone hearth 7107 in Building 3 and stone hearth 9090 in Building 6. Both contexts date to Phase 6 (mid-15th to mid-16th century).

Bath stone (Box Groundstone or Athelstan oolite)

Purpose-made elements used to line a Phase 10 (mid-19th century or later) drain are made from

an extremely fine-grained oolitic limestone. Seen in several post-medieval elements from the Westgate excavations (Hayward forthcoming b) as well as several medieval stone mortars from Magdalen College (Appendix 2), they are very similar in hand specimen to fine hollowed oolitic limestones from the Middle Jurassic (Bathonian) freestones of Box-Bath (60km south-west) in west Wiltshire and Tetbury in Gloucestershire (50km west) (Hayward 2009).

Moulding form

A review of the principal moulding types from the excavations combines the findings from the initial assessment scan (de Turberville 2019) with this more detailed review of 29 selected stone mouldings. This includes comment on any tool marks and attached paint and plaster. Mouldings are grouped into types.

Roll-holl and plain shaft mouldings

Three examples, 2625g. Also known as 'bowtell' or 'great bowtell' mouldings (Morris 1992), roll holls are small plain moulds with a convex section roughly three-quarters of a circle. Two retained examples (SF 114; SF 133) in Wheatley stone were found reused in a Phase 8 (late 17th to early 18th century) masonry wall of Building 10 (contexts 3306 and 3307) and clearly came from a medieval building. Both are small, 70mm and 60mm respectively, and have a standard rounded profile with a fillet, which is typical of mouldings in England from the 13th century onwards (ibid., 14). They are frequently associated with colonnettes or shafts of medieval clustered piers, although they can be associated with many different parts of an ecclesiastical building.

It is also likely that a small (80mm diameter), plain, undecorated column shaft in Wheatley stone recovered from Phase 6 (mid-15th to mid-16th century) levelling layer 8667 in Building 2, Room 3, derived from a similar grouping of later medieval moulds.

Cornices

Three retained very large (6.5–12.5kg; total 27.4kg) cornice sections reused in Phase 6 (mid-15th to mid-16th century) masonry wall 9039 of Building 6 are likely to have belonged to the same earlier structure. All are in Wheatley stone. They measure 190–341mm long, with a height of between 170mm and 190mm, each with the same 45° plain chamfered edge profile and fine diagonal tooling. It is not possible from their profile to date these precisely, other than the fact that stratigraphically they must originate from a medieval structure. Later medieval chamfered profiles are generally narrower (steeper) from the 14th century (Morris 1992, 12), which would indicate that these are 12th to late 13th century in date. Given their size it is more probable that they formed larger elements such as late Gothic piers, responds or continuous mouldings rather than much smaller arches, ribs or mullions (ibid.).

Gutter mould

A crudely carved, gently concave (20°) U-shaped mould with a three-sided chamfered base (9.4kg) is almost certainly a guttering element. As with the quoin element (see below), it is carved out of orange Taynton stone and comes from a very early phase, in this case Phase 3 (late 12th to early 13th century) pit 3981.

Quoin

Only brief comment is necessary on the form of part of a large quoin (10.2kg) with two 45° chamfered moulds. This very basic element was used as a corner block on an external or internal wall. Its main interest lies in it being carved in orange Taynton stone, the earliest freestone type to be used in Oxford (see above), coupled with its early date of use, having derived from Phase 2 (late 11th to mid-12th century) pit 7875=7714. This block therefore belonged to the earliest masonry structures on or near the site.

Hearth moulds

It is a feature of this site that there are many large sections of crudely made, flat, gently rounded, almost worn step moulds (seven examples, 84.5kg). Nearly all are carved from easy to acquire, poorer quality Wheatley stone. Hearth moulds were only found in Phase 6 (mid-15th to mid-16th century) features, especially those associated with hearths from Tenement B, such as that from Building 2 (8663) and an example from hearth 9090, Building 6. Hearth 7107 from Building 3 in Tenement C contains the largest example (24kg). That they were used in a hearth is not in doubt, given that the Wheatley stone has burnt pink on one side, as with the example from 8663, with an example in oolitic Burford stone from hearth 9090 also burnt in a similar way. Cornered blocks come from hearths 7107, 8663 and 9090. They also vary in thickness from a standard 95mm to as much as 220mm from 7107.

It has so far not been possible to find parallels of this form, but the wide, rounded, stepped recess seen in all examples together would have created a restricted square or sub-rectangular covered area which would certainly help maintain high temperatures in a hearth. Some of these hearths have evidence of hammerscale and slag indicative of ironworking and stone flues to channel air.

Miscellaneous

A fresh example in Wheatley stone came from fill 7002 of the construction cut (7003) for the mid-19th-

century school building. This complex element, which splays out, had traces of white paint. This highly decorative piece is possibly medieval in date. A further complex form in crisp Wheatley stone was a gently curving splayed element recovered from Phase 6 (mid-15th to mid-16th century) pit 6394. Both mouldings are rather atypical of the 'functional' moulded stone assemblage at Magdalen College in that they are far more decorative, and probably belonged to an ecclesiastical building or came from the Hospital of St John the Baptist.

Mid-19th-century and later forms

Late forms from Phase 10 contexts included a base for an iron railing and purpose-made hexagonal mouldings for a drain; these pieces are in Middle Jurassic (Bathonian) freestone from the south Cotswolds. A crisply cut cornice element in fresh Burford stone recovered from wall 6067, belonging to the mid-19th-century school building, was probably a reject mould used as a test piece for stone masons to work on.

Summary

Forms

Much of the stone assemblage consists of rather standard, functional forms. Medieval guttering, quoin, hearth stone elements and cornices predominate with only two more highly decorative splayed forms that are probably late medieval in date. This reflects the fresh use (and reuse) of stone for medieval tenements, later leased out by Magdalen College in the 15th century. Of note were several burnt, rounded step moulds with recesses used in mid-15th- to mid-16th-century hearths, especially in Tenement B but also Tenement C. They are purpose-made blocks in Wheatley stone designed as a series of interconnecting elements forming a square or sub-rectangular recess to contain the heat, and in some cases are associated with iron smithing.

The earliest elements are from late 11th- to mid-12th-century and late 12th- to early 13th-century features and consist of rather standardised quoin and gutter forms. Both in Taynton stone, a freestone type linked with earliest Norman carvings in Oxford, they may originate from monastic or other high-status structures, perhaps the nearby first Hospital of St John the Baptist.

The roll-holl moulds have a rounded profile with a fillet typical of later medieval decoration, whilst two more elaborate pieces are also likely to date from this period. It is possible that they originate from the second hospital, which was still standing in the 14th century and suppressed in the later 15th century.

In conclusion, the assemblage lacks many of the finer mouldings seen in the medieval Greyfriars excavations (Hayward forthcoming b) and rather reflects the drabber utilitarian character of a set of medieval tenement buildings.

Fabrics

Hand specimen comparative analysis of 23 examples of architectural stone has been successful in identifying a total of just five lithotypes of freestone, all common in medieval Oxford and all also identified in the Greyfriars excavations (Hayward forthcoming b). Again, this study demonstrates the importance and adaptability of the nearest high-quality freestone for medieval builds, Wheatley stone quarried 7km to the east of Oxford and accounting for around two-thirds of the architectural stone assemblage (60.8%).

As at the Greyfriars excavations, though, it is the orange-brown Taynton stone quarried from west Oxfordshire that predominates in the earliest Phase 2 and 3 stone (late 11th to early 13th century). The demand of this stone for major construction projects at Reading Abbey (Hayward pers. obs.) and large ecclesiastical builds in London (eg St Paul's) at this time would have made this golden freestone highly accessible. By contrast, the more intricately carved freestone mortars and lamp from the Phase 4–6 medieval tenements are made of material brought over much greater distances (Appendix 2).

STONE OBJECTS *by Ruth Shaffrey*

A total of 35 portable stone objects were recovered (Table 3.16). These have been allocated to three categories: firstly, whetstones, grindstones and other items used for sharpening; secondly, mortars; and thirdly, other objects including lamps, querns, counters, unworked fossils and other tools. These are described and discussed by artefact class and phase below.

Sharpening stones

A total of 16 items have been identified as having been used to sharpen metal tools, and therefore potentially associated with the smithy. These were found in features ranging from Phase 2 to Phase 10, but with the bulk (ten) coming from Phase 4–6 features.

Phase 2: late 11th to mid-12th century

Only three whetstones were recovered from this phase, all from Tenement B. An elongate whetstone

Table 3.16: Summary of stone artefacts

Phase	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*10*	*Total*
Sharpening stones	3		2	2	6		2	1	16
Mortars/vessels			1	4	5				10
Other		1		5	2	1			9
Total	3	1	3	11	13	1	2	1	35

of Norwegian Rag found in pit 9253 has been used as a point sharpener (Fig. 3.19, no. 1) while a rectilinear whetstone of Wealden sandstone type demonstrates several facets that result from use (SF 3129, fill 9718, pit 9721). A corner fragment of sandstone has highly worn faces (fill 8306, ditch 8300, Ditch 1).

Phase 4: 13th century

Two whetstones were found in Phase 4 features. Two adjoining fragments from occupation deposit 7681 in Tenement A (Building 1) are from a grindstone of micaceous sandstone, possibly Pennant sandstone. Part of the square central socket survives, and the circumference is worn, but the faces are damaged where the stone has split along the natural laminations. A fragment of sandstone whetstone was also found in pit 6539 (fill 6555) within Tenement B.

Phase 5: 14th to early 15th century

A whetstone was found in an occupation layer in Building 6, Tenement B (ctx 9614). It is a square-sectioned whetstone, made of siltstone. A second whetstone, made of Norwegian Rag, was found in heat-affected deposit 4862 in Building 4, Tenement A.

Phase 6: mid-15th to mid-16th century

A total of six whetstones were found in Phase 6 features, with one from Tenement A (hearth 4512) and five from Tenement B (pits 4330 and latrine Structure 11, layers 8920 and 8678, and floor 4260; Fig. 3.19, nos 2 and 3). Two of the whetstones are made of Norwegian Rag, the most common medieval whetstone lithology, and the remainder are made from sandstone, probably Pennant sandstone. These could be residual in features in this phase and relate to the workshops of Phase 4, or they could have been associated with activity related to the hearths and ovens of Phase 6. The whetstones include both slab-shaped stones and elongate examples with square and rounded cross-sections suggesting that a range of tools were being sharpened.

Phase 8: late 17th to early 18th century

A fragment of circular siltstone object was recovered from wall 3857, Tenement B. The main face has been worn very smooth, as have the edges, and it was probably used as a grindstone. A grindstone was also found in pit 3345 in Tenement B (Fig. 3.19, no. 4). It has grooves from sharpening on the circular edge, but also across one of the faces, and there are two holes, presumably for a clamp, either side of the circular central socket.

Phase 10: mid-19th century and later

A fragment of a sandstone slab that had been used across one face and two edges as a whetstone was found in makeup layer 7800 in Tenement A.

Discussion

The variety of whetstones and grindstones from Tenements A and B show that a range of tools were being sharpened, as might be expected in a smithy. Some of this activity may have been domestic, but the larger number of whetstones from Tenement B suggests that there was more of an emphasis on sharpening tools at the workshop in Tenement B than in Tenement A, where the main smithing activity took place. The occurrence of Norwegian Rag whetstones in Oxford from the late 11th–12th century is in keeping with evidence that suggests the 12th century as the point at which their importation increased significantly across the country (Jervis 2023, 47 and fig. 2). The mixture of imported schist whetstones and sandstones and siltstones of elongate or slab form reflects the combination of imported commodities and 'found' items seen in medieval whetstone assemblages from across England (ibid., 41) and in this context the Magdalen College whetstones are broadly typical of the period to which they date.

Catalogue of illustrated whetstones and grindstones (Fig. 3.19)

1 **Whetstone**. Elongate with irregular cross-section: rectangular at one end, oval at the other. Used as a point sharpener with a long groove running the length of one side. Snapped at the narrow end and surviving at the wider end. Norwegian Rag. Measures >95mm long x 9–15mm wide x 7–12mm thick. 31g. SF 3153. Ctx 9218, pit 9253, Pit Group 9, Tenement B, Trench 129, Phase 2.

2 **Whetstone**. Elongate whetstone with sub-square cross-section. Faces are flat and arrises are slightly rounded. Both ends are rough; one looks original, the other less certain. Slightly bevelled across some of the arrises. Very fine-grained grey slightly micaceous sandstone. Measures 89mm x 25–32mm x 21–22mm. 122g. Ctx 6487, latrine Structure 11, Tenement B. Phase 6.

3 **Whetstone**. End of long rectilinear large whetstone. Sub-rectangular cross-section with flat faces and very slightly rounded arrises. Pennant sandstone. Measures 225mm x 40–45mm wide x 19mm thick. 426g. Ctx 4260, Floor, Room 1, Building 7. Tenement B. Phase 6.

4 **Grindstone**. Thick circular grindstone with regular wear on the straight-edged circumference. Hole is circular and either side of it are two circular holes, presumably sockets for a clamp. One face is flat and unworn, but the other is concave and has traces of pecking suggesting it was originally a rotary quern.





Fig. 3.19 Whetstones and grindstones

This face also has some grooves from whetting and there is one prominent groove around the circumference, also from sharpening. Fine-grained pale brown siltstone. Measures 230mm in diameter x 47–63mm in thickness. 2752g. Ctx 3344, fill of cut 3345, Building 9, Room 1. Tenement B. Phase 8.

Mortars and vessels

Eight mortars were found, as well as fragments of two further vessels. These are described by phase below and discussed as a single group. Petrological analysis of all the mortars and fragments was carried out by Kevin Hayward (Appendix 2).

Phase 4: 13th century

A single mortar was found in an occupation layer in Building 1, Tenement A. This is of Middle Jurassic freestone (Fig. 3.20, no. 5). Only a fragment of the vessel wall remains, with a band around the rim and a single rib with shallow spout.

Phase 5: 14th to early 15th century

Four of the mortars were found in Phase 5 contexts: three on Tenement A and one on Tenement C. The example from Tenement C is a four-ribbed mortar of Middle Jurassic freestone and was found in pit 6213 (Fig. 3.20, no. 6).

Of the three mortars found on Tenement A and dated to this period, one Jurassic freestone example

had been reused in wall 3700, Building 4 (Fig. 3.20, no. 7). This had four ribs originally, of which two are complete and two survive at the base. Two of these ribs were deeper and had been slightly hollowed out to form handles.

A third fragment of Jurassic freestone from pit 4418 is a base fragment (Fig. 3.20, no. 9). Little can be said about the overall dimensions or form of this example, but it has a three-facetted rib. This design is very unusual but is paralleled by a mortar from a rural settlement at Graven Hill near Bicester that is made of a hard shelly Jurassic grainstone possibly from the Portlandian Beds of the Aylesbury area (Shaffrey with Hayward 2023).

A Wheatley limestone mortar was found in oven deposit 4862, Building 4, Tenement A. This example has one surviving perforated handle with a markedly curved D-shaped profile (Fig. 3.20. no. 8). An exact parallel for the handle type could not be found. Mortars with perforated handles are much less common than those without handles and the handles are usually flat across the top. There are two mortars from Beverley in Yorkshire with D-shaped handles, but one is blind, and the other has a larger piercing handle than the Magdalen College example. These are made from chalk and Caen stone respectively (Foreman 1992, 129).

Phase 6: mid-15th to mid-16th century

Fragments from three, and possibly another one or two, mortars were found in Phase 6 features. A mortar was found on Tenement A in a Phase 6 fill of pit 4418 in Pit Group 14. This is a plain mortar with one surviving very deep rib and is made of Wheatley limestone (Fig. 3.21, no. 12). A fragment from Tenement A was also recovered from garden soil 3565 (Fig. 3.21, no. 11). This has one surviving hollowed handle but is otherwise plain and is made of Jurassic freestone.

A further Jurassic freestone example was found in demolition layer 6788 in Tenement C. This is a four-ribbed mortar with two of the ribs having distinctive separate large lugs with runnels across the top. The other two ribs are deeper and slightly hollowed to create handles (Fig. 3.21, no. 10).

Another possible vessel was found in latrine Structure 11 on Tenement B. This is of the same Jurassic freestone as several other examples and is heavily smoothed on the inside, but it is of a square or rectangular shape, finished only with very coarse tooling (Fig. 3.22, no. 13). It may be a structural item such as a trough rather than a mortar. Another single fragment of square or rectangular Jurassic freestone vessel was found in fill 3838 of pit 3839, Tenement B. This is crudely tooled on the exterior and evenly smoothed on the inside. It could be a crude bowl but it may also have served a structural purpose. It is very similar in size, finish, form and lithology to the fragment from latrine Structure 11, and could be part of the same item.

Discussion

The number of mortars found at this site is out of the ordinary for Oxford: only 17 have previously been recorded from the city. This suggests that the mortars were not used for everyday activities in typical household settings. Precisely what they were used for and how is, however, difficult to establish. We know mortars were used for a range of tasks because of the different wear patterns on them: internally rough bases may have been for grinding coarse substances, for example, while a smoother surface suggests the production of pastes (Ottaway and Rogers 2002, 2800). Most of the Magdalen College mortar bases do not survive, but the insides of those that do are finely worked and worn smooth; that from pit 6213 also has circular striations visible. The likelihood is that these were used for grinding and mixing substances to a fine powder or paste, rather than solely for crushing and pounding. Six of the eight mortars were found in contexts on Tenement A where the smithy was located, but none bear any evidence that they were used in any metal-working processes, and it is most likely that they found their way here for recycling (for example as building material). The mortar from pit 6213 on Tenement C was found in a rubbish layer above a thick deposit of lime mortar, and it is conceivable that it had been used for preparing the ingredients for the mortar or mixing small batches of it. Given the rarity of mortars from Oxford, it is possible that some examples here were originally used in the Hospital of St John, since similar types have been identified at other hospitals and infirmaries, such as St Nicholas in Lewes, St Mary Spital in London, and St Mary of Ospringe in Kent (Barber 2010, 20; Harward *et al*. 2019, 264; Smith 1979, 153–4).

Until recently, mortars have only been studied in detail in the specialist contributions to some excavation reports, with a few notably detailed discussions (eg Dunning 1977; Biddle and Smith 1990; Major 2012). A survey for this report, which generated data on *c* 300 examples, but was far from exhaustive, suggests that the largest quantities of mortars are found in towns while smaller numbers are sometimes found at religious houses, infirmaries/hospitals and castles. They are not often found on low-status rural sites. A similar pattern was found in a survey conducted concurrently with this one (Jervis 2022, table 22).

Mortars are typically found in contexts of 13th- to 14th-century date and their use is thought to date broadly to this period, when in some circumstances they came to replace the rotary quern for the processing of grain into meal for flour. The Magdalen College mortars were recovered from a range of contexts including pits, walls, demolition and occupation layers, and in features dated to the 13th to mid-16th century; the later of those examples may be assumed to be residual.

The number of mortars from Magdalen College is not large in comparison to some urban assem-

Table 3.17: Stone mortars from Oxford

Site	*Notes*	*Lithology*	*Bowl shape*	*Finish*	*Ribs*	*Internal rim diameter (mm)*	*Height (mm)*	*Context date*	*Reference*
Greyfriars		Unknown		Vertically tooled	Unknown			Unknown	OXCMS: 1975.27
High Street	Fragment	Purbeck marble						Unstratified	Roe 2000, 425
Hinxey Hall	Fragment	Purbeck marble		Not specified	1 rib survives			16th century	Mellor and Powell 1983, 67
Magdalen College	Recessed band around base and two parallel grooves around top	Jurassic freestone, south Cotswolds	Curved	Tooled	4 ribs, at least one of which has a runnel	150	140	14th–early 15th century	This volume, Fig. 3.20, no. 6
Magdalen College	Bands around the base and top	Jurassic freestone, south Cotswolds	Curved	Diagonal tooling	4 ribs, 2 complete: 1 a hollowed handle, 1 with a runnel	160	127	14th–early 15th century	This volume, Fig. 3.20, no. 7
Magdalen College	Bands around top and base	Wheatley stone	Curved	Pecked	1 rib/perforated handle survives	170	140	14th–early 15th century	This volume, Fig. 3.20, no. 8
Magdalen College	Plain sides	Wheatley stone	Curved	Pecked	1 tapered rib survives	230	Indet.	Mid-15th–mid-16th century	This volume, Fig. 3.21, no. 12
Magdalen College	Plain sides	Jurassic freestone, south Cotswolds	Curved	Pecked	4 ribs, 2 with runnels, 2 hollowed into blind handles	205	145	Mid-15th–mid-16th century	This volume, Fig. 3.21, no. 10
Magdalen College	Band around the rim. Base does not survive	Jurassic freestone, south Cotswolds	Curved	Pecked	1 rib survives with runnel	140	Indet.	Early–late 13th century	This volume. Fig. 3.20, no. 5
Magdalen College	Fragment with vertical ribbed pattern	Jurassic freestone, south Cotswolds	Indetet.	Ribbed	Indet.	Indet.	Indet.	14th–early 15th century	This volume, Fig. 3.20, no. 9
Magdalen College	Band around the top	Jurassic freestone, south Cotswolds	Curved	Pecked	Part of one hollowed handle	160	Indet.	Mid-15th–mid-16th century	This volume, Fig. 3.21, no. 11
Oxford Castle	Fragment	Not specified		Smoothed	Indet.			13th–15th century	Henig 1976, 266
Paradise Square	Rim fragment	Purbeck limestone	Vertical	Vertical tooling	Indet.	210		Mid-13th–mid-14th century?	Shaffrey forthcoming

Table 3.17 continued

Site	*Notes*	*Lithology*	*Bowl shape*	*Finish*	*Ribs*	*Internal rim diameter (mm)*	*Height (mm)*	*Context date*	*Reference*
Queen's College	Fragment	Purbeck marble		Vertically tooled	Indet.	140		Unstratified	Shaffrey 2020
Queen's College	Fragment	Purbeck limestone		Pecked and smoothed	1 rib with runnel survives	200		1650–1700	Shaffrey 2020
St Aldate's	Fragment	Local Jurassic limestone		Pecked	Indet.	252 external		Early 13th century to 1375	Allen and Durham 2003, 274
St Aldate's	Unknown	Unknown		Unknown	Unknown			Unknown	OXCMS: 1975.29
St Aldate's	Unknown	Unknown		Unknown	Unknown			Unknown	OXCMS: 1986.112
St Aldate's	Band around the rim. Base does not survive	Jurassic freestone, south Cotswolds	Curved		1 rib survives	300			OXCMS: 1975.29
St Cross College		Fragment	Purbeck limestone	Worn	1 lug or rib survives			Unknown	Shaffrey 2013
St Ebbe's	Fragment	Purbeck marble			1 lug with runnel survives			Unknown	OXCMS: 1975.25
St Ebbe's	Fragment	Headington Stone			1 lug survives			Unknown	OXCMS: 1975.25
St Ebbe's	Fragment	Purbeck marble			1 rib or lug survives	270 external		Not specified	Egan 1989b, 236
St Thomas's, Park End Street	Band around the rim. Base does not survive	Jurassic freestone, south Cotswolds	Curved	Pecked	2 ribs, 2 lugs	140		Unknown	OXCMS: 2003.12
Tom Quadrangle, Christ Church	Fragment	Purbeck marble	Vertical	Vertically tooled	1 lug survives	150		Unknown	OXCMS: 2005.122

OXCMS: Oxfordshire County Museums Service (followed by accession number code)

blages (eg Winchester), but it is the first substantial group of mortars to be recovered from an Oxford city site and it increases the number of excavated mortars in the town from 17 to 25, with a further four from the wider county. With 25 mortars from Oxford, it is now possible to garner an understanding of their provenance and to make comparisons with mortar use in other towns and cities in the 13th and 14th centuries.

Six of the Magdalen College mortars are made from a Jurassic freestone from the south Cotswolds (Appendix 2) and two from Wheatley limestone. These can be added to previously recorded Oxford mortars of Purbeck marble, Purbeck limestone and Headington stone (Table 3.17).

Mortars in southern England were predominantly made from Purbeck marble and a range of stones from the Purbeck limestone, principally

Table 3.18: Summary of the lithologies of some urban mortars

Summary type	*Exeter*	*Kings Lynn*	*Oxford*	*Poole*	*Southampton*	*Winchester*	*York*
Purbeck marble	4	4	6	10	6	33	
Purbeck limestone	6		3	6	10	12	1
Bembridge Limestone/Quarr		1		3	7		
Caen stone/French limestone		13			1	4	
Limestone (local/regional to site)	2		4		1	1	17
Sandstone (local/regional to site)						1	2
Other limestone	2	2	8		8	1	2
Not specified			4				
Total	14	20	25	19	33	52	22

burr stone (Table 3.18). These mortars were clearly manufactured at scale and are found on excavations in most towns in southern England. Mortars of other stone types were less widely distributed. Caen stone from France was popular in eastern towns such as Kings Lynn and Norwich but is less commonly found further west (Dunning 1977; Jervis 2022, fig. 1). Quarr and other stones from the Bembridge limestone outcrops on the Isle of Wight, meanwhile, were popular along the south coast close to the quarries, as at Southampton and Poole (Shaffrey and Allum 2011; Horsey 1992, 159). Although clearly producing large numbers of mortars, most of these stone types were not used in northern England. In York, one example of possible Purbeck limestone is far outnumbered by mortars of the regionally available Magnesian limestone (Ottaway and Rogers 2002). Mortars appear to be rare finds from medieval Bristol, and although there is an example of Purbeck marble, the local Pennant sandstone dominates there (Burdill *et al*. 1987, 28; Good 1998, 166; Shaffrey 2025).

This evidence suggests that mortar production and use was linked to the building stone industry, since all these stones were also widely used in the construction of buildings during the medieval period. Large-scale mortar manufacture is evident in the Purbeck stones while more limited manufacture can be seen for other building stones such as Quarr, Magnesian limestone, and Pennant sandstone. However, no exploitation of local or regionally sourced building stones for mortars has been previously identified in the region around Oxford, other than one example from St Aldate's identified as 'local Jurassic limestone' which hinted at this (Allen and Durham 2003, 274). The two mortars of local Wheatley limestone and six mortars of south Cotswolds Jurassic freestone from Magdalen College, as well as one example of Headington stone from St Ebbe's (Table 3.17), reveal that local and regional building stones were exploited to manufacture mortars for Oxford and that few mortars were sourced from stones that were commonly used elsewhere in southern England. This use of different stone types explains why the Magdalen College mortars are styled differently to those normally seen in southern towns. These give a first glimpse at the styles of mortars being produced in these stone types. It seems likely that the Wheatley and Headington stone mortars were produced from surplus building stone in Oxford. Wheatley stone was widely used as a building stone in Oxford during the 13th and 14th centuries, when these mortars are likely to have been made (eg Merton, Queen's, Exeter and New Colleges: Arkell 1947a, 37–8). The south Cotswolds Jurassic freestone has not been tied to a specific source, though they may derive from around Box in north-west Wiltshire (Appendix 2). Only future petrological analysis of mortars from across the region will enable us to determine whether they were manufactured at the quarry or in builder's yards nearer the point of use.

Catalogue of stone mortars and vessels (Figs 3.20–3.22)

5 **Mortar**. Wall fragment with remains of a single rib with shallow spout. The external walls are very slightly curved with a band around the rim. The rib is shallow, 18mm deep, tapering up from the base and of consistent width, 32mm. On top of this rib is a large rectangular spout measuring 62mm wide x 54mm deep x 45mm high. Middle Jurassic (Bathonian) freestone, south Cotswolds. Measures *c* 140mm in internal diameter x 105mm in depth x 30mm thick on band. 1544g. SF 3126. Ctx 8086, Occupation layer, Building 1, Room 1. Tenement A. Trench 122. Phase 4.

6 **Mortar**. Four-ribbed mortar. Flat-bottomed internally and externally. Walls bulge out slightly externally and very slightly concave internally. The inside is smooth, but the base shows some circular striations, and the walls retain tool marks from manufacture. Neatly finished externally with four ribs, two of which only survive at base level and two of which are complete. One functioned as a very shallow spout and has a recessed outer face, the other rib is deeper. Both are slightly tapered in thickness top to bottom and



Fig. 3.20 Stone mortars, nos 5–9



Fig. 3.21 Stone mortars, nos 9–12

rounded. The main face has a recessed rib around the base and two parallel grooves towards the top 14mm apart. Middle Jurassic (Bathonian) freestone, south Cotswolds. Measures 150mm internal diameter x 74mm deep. Walls 30mm thick. Measures 210mm external diameter and 140mm high. SF 3096. Ctx 6208, fill of pit 6213, Building 3, Room 2. Tenement C. Phase 5.

7 **Mortar**. Four-ribbed mortar, although only two ribs survive; these are adjacent. Walls bulge out slightly externally and very slightly concave internally. The inside is very smooth, but the walls retain tool marks from manufacture towards the top. Neatly finished externally with traces of diagonal tooling. One of the ribs is quite shallow, slightly tapered from top to bottom and functioned as a shallow spout. The other rib is much thicker, and slightly hollowed to form a handle. There is a vertical band around the base of the mortar which is straight and then the bowl curves out above this – and the handle curves out only from above the band. The spout rib is straighter. There is a projecting band around the top of the mortar and this projects right around the ribs. Middle Jurassic (Bathonian) freestone, south Cotswolds. Measures 160mm internal diameter x 85mm deep. Walls are 32mm thick on the band. Measures 210mm external diameter x 127mm external height. SF 3078. Ctx 3700, wall, Building 4. Tenement A. Phase 5.

8 **Mortar**. One perforated handle survives. Internally it is flat bottomed and vertical sided, smooth on the base and lower 30mm of walls. Above this the walls are pecked and quite rough. Externally it is pecked all over, the walls bulge out slightly and there are bands running around the top and base. Coarse Wheatley stone Upper Jurassic (Oxfordian). Measures 170mm internal diameter x 90mm deep. The walls are 33mm thick on band. Externally measures 245mm diameter x 140mm high. SF 3080. Ctx 4862, heat-affected deposit, Building 4. Tenement A. Phase 5.

9 **Mortar**. Base fragment. Flat internal and external base, both smooth. Part of one corner survives and this has the remains of three ribs/two grooves. Middle Jurassic (Bathonian) freestone, south Cotswolds. 746g. Ctx 4469, fill of pit 4418, Pit Group 14, Tenement A. Phase 5.

10 **Mortar**. In four adjoining fragments. Four-ribbed mortar with flat-bottomed inside and vertical internal walls. Base and lowest 50mm of mortar worn smooth internally. Upper walls have some wear, but plenty of pecking remains. Externally it is neatly pecked all over. Two of the opposing ribs have shallow spouts. These ribs are narrow, widening out in depth and plan view to the base to be roughly triangular. The narrow top meets a wide rectangular spout 82mm in width x 50mm in depth in plan view and 50mm high. The other two ribs are deep, 30mm, curved in profile from base to top and slightly hollowed on each side, but not perforated. Middle Jurassic (Bathonian) freestone, south Cotswolds. Measures 205mm internal diameter and 265mm external diameter x 110mm in depth and 145mm high. SF 3108. Ctx 6788, demolition layer, Building 8, Tenement C. Phase 6.

11 **Mortar**. Rim fragment with part of hollowed handle. Rectangular in plan view and side view. Base is missing. Handle projects by 35mm. Bowl is curved. There is the trace of a slight band around the top of the external vessel wall. Handle is similar to no. 6 but more hollowed. Burnt. Middle Jurassic (Bathonian) freestone, south Cotswolds. Measures 160mm internal rim diameter, 95mm internal depth. Vessel walls are 25mm thick. 977g. Ctx 3565, garden soil, Tenement A. Phase 6.

12 **Mortar**. Plain simple mortar with single surviving rib that is very deep, 50mm at base and tapered slightly from top to bottom. Externally it is neatly finished all over. The base does not survive but the vertical internal walls are pecked, with some smoothing. Externally the walls are gently rounded, just off vertical. The very edge of the internal base survives to give depth. Coarse Wheatley stone Upper Jurassic (Oxfordian). Measures *c* 230mm internal diameter x 110m deep. Walls are 50mm thick. Ctx 4417, Phase 6 fill of Phase 5 pit 4418, Pit Group 14, Tenement A. Phase 6.

13 **Bowl/trough**. Large bowl with curved internal face, evenly smooth and sloping down towards the centre with curved corner and straight sides. The rim does not survive but there is a flat base and there are straight sides with square corner. Crudely tooled on base and sides. Very similar in appearance to a piece from ctx 3838 and could be from the same item although the fragments do not adjoin. It is possible this is a structural element rather than an object. Middle Jurassic (Bathonian) freestone, south Cotswolds. Measures >170mm x >140mm x >85mm externally. Vessel walls are 30–35mm thick and it is >50mm deep. 3050g. Ctx 6487, fill of latrine Structure 11, Tenement B. Phase 6.

Other stone objects

Phase 3: late 12th to early 13th century

A small, crudely circular shale disc was found in grave 3186 (grave fill 3185). Given its size, this seems likely to be a counter.

Phase 5: 14th to early 15th century

An intriguing stone slab was found in a dumped deposit on Tenement A (3960, Fig. 3.22, no. 14). It has been used as a hone across two edges and it has many small, pointed dimples on one surface. These are uniformly sized but of slightly varying depths. They are not regularly spaced and although some appear to form into lines, this appears to be incidental. The holes were deliberately added to the stone to serve a purpose, or the holes resulted from use. One possibility is that the stone was used to round or soften the end of some small, pointed tools but it seems more likely that it was used to secure leather while perforations were made through it with an awl. The sides of the stone could then have been used to resharpen the awl which would have blunted over time on the stone beneath.

More substantial worked stone was found in the form of two adjoining fragments of a millstone (SF 3150) set into the floor (9140) of Building 6 in Tenement B, where they had possibly been used as the base for a hearth (Figs 2.35 and 2.42). The millstone is of Old Red Sandstone (Quartz Conglomerate) from the Wye Valley, a popular millstone material throughout the medieval and post-medieval periods (Tucker 1972). It measures 730mm in diameter and retains two arms of a distinctive curved, probably four-armed rynd chase (Fig. 3.22, no. 15). Few querns or millstones have been recovered from stratified archaeological contexts in Oxford, but four millstones were found during excavations at Brewer Street, and these were made of lava and Millstone Grit (Shaffrey forthcoming). Three of these were from contemporary deposits to the Magdalen College millstone, and one from a late 13th–14th-century context. There were numerous watermills on various bodies of water in early medieval Oxford, and any one of these could be the source of the millstone. Magdalen College briefly had its own mill on the River Cherwell, which was removed in 1486 because it apparently affected the supply of water to Holywell Mill (Crossley 1979, 327–31), and the millstone could have come from here. Another prominent mill was Castle Mill, at which all freemen and common bakers were supposed to grind their grain during the 14th–17th centuries (ibid.), and the intensity of production there makes it a likely source for millstone fragments.

A fragment of a rotary quern, or possibly a millstone, was found in hearth deposit 9133 within Building 6 on Tenement B. The quern is not diagnostic in form, but is of Mayen Lava, which was not used to make anything other than querns and millstones at this time.

The only other stone objects found in Phase 5 features are two unworked ammonite fossils, one of which had been built into wall 9163 of Building 6, possibly as some kind of charm (Fig. 2.40).

Phase 6: mid-15th to mid-16th century

A small domed ironstone disc was found in Ditch 5 (4822); its small size suggests it was a counter.

The corner portion of an octagonal block lamp was built into the fabric of a stone-lined cesspit (Structure 11) on Tenement B (6415; Fig. 3.22, no. 16). The inside of the vessel is heavily charred and residue analysis (Appendix 3) indicates that it contained carcass products from ruminant animals, such as cattle, sheep or goat, presumably in the form of tallow, together with some pig fats (lard). The results are comparable to that from a block lamp from Dulverton House, Gloucester (Shaffrey *et al*. 2022).

Stone lamps are uncommon finds on medieval sites and almost entirely found on excavations of ecclesiastical sites or in towns. They are rarely found in large groups and even during excavations of urban sites they tend to be outnumbered by ceramic lamps 10:1 (Barclay and Biddle 1990, 985). This is the only example from Magdalen College compared to numerous ceramic examples from Tenements A, B and C (see Blinkhorn, above). Only eight stone lamps are known from Oxford, of which four are pedestal lamps, one is a handled lamp and three, including the Magdalen College example, are simple block lamps (Table 3.19). There is also a candle holder from St Ebbe's. Stone lamps vary tremendously in their forms, and only a handful of octagonal block lamps are known. In common with stone cressets of all other forms, octagonal examples usually have a circular cup. The Magdalen College example is therefore particularly unusual with its square cup, but it can be paralleled by an example from Fountains Abbey, Yorkshire, dated *c* 1480–90 (Atkins 1986, 82). Interestingly, the Fountains Abbey cresset was found in the smithy and the Magdalen College example, although from a context of reuse, might be another example of workplace lighting. If so, it tallies with the ceramic lamps, which disappear from the site when industrial activity came to an end (see Blinkhorn, above).

Petrological analysis has shown that this lamp is made from Taynton or Burford stone (Appendix 2). Taynton stone was probably used as a building stone in Oxford as early as the 13th century (Arkell 1947a, 61), but it was most widely used from the 14th century, which would be consistent with a use within the hospital. However, Taynton stone was also widely used in the construction of Magdalen College itself from 1474, and the lamp could have a later production date and an association with the early college buildings (ibid., 62). A lamp from St Aldate's (now St Ebbe's) and a probable candle holder from St Ebbe's were also made of Taynton stone, whilst the large pedestal lamp from the Town Hall is made from Burford stone (Table 3.19).

Phase 7: late 16th to mid-17th century

A slate pencil was recovered from garden soil

Table 3.19: Stone lamps from Oxford

Name	*Type*	*Dimensions (external except depth)*	*Lithology*	*Context date*	*Base shape*	*Notes*	*Reference*
Magdalen College	Block	130 x 130mm, 100mm high, 65mm deep	Taynton or Burford stone	Mid-15th–mid-16th century	Octagonal	One charred internal surface	This volume, Fig. 3.22, no. 16
Oxford	Handled	Not specified	Oolitic limestone		Not specified	Small hand lamp from a block of oolitic limestone. Chamfered on two corners with a solid handle formed in a third	Saunders 1978, 367
St Aldate's	Block	134mm long	Fine-grained limestone, probably local	Late 11th century	Rectangular	Fragment	Allen and Durham 2003, 274
Town Hall	Pedestal	140mm wide, 260mm high, 30mm deep	Burford stone	Undated	Square	Complete. Highly decorated	Penney 1987, 196
Cornmarket Street	Pedestal	120mm wide, 125mm high, 35mm deep	Coarse white limestone	12th century	Circular	Simple cup	Henig 1985, 57
Brewer Street	Block	62mm diameter	Oolitic limestone	Late 11th–mid-13th century	Circular	Conical with some internal charring	Shaffrey forthcoming
St Ebbe's	Candle holder	68mm wide, 50mm high, 32mm deep	Taynton stone	19th century	Sub-square	Conical	Shaffrey 2025
St Ebbe's	Pedestal	65mm diameter on base to >100mm	Headington stone	Not specified	Circular	Short pedestal	Egan 1989b, 236
St Ebbe's	Pedestal	87mm diameter, 80mm high, 44mm deep	Taynton stone	Unknown	Circular	Hourglass	OXCMS: 1975.25.186

deposit 21209 in Trench 212. This relatively early date is noteworthy. Pencils and writing slates were not in widespread manufacture until the very end of the 18th century when they began to be commonly used in schools (Shaffrey 2022). Pencils and writing slates are only rarely found in archaeological contexts that predate this but there are examples from 15th–17th-century features in Norwich and London (Margeson 1993, 71, fig. 38; Vince 1981, 75). Early pencils and slates are mostly recovered in religious houses where they were used to record a variety of things including accounts, medical lists and music (eg Blezzard 1979, 26; Bliss 1965; Jones 1950, 103). They are sometimes associated with schools and educational establishments, however, and it is not unreasonable to assume that it relates to writing activities in the nearby Magdalen College.

Catalogue of illustrated other stone objects (Fig. 3.22)

14 **Bow drill guard**? Flat piece of stone with pointed dimples on one face. It has been used as a hone along two edges. It has broken along the bedding plane, so the other face does not survive. Fine-grained micaceous sandstone. 55mm x 55mm x >15mm thick. 68g. SF 3040. Ctx 3960, dumped deposit. Tenement A. Phase 5.

15 **Upper millstone**. Two fragments of disc-type millstone with two arms of a curved, probable four-armed rynd chase. Old Red Sandstone, very pebbly poorly sorted conglomerate.

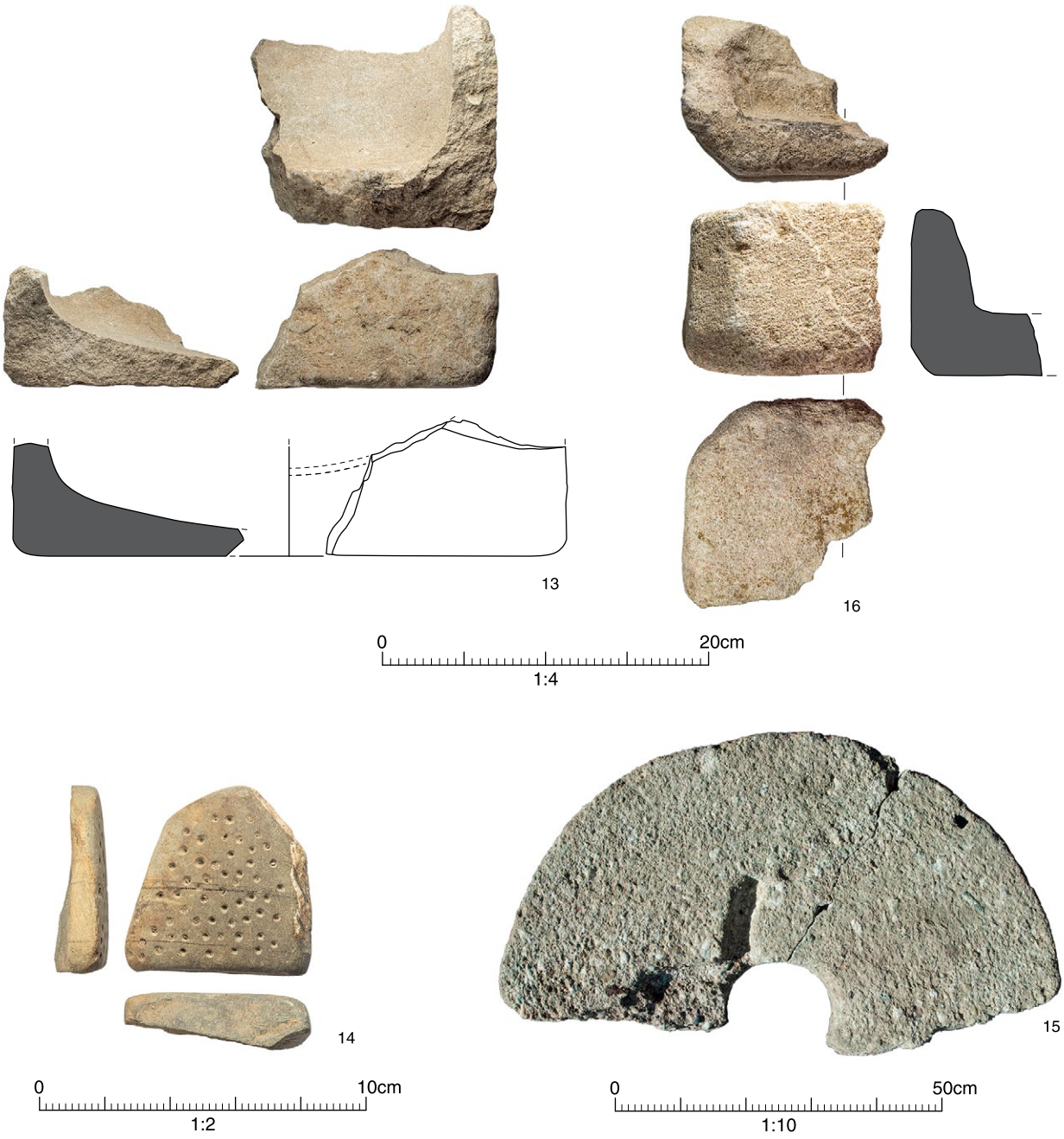


Fig. 3.22 Other stone artefacts

730mm diameter x 95mm thick with a 130mm eye. SF 3150. Ctx 9140. Floor layer, Building 6, Tenement B. Trench 127. Phase 5.

16 **Lamp**. Corner of octagonal lamp with shorter corners and longer side. The external walls are vertical, the base is flat. Inside is less neatly finished but is flat and the walls are vertical. The only top internal wall that survives is heavily charred, supporting the view that this was a lamp. Taynton or Burford stone. 100mm external height (65mm internally) x 130mm square. SF 3098. Ctx 6415, wall, Structure 11. Tenement B. Phase 6.

GLASS *by Anni Byard*

Introduction

The glass assemblage comprises 816 shards (Table 3.20; beads are reported on separately below). Refitting has indicated that a maximum of 569 vessels/windows are represented; it is also likely that some non-refitting pieces of glass originate from the same object, meaning the actual vessel/window count is likely to be lower than that recorded. Most of the assemblage is of mid-17th- to mid-19th-century or later date (Phases 8–10), with very little glass from 14th-century or earlier stratigraphic phases. Of the identifiable glass found in

Table 3.20: Quantification of glass assemblage by phase

	Vessel glass		*Window glass*		*Total*
Phase	*Objects*	*Fragments*	*Objects*	*Fragments*	*weight (g)*
1	5	5	-	-	1
3	4	6	1	1	25.1
4	9	15	1	1	151.2
5	1	1	2	2	5.2
6	9	10	9	14	38.4
7	63	82	3	3	325.7
8	51	102	6	6	4985.3
9	236	289	29	33	17,926.6
10	102	178	28	44	11,510.3
Unphased	7	21	3	3	1606.6
Total	487	709	82	107	36,575.4

Phase 1–5 contexts, all was of post-medieval date and intrusive. A variety of household vessels like beakers, flasks and urinals or lamps were recovered as well as a small number of pharmaceutical phials, but the assemblage predominantly comprises post-medieval wine bottles. The window glass (107 shards) is also mostly post-medieval with a few more modern shards. There are just eight small and heavily weathered/laminating shards of window glass that could be medieval in date. Glazing is also evinced by lead window cames from Phase 6, 9 and 10 contexts (see L Allen below). A full catalogue of the glass can be found in the site archive.

The assemblage

Phase 1: 10th to mid-11th century

Five tiny fragments of mixed glass were recovered from pit 6961 (fill 6962). These are undiagnostic but unlikely to be Saxon in date.

Phase 3: late 12th to early 13th century

Five fragments of glass were recovered from Phase 3 features. Two body shards from light green vessels were recovered from Pit Group 3 in Tenement A, but they are undiagnostic. A third shard recovered from a dump layer in Tenement C is from a post-medieval wine bottle and is therefore intrusive. A small piece of pale blue-green window glass retrieved from layer 3359 is probably post-medieval in date. A tiny fragment from a sample in pit 10206, Pit Group 6, in Tenement B was too devitrified to be diagnostic.

Phase 4: 13th century

Of the 16 fragments of glass recovered from this phase, four shards came from features associated with Tenement A while seven came from Tenement B. Many of the shards were very small and undiagnostic, but those that could be identified were all post-medieval date and therefore intrusive in their respective contexts. The hollow baluster from a stemmed drinking glass recovered from Pit Group 13 in Tenement B is of probable 18th-century date.

Phase 5: 14th to early 15th century

Only three fragments of glass were recovered from this phase. A small shard of colourless window glass recovered from occupation layer 7242 in Tenement A is of post-medieval date. The neck of a late 18th- or early 19th-century wine bottle was recovered from a robber cut in Tenement B.

Phase 6: mid-15th to mid-16th century

Of the 24 fragments of glass recovered from features of this phase, three came from Tenement A, 14 from Tenement B and seven from Tenement C. Where form could be identified, many were shards from post-medieval wine bottles. A small body shard of an optic-blown beaker with lozenge-pattern decoration (Fig. 3.23, no. 1) recovered from Building 7 is of a type usually dated to the late 16th- or early 17th-century (Willmott 2002). Recovered from the floor layer, this shard is conceivably contemporary.

Seven fragments of window glass were recovered from six contexts. Most are very small and of uncertain date but a tiny shard from latrine fill 6459 in Structure 11 of Tenement B may be of medieval date and therefore potentially contemporary. One other opaque and severely weathered/laminated fragment of window glass came from the floor layer of Building 3 in Tenement C and may also be of medieval date. A small number of fragments are of probable post-medieval date.

Phase 7: late 16th to mid-17th century

Most of the glass from features of this phase was recovered from Pit Group 17 in Tenement B, and the majority (41 shards) from fill 3756 of pit 3752. This collection comprised vessel glass in all but two cases. Most of this colourless or light green vessel glass is small and undiagnostic. However, various household items were identified from the fragments including jugs, beakers and a possible flask. The remains of a beaker with optic-blown thick cut trails is probably mid-16th to early 17th century in date. A small shard from a pedestal vessel is of similar date while a fragment from the foot of a stemmed vessel in colourless glass is of 17th-century date. Seven shards from jugs or tankards were recovered from the same fill, including one large body shard that retains most of an applied handle (Fig. 3.23, no. 3). One or two shards refit and it is likely they are all from the same vessel. These are of a similar date to the beaker. The two small shards of window glass from this pit are weathered and laminated but probably of post-medieval date.

Several small shards of colourless and green glass of undiagnostic form were recovered from pit 3229 (fill 3206). Two base shards may be from urinals or lamps and two beakers are represented, one decorated with a lattice pattern and another with an applied rigaree string around the base (Fig. 3.23, no. 4).

The six fragments of beakers come from the fills of pit 3772/6383. Three show optic-blown decoration in light green or colourless glass. These fragments, and the remains of a pedestal base in a dark glass and a base of a colourless beaker with applied rigaree decoration, are all likely to be of later 16th- to mid-17th-century date.

Several other shards from Tenement B represent a probable phial, a drinking vessel, uncertain bottle types and two probable flasks/bottles. The latter were recovered from pit 3772/6383 and may be early 18th-century case bottles (Fig. 3.23, no. 5), an uncommon find in British contexts (Willmott 2002, 86) but paralleled by discoveries at St Ebbe's (Hassall *et al*. 1984). Case bottles were square and designed to fit into a wooden crate for ease of transport, possibly for the export of wine (Dumbrell 1983), though in the 18th-century Dutch gin was the tipple of choice across England and was traded in square bottles (Carnes-McNaughton and Wilde-Ramsing 2008, 10–11).

This phase yielded only three fragments of window glass – two from pit 3752 (fill 3756) and one from pit 3229 (fill 3206). All are post-medieval in date.

Phase 8: late 17th to early 18th century

Some 51 vessels are represented by the 108 fragments of glass recovered from this phase. Most fragments come from wine bottles of mid-17th- to early 18th-century date and where the form is identifiable, most are from cylindrical bottles.

Tenement B yielded the highest number of shards (n=46; 43%), recovered from a variety of features including pits, charcoal spreads and well backfills. Building 9 produced 36 shards and Building 10 just 6. The wine bottle assemblage from this tenement comprises a range of shapes current from the late 17th into the 18th century. These include 'globe and shaft' and 'onion' bottles in dark green glass dating to the late 17th century, squat wine bottles of early 18th-century date and cylindrical wine bottles of early to mid-18th-century date. Over 50% (n=34) of wine bottle fragments were recovered from Building 9, all but one from Room 2. Building 10 produced only five wine bottle shards. The Phase 9 backfill of Phase 8 well shaft 6135/3313 produced 19 shards of vessel glass from two contexts (3377 and 3378). All are from wine bottles made from green or dark green glass and where the form was identifiable, most derive from cylindrical bottles. Several bottle necks recovered from fill 3377 retained their flat, tooled string rims and are probably of later 18th- to early 19th-century date. Context 3378, stratigraphically below 3377, contained neck, body and base shards (no refits) from cylindrical wine bottles of mid- and late 18th- to early 19th-century date. Only two pieces of post-medieval window glass, both pale green in colour but highly weathered, were recovered from the tenement.

Tenement C produced only nine shards of glass – four fragments of pale, weathered window glass of post-medieval date and five shards from vessels. Four shards are from the body of the same pale/colourless vessel of uncertain function. Of note is a small body shard of clear Venetian (or *façon de Venise*) glass, possibly from a drinking vessel. Venetian glass was expensive and highly prized. By the later 16th century, the city of Antwerp was producing an imitation glass (*façon de Venise*) which was exported to London, Amsterdam and northern France (De Raedt *et al*. 1999, 498). The fragment from this site was recovered from the fill of a well (context 6039) and may have been redeposited.

Phase 9: mid-18th to early 19th century

Of the 322 shards from Phase 9, all but eight were recovered from features associated with Tenement B. Tenement A produced two undiagnostic shards and Tenement C just one fragment of window glass. Three small shards from wine bottles were recovered, two from posthole 3467 and one from a layer of made ground. These are not discussed further.

The assemblage from Tenement B has the highest shard count of any phase but is otherwise similar in composition to that of the earlier phase. However, a significant proportion of the glass derived from the backfill/demolition of Building 9 (n=141) while 58 shards were retrieved from charcoal and coal layers in Building 11. Twenty-four shards are associated with stone floors in Building 11. The remaining 39 shards came from pit 3767.

The glass from pit 3767 comprised several necks and bases from early 18th-century wine bottles, all made in green or dark green glass. Of note is a glass seal from a wine bottle bearing the initials 'R·H' within a ring of dots, likely to be later 17th or early 18th century in date (Fig. 3.23, no. 6). Only one other example is recorded in the Ashmolean archives (A.M. 1937.281), found at the New Bodleian site and noted by Leeds (1938, 156). The owner of the initials has not been identified.

The Building 11 assemblage comprises 83 fragments of glass. A small number of bottles, pharmaceutical phials and shards of post-medieval window glass are represented, but most of the collection comprises wine bottles (n=28) or other undiagnostic vessel glass (n=50).

The wine bottles from Building 11 date from the early 18th to early 19th centuries and generally comprise body shards. Bottle shape could not be ascertained. The wine bottle shards from the Building 9 backfill (context 3190) comprised mostly squat and broad cylindrical types of early to mid-18th century and mid-18th century or later respectively. The neck from a possible 'onion' bottle of late

17th/early 18th-century date (see Banks 1997, 27 for parallel dated 1699) and several probable 'mallet' bottles of 18th-century date were also identified. The backfill/demolition also yielded three bottle seals (Fig. 3.23, nos 7–9). One is comparable to that found in pit 3767, with the initials 'R · H', and the remaining two are Magdalen College Common Room seals, one dated 1769. Magdalen was the first Oxford college to construct an in-house wine cellar, in *c* 1730 (Banks 1997, 97).

A late 16th- or early 17th-century shard comes from a fine optic-blown beaker or goblet with cut trails in a pink-tinted glass, which suggests the inclusion of manganese. This fragment was found in boundary wall masonry in Tenement C (Fig. 3.23, no. 2).

Phase 10: mid-19th century and later

The glass assemblage from this phase is largely residual and derives from features or layers indicative of levelling, clearing and redevelopment when Magdalen College School was constructed in 1849–51. Wine bottles dominated the assemblage, with window glass to a lesser extent. Tenement A yielded a significant collection of wine bottle shards, all from Building 12, although areas associated with clearance or construction away from Tenement A produced slightly more.

Wine bottles dating from the late 17th to early 19th centuries and later are present throughout the clearance/construction features. Pharmaceutical phial fragments of similar date were recovered from backfill/levelling layers, as were the remains of four stemmed drinking glasses of later 18th-century date. Window glass from these areas appears to be of 19th-century or later date.

Building 12 in Tenement A produced 68 shards which included a variety of 18th-century and later wine bottles, a single shard of a late post-medieval pharmaceutical phial in aqua-coloured glass and 28 fragments of window glass including some of probable early 20th-century date. Of note is a section of window complete with triangular and diamond-shaped panes retained in lead cames (Fig. 3.24, no. 10). Of post-medieval date, the glass is light green in colour and was recovered from the fill of robber trench 6689 in Building 12.

Two wine bottle seals of probable 18th-century date were recovered and make a significant contribution to the history of the wine trade in Oxford. A seal recovered from topsoil depicts three tuns and the name 'R Bradgate' (Fig. 3.24, no. 11). Before the discovery of this example, no bottle seals of the Bradgates were known (Banks 1997, 51). Richard and Elizabeth Bradgate ran the Three Tuns tavern at 89 High Street (opposite All Souls) from 1719 until Richard's death in 1729, after which Elizabeth continued to run the tavern until 1748. Widow Bradgate was regarded as quite a beauty, as attests a poem published in the *London Magazine and Monthly Chronologer* in 1738.

Haslam (1969, 77), following a statement by E C Davies, suggests that their son, also Richard, took over the tavern after Widow Bradgate's death until *c* 1764; however, Banks (1997, 60) appears to reject this. Other bottle seals from Oxford bear the initials of husband-and-wife partnerships in the tavern trade (for example Richard and Elizabeth Pont, also at the Three Tuns from 1666–71). Archives record several examples, but while a common occurrence it was not universal. The omission of Elizabeth's initials on the Bradgate seal could indicate the seal is of Richard junior, but there remains the question over his tenancy of the Three Tuns and therefore it is not possible to confidently attribute this seal to either Richard Bradgate senior or junior.

Another significant discovery from the site is a previously unrecorded bottle seal probably associated with Oriel College (Fig. 3.24, no. 12). The seal, in a light green glass, bears the letters 'O * C', with five dots arranged in a cross pattern beneath. Banks (1997) listed all known seals of Oriel and while the Magdalen example is similar, it cannot be paralleled by those illustrated. Banks does refer to two other seals (1997, 153) that are thought to exist but for which no known specimens existed. A search of the Ashmolean Museum's archives and recent excavation reports has not revealed any other examples, so it seems reasonable to conclude this is one of the missing Oriel College seals.

Conclusions

Most of the glass dates from the 18th century. Wine bottles make up most of the assemblage, as it does at many Oxford sites, but in all cases the glass is very fragmentary and only a few refits were identified, suggesting significant disturbance and redeposition across the site. The wine bottles reflect types common from the later 17th century through to the early 19th century: onion, mallet and 'globe and shaft' types were identified, but a significant proportion were cylindrical types, a form that developed from the early 18th century through to the tall cylindrical bottles common today. The presence of so many wine bottles may in part relate to the Greyhound Inn, which stood on the site from 1556. The dominance of wine bottles is paralleled by assemblages from other contemporary Oxford sites including St Ebbe's (Hassall *et al*. 1983), the Bodleian Extension (Leeds 1938) and Trinity College (OA 2023). Indeed, wine bottles and colleges are concomitant. The Magdalen Library assemblage also resembles that from Trinity in the low number of drinking glasses and the lack of bottle seals, considering the size of the wine bottle assemblage. The makeup of the assemblage, including the presence of two previously unrecorded seals and another example of an unattributed third ('R·H' seal), provides important comparative information on wine (or beer) drinking in Oxford during the post-medieval period.

The remains of several fine drinking beakers in clear glass are of a quality generally only accessible

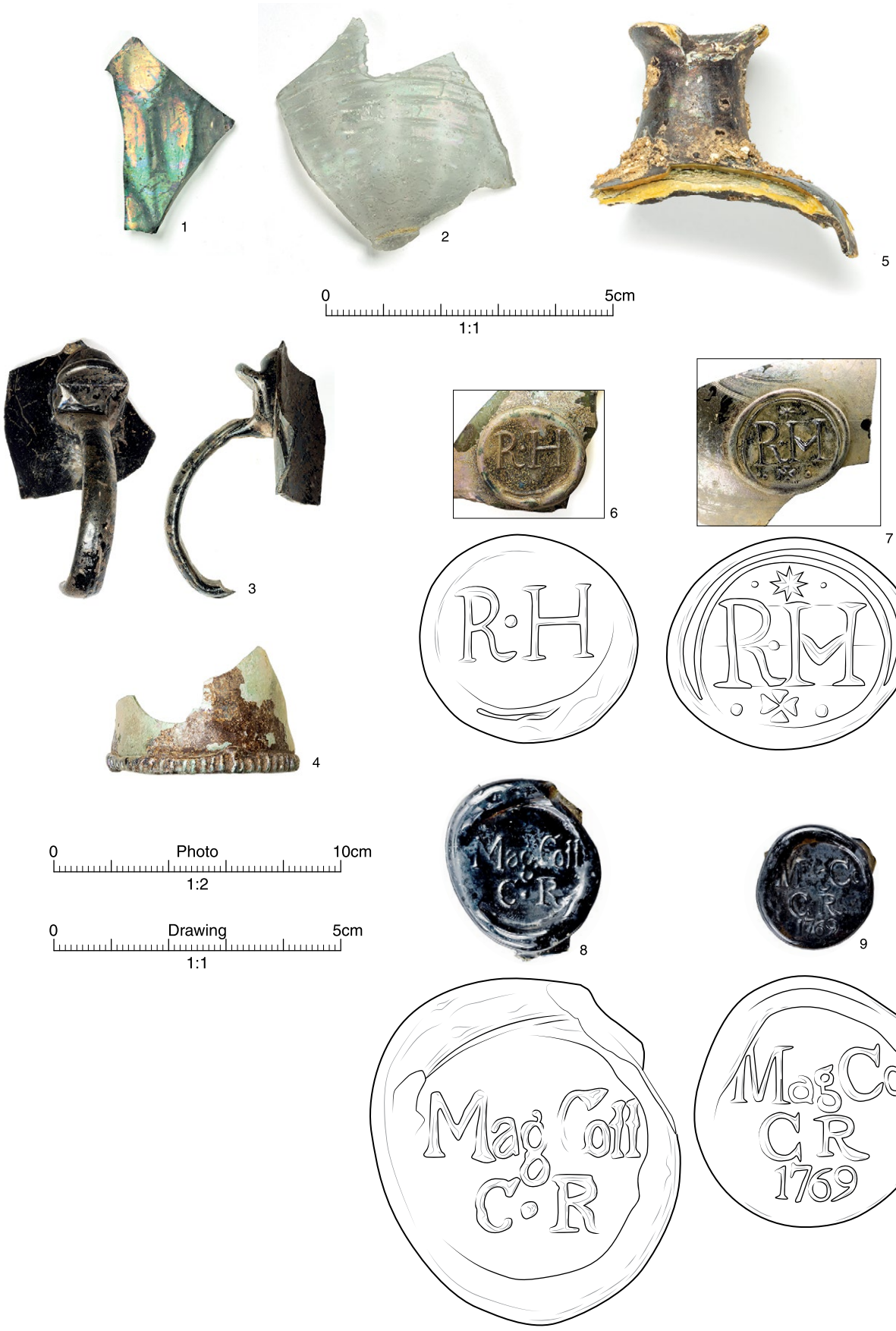


Fig. 3.23 Glass, nos 1–9



Fig. 3.24 Glass, nos 10–12

to more wealthy consumers. The fragmented remains of small glass flasks and phials make up only a small proportion of the vessel glass. There were probably used to hold precious liquids like unguents or perfumes (Willmott 2002, 89) and are often termed pharmaceutical or apothecary phials. These vessels are not uncommon finds, although significantly fewer were recovered from this site than at comparable sites like Trinity College and Bodleian Extension, although the high number of phials in those assemblages was probably due to the proximity of an apothecary on Broad Street (Beckley and Radford 2012b, 64).

Window glass is not common in the assemblage, and where it does appear it is frequently very small, many shards weighing only a gram or two. A small number of shards may be medieval, but most are post-medieval with a few shards of more modern, 20th-century date. The glass is found across several phases again attesting to site disturbance and redevelopment.

Catalogue of illustrated glass (Figs 3.23 and 3.24)

1 **Beaker**. Small body shard from a colourless optic-blown beaker decorated with lozenge pattern. Mid-16th to early 17th century. Ctx 3869, floor layer, Building 7, Tenement B. Phase 6.

2 **Drinking vessel**. Optic-blown beaker or goblet with cut trails in a pink-tinted glass. Mid-16th to early 17th century. Ctx 6644, wall, Tenement C. Phase 9.

3 **Jug/tankard**. Large body sherd with most of applied handle still attached. Opaque weathering. Possibly related to several other shards from same context. Late 16th to early 17th

century. Ctx 3756, pit 3752, Pit Group 17, Tenement B. Phase 7.

4 **Beaker**. Base shard from a cylindrical beaker with applied rigaree string around base. Pale green glass. Late 16th- to early 17th-century. Ctx 3229, pit. Phase 7.

5 **Bottle**. Neck and shoulder sherds of small flask or case bottle, with outward flaring lip. Heavily weathered/degrading. 18th century. Ctx 3817, pit 3772, Pit Group 17, Tenement B. Phase 8 fill of Phase 7 pit.

6 **Bottle seal**. Circular seal bearing initials 'R·H'. Dark green glass. Ctx 3769, pit 3767, Tenement B. Phase 9.

7 **Bottle seal**. Circular seal bearing initials 'R·H'. Dark green glass. Late 17th–18th century. Ctx 3190, backfill, Building 9, Tenement B. Phase 9.

8 **Bottle seal**. Circular seal reading 'Mag Coll | C·R' over two lines. Dark green glass. 18th century. Ctx 3190, backfill, Building 9, Tenement B. Phase 9.

9 **Bottle seal**. Circular seal reading 'Mag Co | C R | 1769' over three lines. Dark green glass. Ctx 3190, backfill, Building 9, Tenement B. Phase 9.

10 **Windowpane**. Pieces of light green window glass within lead came borders. Came is broad milled with beaded edge. One large triangular pane and an incomplete smaller diamond pane, plus fragments. Mid-17th–18th century? Ctx 6688, cut 6689, Building 12, Tenement A. Phase 10.

11 **Bottle seal**. Three tuns above 'R | Bradgate'. Light green glass. Early to mid-18th century. Ctx 6543, topsoil. Phase 10.

12 **Bottle seal**. Circular seal reading 'O * C' with five pellets arranged in a cross beneath. Light green glass. 18th century. Ctx 6688, cut 6689, Building 12, Tenement A. Phase 10.

BEADS *by Ian R Scott and Anni Byard*

Introduction

The excavations yielded a total of 122 beads (137 fragments) weighing 12.7g. The beads are made of materials including glass, jet, amber, bone and wood. Beads were recovered from tenement contexts associated with Phases 3, 5, 6 and 9, almost all from bulk soil samples. Almost all are likely to be medieval in date.



Fig. 3.25 Beads

The assemblage

Phase 3: late 12th to early 13th century

There is just one bead from Phase 3. This is a small, annular, dark brown glass bead from occupation deposit 7164 in Structure 4 in Tenement C.

Phase 5: 14th to early 15th century

The Phase 5 beads include 90 of amber and jet, probably from the same string, found together in drain 8055 (group 8077, context 8061) in Tenement A. There are six square faceted/polyhedral jet beads and 17 small barrel-shaped jet beads together with five faceted square amber beads of varying sizes and 62 smaller bun-shaped annular amber beads (Fig. 3.25). The illustrated layout is arbitrary, as no details of the arrangement or layout were preserved.

Hearth 7227 in Building 1 produced seven beads, including an annular bone bead (context 7234), a small round bead, probably of jet (context 7233), and five small round beads probably of glass (context 7238). Floor deposits in Building 6 produced two light yellow glass beads (contexts 9140 and 9157).

Phase 6: mid-15th to mid-16th century

There are 21 beads from scattered Phase 6 contexts. These comprise six barrel-shaped bone beads from Building 1 in Tenement A (contexts 7216, 7220 and 7618) and three from Tenement B (contexts 8856 and 9026). One decayed and cracked glass or frit bead also comes from Building 1 (context 8004). Three jet beads (contexts 9003, 9059 and 9099) including one possible spacer (context 9003), and two amber beads (contexts 8841 and 9021), are all from Tenement B.

Phase 9: mid-18th to early 19th century

There is a small, pierced disc bead or spacer apparently of wood from Phase 9 context 8612 in Building 11 in Tenement B.

Discussion

The beads are all likely to be medieval in date. Most are probably from paternosters as beads were not common on clothing nor generally worn as jewellery during this period. A paternoster is a set of 10, 50 or 150 beads which was used to count the number of times the 'Our Father' prayer (in Latin, *pater noster*) was recited. For those of low or no literacy, reciting the Pater Noster 150 times was considered equivalent to reciting the 150 psalms (Gottschall 2014, 97).

Rosary beads developed from paternosters and contained additional beads to remind and help the devout recite the Ave Maria ('Hail Mary') and Gloria Patri ('Glory Be') prayers alongside the Paster Noster. These became standardised during the mid-16th century (ibid., 99). While paternosters and rosaries are considered to have been a common accessory for all levels of society from the 12th century, some scholars consider early paternosters to have been the reserve of the clergy and used to teach the laity (ibid.). Bead makers were known as 'Pater Nosterers' and workshops were often located within or close to religious centres. Bead strings of wood and bone were amongst the cheapest available, followed by glass, amber and jet. Silver and gold examples would have been restricted to the highest levels of society.

The collection of jet beads from the fill of a drain in Tenement A probably represents an incomplete set of paternoster beads, potentially of late 13th- or 14th-century date. A set of this date comprising barrel-shaped and polyhedral jet beads was found with a hoard of coins and jewellery in Dumfriesshire (National Museums Scotland online ID: 000-100-000-734-C). The amber beads were probably part of the same set, as examples incorporating both jet and amber beads are known from later medieval contexts (Gottschall 2008).

COINS, JETTONS AND TOKENS

by Ian R Scott and Anni Byard

Introduction

The 31 items of numismatica comprise 15 coins, ten jettons, three tokens (including one lead token) and three unidentified pieces. The coins include three Roman pieces and eight medieval coins. The jettons include three English medieval jettons as well as later Nuremberg jettons.

The assemblage

Phase 3: late 12th to early 13th century

One late Roman coin, a radiate of the British usurper Allectus (AD 293–6), was recovered from pre-cemetery soil layer 3359. This is residual.

Phase 4: 13th century

A bedding layer in Building 3 of Tenement C yielded a single silver half penny, a long-cross issue of Edward I (1279 issue) or later, also likely to be contemporary with the layer in which it was found.

Phase 5: 14th to early 15th century

Nine coins or jettons including two residual Roman coins, an unidentified dupondius and a nummus from the House of Constantine, were recovered from various contexts of this phase.

Tenement A produced seven coins/jettons. A pierced blank disc, possibly a reused jetton, was

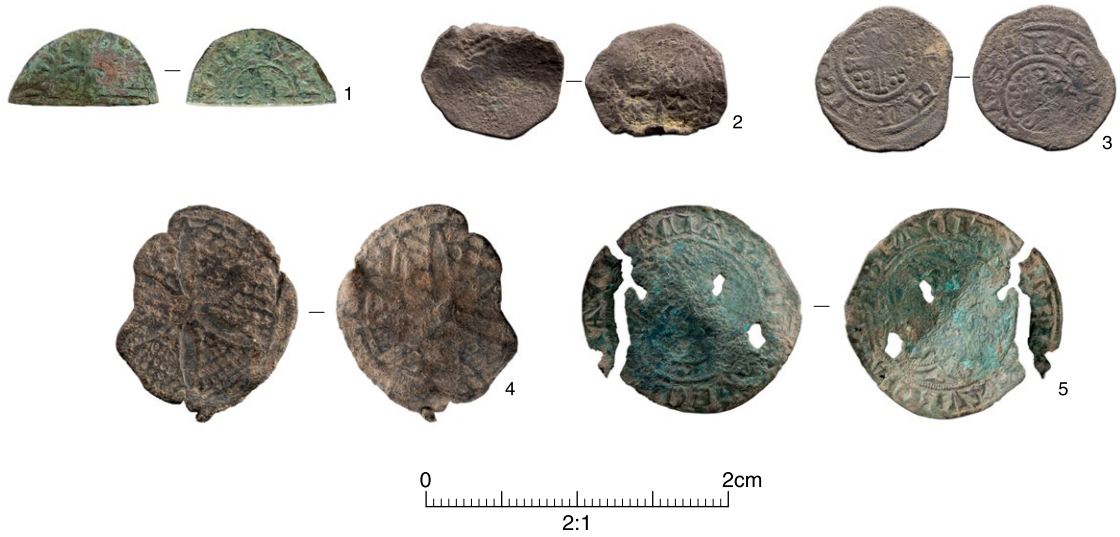


Fig. 3.26 Coins, jettons and tokens

recovered from the hearth deposit of Room 1, Building 1. A copper alloy contemporary copy of a cut half penny (Fig. 3.26, no. 1) of Henry III (1248–50) was recovered from the fill of a construction cut in Building 5. An occupation deposit associated with Tenement A yielded a worn and clipped silver penny of the 'cross crosslets' type of Henry II (Fig. 3.26, no. 2), dating from *c* 1158–80, and the Roman dupondius. These should both probably be considered residual. A disuse layer in Building 4 yielded a worn-smooth copper alloy disc which is likely to have been a jetton. A silver short-cross penny of Henry III, Class 7c, dating from 1236–72 and struck by the moneyer Nicole at Canterbury (Fig. 3.26, no. 3), was recovered from a pit in Pit Group 14. Another pit yielded a copper alloy English jetton which is of late 13th- or early 14th-century date.

Two coins were recovered from Tenement B. This comprised the residual 4th-century nummus and a silver long-cross penny from Room 1 in Building 2. The penny is of Edwardian type (1279–1377) and is likely to be contemporary with the occupation layer in which it was found but is too worn for further identification.

In the early 14th century, a gallon of cheap ale cost around one penny while a thatcher's mate could expect to earn in the region of one or two pence per day (Dyer 1989).

Phase 6: mid-15th to mid-16th century

One coin and one jetton were recovered from Tenement A. A French stock jetton of the 'Moor's head' type dating from *c* 1350–1425 was recovered from the demolition layer of Room 1 in Building 1 while a silver long-cross penny in four refitting fragments came from the accumulation layer of Building 5. It is too worn for further identification.

Six objects were recovered from the area associated with Tenement B and three were associated with Building 2. These comprise a worn silver voided long-cross penny probably of later in the reign of Henry III (1247–72) from a levelling layer in Room 3 and a 15th- or 16th-century lead alloy token or tally (Fig. 3.26, no. 4), from an occupation layer in Room 3. A Nuremberg jetton dating from 1490–1550 was recovered from a disuse layer in Room 4.

The occupation layer in Room 1 of Building 7 yielded a French royal jetton of 14th- or 15th-century date (Fig. 3.26, no. 5) while a pit in the area produced an English jetton of Edward III (1327–77) or Richard II (1377–99). A second English jetton dating from 1345–55 was recovered from a dump in Tenement B.

Phase 7: late 16th to mid-17th century

Only two coins of this phase were recovered. A silver groat, probably of Henry VIII's second coinage (1526–44), was recovered from the fill of pit 3229 while a Charles I 'Richmond' farthing dating from 1625–9 was recovered from a garden soil layer.

Phase 8: late 17th to early 18th century

The only items from this phase are two late 16th- or early 17th-century Nuremberg jettons by master Hanns Krauwinckel II (d. 1635). The first, from a wall in Room 2 of Building 9 (Tenement B), has been counterstruck with a serif 'P'. The second was recovered from a pit fill.

Phase 9: mid-18th to early 19th century

There is a residual late 16th- or early 17th-century Nuremberg jetton of Hanns Krauwinckel II, and a mid-17th-century Oxford farthing trade token, both from Tenement B. The trade token was issued by Robert White, an Oxford silk weaver, and is dated 1657 (Thompson and Dickinson 1993, 'Norweb' 3737a; Leeds 1923, no. 107).

Phase 10: mid-19th century and later

There are five coins or jettons from this phase, comprising an early 17th-century Nuremberg jetton of master Wolf Laufer II (d. 1651) from a rubble layer, another possible jetton with no discernible markings from a backfilling episode, and two George III halfpennies dated 1806, from the fill of an unidentified cut. A white metal disc, possibly a coin or token, was recovered from a pit fill.

Unphased

A single copper alloy farthing of Charles II (1672–9) was recorded as an unstratified find.

METALWORK AND WORKED BONE

by Leigh Allen

Introduction

The excavation produced 878 metal objects and 17 worked-bone objects, excluding coins and beads. Miscellaneous unidentifiable fragments accounted for 139 pieces of metalwork and one worked-bone item. The 740 identifiable metal objects comprise 192 of copper alloy, 500 of iron and 41 of lead. The ironwork assemblage is dominated by nails, which comprise 432 of the 500 identifiable objects (86% of the ironwork). Similarly, 110 of the 192 copper alloy objects are fine wire pins, lace tags or loop fasteners.

The condition of the assemblage is variable; much of the ironwork is fragmentary and heavily encrusted with corrosion products, while the copper alloy items are well preserved. The objects have been visually examined and the entire copper alloy and ironwork assemblage has been X-rayed. Objects have been categorised using a range of standard references and recorded onto an Access database (available in the archive).

Table 3.21: Quantification of identifiable metal and worked-bone objects by phase

Phase	*Date*	*Metal objects*	*Nails*	*Lead cames*	*Worked-bone objects*	*Total*
1	10th–mid-11th C	1	0	0	0	1
2	Late 11th–mid-12th C	0	9	0	1	10
3	Late 12th–early 13th C	11	31	0	0	42
4	13th C	20	22	0	3	45
5	14th–early 15th C	32	39	0	2	73
6	Mid-15th–mid-16th C	127	247	2	5	381
7	Late 16th–mid-17th C	24	18	0	0	42
8	Late 17th–early 18th C	10	8	0	0	18
9	Mid-18th–early 19th C	9	23	15	1	48
10	Mid-19th C and later	44	32	11	5	92
Unstratified		2	3	0	0	5
Total		280	432	28	17	757

Objects from the following functional categories have been identified: writing equipment, book furniture, musical instruments, toiletry items, dress accessories, spoons, knives, shears, scissors, tools, lock furniture, horse gear, fixtures and fittings, weapons, and structural items (including nails and window cames).

The assemblage includes finds dating from the late Saxon period (Phase 1) through to the 19th century (Phase 10) (Table 3.21). Small quantities of finds came from Phases 2–5 associated with the development of medieval tenements along the street frontage in the 11th–15th centuries, with timber-framed buildings giving way relatively quickly to stone structures. By far the largest concentration of material came from a period of rebuilding and alteration to these tenement buildings in the late medieval period (Phase 6), after which the quantities of finds decrease again as the buildings fell out of use and were ultimately demolished prior to the building of Magdalen College School.

Leaving aside the ubiquitous nails, the assemblage includes a small but interesting group of late Saxon/early Norman objects, including an equal-arm brooch, a finger ring (from a Phase 9 backfill) and fragments of at least one horseshoe. A Norman spindle whorl and a balance of Angevin date indicate that, once established, the tenements were used both for craft activities and possibly for trade in items such as spices. Dress items from Tenement B include a buckle and bar mounts, although they could also have been used to decorate horse harness.

In the 13th century, Tenement A (Building 1) was used as a smithy; no metal items recovered from the building can be directly associated with this function although various items of horse gear, including horseshoes and harness fittings, indicate the presence of horses possibly being shod on the site. Other than a carving knife, the other finds indicate the leisure activities of this household: a skate and a gaming counter. Tenement B, where some metalworking was also carried out, had further horseshoes, mounts and buckles related to horse gear and Tenement C produced a shield-shaped harness mount with enamel detail.

In the 14th century there is a different emphasis, towards a less industrial and more domestic function in the tenements. Personal items including a strap-end, buckles, small scissors and fine wire pins indicate a greater emphasis on appearance. A tuning peg suggests musical instruments were present in the tenement, and further pegs were found in this tenement in the late 15th–mid-16th century. The presence of writing leads perhaps indicates literacy. An adze may have been for woodworking or agricultural use.

The late 15th to mid-16th century saw changes to the tenement buildings, and evidence of construction included a plasterer's trowel and lead-working waste in Tenement B and a hot chisel in Tenement

C. Both Building 5 in Tenement A and Building 2 in Tenement B have fragments of metal vessels. These fragments would most easily be explained as stock for reworking. Styli came from Tenements A and C, and a fitting from a book cover from Tenement B, all suggesting literacy, but the activities carried out in these tenements at this time are not evident from the metal and bone finds, which are generally domestic, as shown by a couple of spoons from Tenement B and knives from B and C. Fragments of two whistles from Tenement B may have belonged to children. A rowel spur may provide some indication of status for the owner of this tenement, but the other personal items like the wire pins, lace tags, loop fasteners or the ear scoop are all common and everyday objects.

From the later 16th to the mid-19th century there are no further items of interest from Tenement A, although a tap and handle associated with levelling after the demolition of the Greyhound probably came from this inn. The few finds from Tenements B and C are mostly personal or domestic items such as knives, one a pocket-knife, pins, lace tags and a strap-end, but there are several furniture items: a hinge strap and hinge pivot, a hasp, a drop handle and a decorative finial, together with bone brushes. A 17th-century spur was found in 19th-century levels and may relate to the activity in Oxford during the Civil War.

Leaving aside the early items, the collection from this site is what might be expected from urban tenements in the suburbs of the city and is not dissimilar to that from the Ashmolean Extension site in the northern suburb, which also covered three tenements (Allen 2020, 382–8). It sheds light on many aspects of the ordinary people who lived and worked here, distinct from the monastic institutions and collegiate centres of learning for which Oxford is famous.

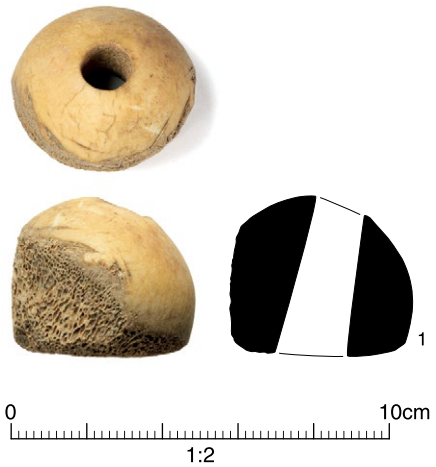


Fig. 3.27 Small finds, Phase 2

The assemblage

Phase 1: 10th to mid-11th century

The earliest recorded features on the site are a scatter of linear ditches and pits, several of which produced late Saxon pottery. A damaged and very corroded horseshoe of late Saxon type (Clark 1995, 85–6, type 1) was recovered from pit 4864. This horseshoe was of crude appearance, rounded and broad (106mm), and has three circular nail holes (D:7mm) set in rectangular countersinkings in the surviving complete arm. Horseshoes of this form are not common from Oxford, but have been recovered from Hinxey Hall, Queen Street (Goodall 1983, 65) and from Cornmarket (Clark 1995, 94).

Phase 2: late 11th to mid-12th century

Phase 2 saw an increase of activity on the site associated with the establishment of three tenements (A–C) fronting the High Street. Features of this phase are mostly pits located away from the frontage, whose primary purpose was for the quarrying of gravel before being used for the disposal of rubbish. The metal finds from this phase are all nails (n=9) recovered from pit fills across all three tenements (pits 4640, 4680, 5004, 6876, 7667, 8102 and 9247). A single worked-bone spindle whorl (Fig. 3.27, no. 1) came from pit 9721 and was fashioned from the head of a cattle femur. This deep, plano-convex spindle whorl has a large central perforation (D:12mm) for the spindle. The upper surface is worn smooth and lightly polished through use.

Catalogue of illustrated objects (Fig. 3.27)

1 **Spindle whorl**, worked bone, complete. Deep plano-convex spindle whorl made from the head of a cattle femur, large central perforation (D: 12mm). Worn and lightly polished upper surface. D: 46mm. Ctx 9718, pit 9721, Pit Group 9, Tenement B. Phase 2.

Phase 3: late 12th to early 13th century

Phase 3 saw an intensification of activity on the site but only a very slight increase in the number of objects recovered. The finds came from pits (probably used for the disposal of rubbish) and a posthole to the rear of Tenement A, from small pits located along the High Street frontage in Tenement B and from occupation layers within Tenement C.

Tenement A

Finds from Tenement A comprise two nails from pit 3803 and posthole 7285 and a very corroded (and incomplete) horseshoe (Fig. 3.28, no. 2) from pit 4955. The edges of the horseshoe are damaged, but the outline appears plain, and the X-ray plate shows a single circular nail hole set in a rectangular countersinking. This could be a fragment from another late Saxon horseshoe (see above), as there is some evidence, particularly in London, that the form persisted into the 12th century (Clark 1995, 93–5). The single copper alloy object from this

tenement is an arm from a folding balance (Fig. 3.28, no. 3). It is circular in section with traces of a collar at the mid-point and with flattened and perforated terminals at both ends. It is similar to the arms on an unprovenanced set of balances in the Ashmolean Museum collection (MacGregor and Bolick 1993, 257). Folding balances are known from the late Saxon and medieval period; easy to transport, they would have been used to weigh light, costly items such as spices.

Tenement B

The finds from Tenement B comprise five nails from pits 6203 (a Phase 3 layer in a Phase 2 pit), 9132, 9723 and 10403 and posthole 9339 (Structure 2); a dome-headed upholstery tack from pit 9192 (fill 9191); and four items associated with dress. Notable is the rather abraded middle to late Saxon Ansate, or equal-arm brooch (Fig. 3.28, no. 5) recovered from pit 9132 (Hübener 1972, Gruppe 1; Thörle 2001, Gruppe II; Weetch 2014, Type II). The terminals are flat, circular discs with incised decoration on the upper faces. The bow has a shallow arch and plano-convex cross-section. The reverse of one terminal has two parallel perforated lugs, part of the hinge; the other terminal has the remains of a catch plate (the pin is missing). The other dress items are a buckle plate and two bar mounts of different forms. The sheet metal buckle plate (Fig. 3.28, no. 7) from pit 9180 is rectangular, and is the upper plate from a simple folded plate, recessed for the pin and with five perforations, the central one with a rivet still *in situ*. The first bar mount (Fig. 3.28, no. 6), found in pit 9185, has a triangular section and a perforation through either end; the second mount (Fig. 3.28, no. 8), from pit 9116, has a central roundel and perforated terminal lobes. The roundel is decorated with lightly incised cross-hatching. Bar mounts would

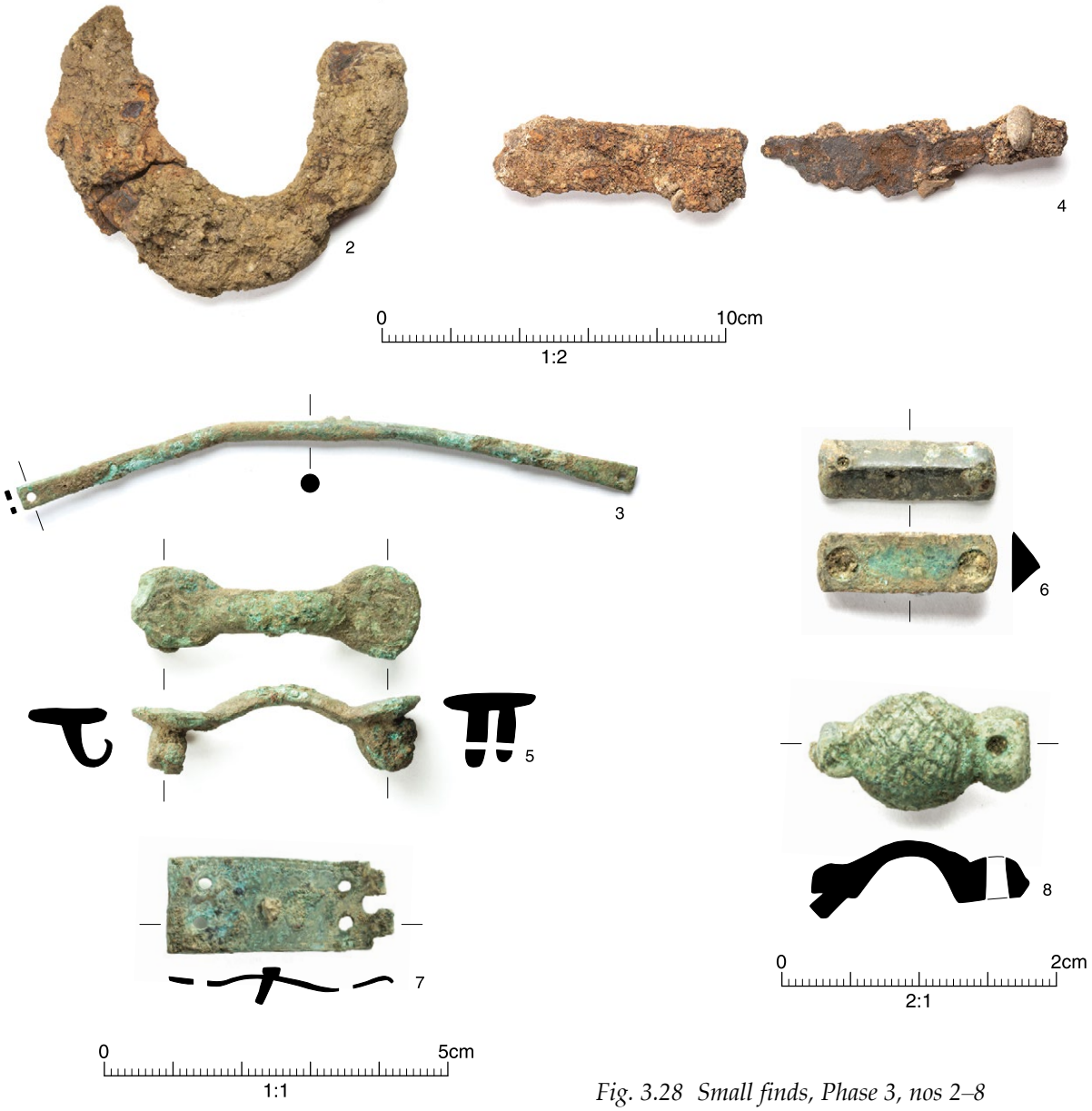


Fig. 3.28 Small finds, Phase 3, nos 2–8

have been used singly or in groups to decorate straps, belts, or harness.

Tenement C

Tenement C contexts produced three nails from posthole 6360, occupation layer 6801 and floor surface 6841, all from Structure 5.

Cemetery

Most of the objects recovered from the cemetery were nails, 17 in total from 11 graves (3006, 3010, 3032, 3047, 3186, 3304, 3337, 3458, 4315, 4526 and 4605). The only notable find was a near-complete whittle-tang knife (Fig. 3.28, no. 4); just the tip and the end of the tang are missing. The tang is centrally placed, and the back of the blade and the blade edge run straight and parallel (Goodall 2011, 106 type B or C). This form of knife is common throughout the medieval period.

Catalogue of illustrated objects (Fig. 3.28)

2 **Horseshoe**, iron, incomplete. Plain outline with a single circular nail hole set in a rectangular countersinking in the surviving arm fragment. L: 87mm. Ctx 4954, pit 4955, Pit Group 3, Tenement A. Phase 3.

3 **Folding balance arm**, copper alloy, incomplete. Slender rod with a circular section and traces of a collar at the mid-point. The terminals are flattened, expanded, and perforated. L: 91mm. Ctx 3666, pit 3665, Pit Group 3, Tenement A. Phase 3. SF 3042.

4 **Whittle-tang knife**, iron, incomplete. The tang is centrally placed, and the back of the blade and the blade edge run straight and parallel. The tip of the blade and the end of the tang are missing. L: 163mm. Ctx 3044, grave 3047. Phase 3.

5 **Ansate or equal-arm brooch**, copper alloy, near complete. Both terminals comprise flat circular shaped discs with incised decoration. The bow has a shallow arch and plano-convex cross-section. The reverse of one terminal carries two parallel perforated lugs of a hinge; the other plate has the remains of a catch plate. The pin is missing. L: 41mm. Ctx 9131, pit 9132, Pit Group 6, Tenement B. Phase 3.

6 **Bar mount**, copper alloy, complete. Solid triangular section with a perforation at both ends. L: 13mm. Ctx 9193, pit 9185, Pit Group 6, Tenement B. Phase 3.

7 **Buckle plate**, copper alloy, incomplete. One plate from a simple folded buckle plate, recessed for the pin and with five perforations through it; the central one still has a rivet *in situ*. Two incised grooves run around the edge of the plate. L: 32mm. Ctx 9180 (pit), Pit Group 6, Tenement B. Phase 3.

8 **Bar mount**, copper alloy complete. Central roundel with perforated terminal lobes. The roundel is decorated with lightly incised cross-hatching. L: 15mm. Ctx 9113, pit 9116, Pit Group 6, Tenement B. Phase 3.

Phase 4: 13th century

Phase 4 saw the construction of the earliest stone buildings, with a substantial building (Building 1) occupying the complete frontage area of Tenement A. The metalworking debris (see Keys, below) indicates that this was a smithy, but very few identifiable metal objects were recovered from this building and those that were do not enhance this interpretation. A greater number of finds came from Pit Groups 10 and 11 and Structure 7 to the rear of Building 1, and they include several items associated with horse gear. In Tenement B a large stone building comprising two rooms (Building 2) occupied the frontage. Slag and hammerscale suggesting smithing were also recovered from the eastern room (Room 2) of this building, but on a less intense scale than seen in Tenement A. The metal objects from this room are almost all structural nails. The western room (Room 1) produced only small quantities of smithing debris suggesting a non-industrial use. The small number of finds from this room include horseshoes and a circular harness pendant. The fragmentary remains of a stone building (Building 3) along the frontage of Tenement C produced only a small number of objects, but these do include a fine shield-shaped horse pendant with enamel decoration. The 22 nails recovered from Phase 4 contexts outnumber the objects; the majority came from Pit Groups 10 and 11 and from postholes and pits in Building 2, Room 2.

Tenement A

Building 1

Two finds were recovered from Building 1: a fragment from a bone gaming counter (Fig. 3.29, no. 9) and the very corroded remains of a knife. The circular, flat-backed gaming counter fragment from occupation layer 8056 is decorated with concentric grooves and ring-and-dot design and has a perforation through the centre. Counters such as these would have been used in the game of 'tables' popular in the medieval period, introduced from France in the course of the 11th–early 12th century (Brown 1990, 696). Similar examples from Oxford have been found at 24 St Michael's Street (Allen 2003, 304–5, fig. 6.16, no. 4) and Paradise Square (Allen forthcoming). The incomplete whittle-tang knife from pit 7704 (fill 7702) has a centrally placed tang and a broad blade; it was possibly a carving knife or a craft knife, as it is too large to be a table knife.

Pit Groups 10 and 11

Notable finds from Pit Groups 10 and 11 to the rear of Building 1 are a complete horseshoe from pit 5034 (fill 5032), a double-ended buckle from pit 3779 (fill 3781) and an annular brooch from pit 4016. The

horseshoe has a lobate profile, narrow arms and rectangular holes set in countersinkings (Clark 1995, 86, type 2B) and is a characteristic form dating to the late 11th–13th century (Clark 1995, 95–6). The double-ended buckle (Fig. 3.29, no. 12) has an integral plate between with three perforations through it; the ones at each end have traces of iron buckle pins in them, while the central perforation would have been for attachment. The exact function of these buckles, which date to the 13th–14th century (Egan and Pritchard 1991, 109–10, fig. 70, no. 488), is not known, as they could have been used on dress, armour or horse harness. The annular brooch is an open-framed brooch with a constriction for the pin, and the pin is complete and still *in situ*. The upper surface of the cast brooch is decorated with an undulating design. This is a robust object and would have been pinned at the neck to fasten together two parts of clothing such as a cloak.

Structure 7
A small, solid bar mount (Fig. 3.29, no. 14) with a D-shaped section and slightly off-centre perforations at either end was recovered from hearth 4059. Plain mounts such as these were often used with several of the same form or a variety of different forms to decorate belts, straps, or harness. A second bar mount (Fig. 3.29, no. 15) was recovered from makeup layer 4796. This example is a sheet metal mount with perforated terminal lobes.

Other contexts
An undiagnostic horseshoe fragment came from layer 4460 together with a bone skate. The underside of the skate is flattened and has a light polish, the toe has been shaped into a point and both the toe and heel are upswept. Skates are common finds in the Saxon and medieval period with a broad date range of the 8th–13th century. Examples have been recovered from numerous sites in Oxford including the Castle (Allen 2019, 262–3, fig. 7.11, nos 10 and 11), St Ebbe's (Egan 1989a, 231, fig. 66, no. 51) and the Westgate (Allen forthcoming).

Tenement B

The remains of two horseshoes with broad webs and plain profiles came from pits 8294 and 8458 in Room 1 of Building 2; this type of shoe is a late medieval type dating from the 14th–15th century (Clarke 1995, 96–7). A circular, plain, convex pendant mount with a loop at the top (Fig. 3.29, no. 10) also came from pit 8294. This would have been suspended from harness straps by means of a suspension mount riveted to the leather and may have been used with shield-shaped mounts or bells to decorate horse harness. Pendant mounts date from the 12th to late 14th century, after which the fashions in harness decoration changed to the use of decorative leather or fabric (Clarke 1995, 62).

A small square mount or boss (Fig. 3.29, no. 11) from pit 8782 in Room 2 of Building 2 has protruding lugs on all four sides and a dome at the centre with a rivet hole through the apex. It could have been used on harness. A writing lead from pit 9248=9441 (fill 9216), which is pointed at one end and wedged at the other, is one of several writing implements recovered from the site. The pointed end was used for writing on wax tablets, and the wedged end to erase mistakes.

Other finds from Tenement B were all personal items and comprise a pair of tweezers of simple form from pit 9705=9248 (fill 9704), a fragment from a buckle frame from pit 10429 (fill 10426) and a bone button from floor layer 6109 in Structure 8.

Tenement C

A shield-shaped mount (Fig. 3.29, no. 13) was recovered from levelling layer 6282 in Building 3. Although fairly worn there are traces of red enamel on the upper face, a common form of decoration on this type of mount. There is a robust shank projecting from the rear and it has been suggested that this type of object could have been mounted onto another object or surface, possibly of iron, wood or leather. Its exact function is unknown, but it may have been used to decorate a stirrup, a scabbard or harness (Griffiths 1989).

Catalogue of illustrated objects (Fig. 3.29)

9 **Gaming counter**, worked bone, incomplete. Circular flat-backed gaming counter with central perforation. Decorated with four concentric grooves and ring-and-dot design. D: 49mm. Ctx 8056, occupation layer, Room 1, Building 1, Tenement A. Phase 4.

10 **Pendant mount**, copper alloy, complete. A circular, plain, convex pendant mount with a loop at the top. D: 32mm. Ctx 8295, pit 8294, Room 1, Building 2, Tenement B. Phase 4.

11 **Mount**, copper alloy, near complete. Small square mount with protruding lugs on all four sides, dome at the centre with a rivet hole through the apex. L: 21mm. Ctx 8783, pit 8782, Room 2, Building 2, Tenement B. Phase 4.

12 **Double-ended buckle**, copper alloy and iron, near complete. Double-ended buckle with two frames and an integral plate between. The buckle frames are circular with straight outside edges. There are three perforations through the integral plate, the two outer ones for the buckle pins (now missing), and the third at the centre of the plate for attachment. Traces of iron corrosion in the two outer perforations indicate that the buckle pins were iron. L: 50mm. Ctx 3781, pit 3779, Pit Group 11, Tenement A. Phase 4. SF 3032.

13 **Shield-shaped mount**, copper alloy, complete. Cast shield-shaped mount (heater-shaped) with a robust shank projecting from the rear. Traces of red enamel on the upper surface. Length: 30mm. Ctx 6282, levelling layer, Building 3, Tenement C. Phase 4.



Fig. 3.29 Small finds, Phase 4, nos 9–15



14 **Bar mount**, copper alloy, complete. Small, solid bar mount with a D-shaped section. Small off-centre perforation at either end. L: 15mm. Ctx 4059, hearth deposit, Structure 7, Tenement A. Phase 4.

15 **Bar mount**, copper alloy, near complete. Sheet metal bar mount with perforated terminal lobes. Central ridge (V-shaped section) one rivet still *in situ*. L: 23mm. Ctx 4796, makeup layer, Tenement A. Phase 4.

Phase 5: 14th to early 15th century

The total number of objects recovered from Phase 5 contexts is slightly larger than from the previous phase, although nails again predominate and constitute just over half of the identifiable objects (n=39). Personal items associated with dress are more common in this phase, especially from Tenement B, bolstered by the recovery of numerous wire pins and lace tags that were used from this time onwards for securing light clothing.

Tenement A

The majority of the objects recovered from Tenement A were nails from Pit Group 14 (n=9) and Buildings 1 and 4 (n=8). The only notable finds were a buckle, two items of horse gear and a bone skate. The small rectangular buckle frame from layer 4584 has a simple folded buckle plate attached. The frame has a narrowed outside edge possibly for a sheet metal roller, which would have allowed for easier and tighter fastening. The items of horse gear are a complete horseshoe and a large decorative mount. The horseshoe from pit 4284 has a plain profile and three rectangular nail holes in each arm (three with the nails still *in situ*). This style of shoe with its wide web, calkins at the tips of the arms and nail holes that taper inwards is characteristic of the later medieval type dating from the 14th and 15th centuries (Clark 1995, 88–9 and 96–7, type 4). The circular sheet metal mount or bridle boss from pit 4418 (fill 4469) is decorated with two raised concentric rings around a central dome; there are two rivet holes for attaching a strap or harness. The bone skate from pit 7868 (fill 7867) has a rounded and slightly upswept front end, the back end has been trimmed, and the underside is highly polished through use.

Tenement B

The majority of the finds from Tenement B came from Building 2, with smaller numbers of objects coming from Building 6, garden soils and pit fills. A group of dress accessories came from Building 2 comprising buckles, pins and a strap-end, and two writing implements came from Building 6.

Building 2

The three buckles (Fig. 3.30, nos 16–18) – one from charcoal layer 8262 and two from occupation layer 8715 – vary in size but are identical in form, all being examples of oval frames with composite rigid plates. They have a forked spacer onto which separate plates are riveted. The frames are lipped and bevelled, and the bars are offset and constricted for the pins. This specifically English form dates from the mid-14th–early 15th century (Egan and Pritchard 1991, 55). The tongue-shaped strap-end (Fig. 3.30, no. 19) from floor layer 8993 also has a forked spacer to which the plates are attached and is of similar date to the buckles. A fourth buckle (Fig. 3.30, no. 20) from bedding layer 8277 is of a different form. It has an oval frame with an ornate outside edge and a folded sheet metal plate; the decorative outer edge has a moulded centre constricted for the pin, flanked by raised ridges and two prominent knops. This form was a long-lasting fashion dating from the late 12th to the late 14th century (Egan and Pritchard 1991, 76). A number of fragments from fine wire pins were also recovered from within Building 2. Such pins were often used to secure light clothing, veils or headdress and are commonly found in large numbers from the 14th century onwards. The only other notable find from Tenement B is a small, complete set of shears with a simple ring bow (Fig. 3.30, no. 23) from layer 8259. Small enough to have been held in the palm of the hand and open and closed by the combined action of the finger and thumb, they would have been suitable for exact cutting, such as thread trimming and hair cutting.

Building 6

The two writing leads, both pointed at one end and wedged at the other (Fig. 3.30, no. 21), came from the fill of the construction cut of the north wall of Building 6. They were designed for writing on wax tablets or parchment (see above). The only other notable object from this building is a biconvex copper alloy button with integral wire attachment loop from floor layer 9140. This form of composite button with an upper and lower hemisphere soldered together first appears in the 13th–14th centuries and continues in use into the post-medieval period.

Other features

Other objects recovered from Tenement B include an adze, a mount and an instrument tuning peg. The adze (Fig. 3.30, no. 24), from garden soil 3978, has a large, curved blade with a splayed cutting edge. The head is perforated for hafting on to a wooden handle. Differing from axes in that they have their blades set at right-angles to the handle, they have a number of uses; a short-handled adze can be used for trimming and shaping timber while a long-handled adze can be used like a hoe for agricultural tasks. A small sexfoil sheet copper alloy mount came from the same context; it has two rivet holes, one with a rivet still *in situ*. Used singly or in combination with other mounts it would have decorated a girdle, belt or harness strap. A worked-bone tuning peg (Fig. 3.30, no. 22) came from pit 3901. It has a square-cut head and a cylindrical shank with a perforation for the string through the end. It would have been used on an instrument whose peg board was accessible from both sides such as a lyre, lute, harp or fiddle. Numerous examples have been recovered from Oxford at both ecclesiastical and collegiate sites, with a particularly large number from St Aldate's, where it is believed an instrument maker may have had their workshop in the 15th to early 16th century (Henig 1977, 163–6, fig. 39, nos 9–11).

Catalogue of illustrated objects (Fig. 3.30)

16 **Buckle frame**, copper alloy, complete. Oval buckle frame with composite rigid plates and an integral forked metal spacer. L: 41mm. Ctx 8262, Charcoal layer, Building 2, Tenement B. Phase 5.

17 **Buckle frame**, copper alloy, incomplete. Oval buckle frame, lipped and bevelled with an integral forked spacer. The composite plates and pin are missing. L: 56mm. Ctx 8715, laminated occupation layer, Building 2, Tenement B. Phase 5.

18 **Buckle frame**, copper alloy, complete. Oval buckle frame, lipped and bevelled with composite rigid plates and an integral forked metal spacer. L: 42mm. Ctx 8715, laminated occupation layer, Building 2, Tenement B. Phase 5.

19 **Strap-end**, copper alloy, complete. Tongue-shaped composite strap-end with forked metal spacer, scalloped attachment end, round grooved aperture and flat lozenge knop. L: 42mm. Ctx 8993, floor layer, Building 2, Tenement B. Phase 5.

20 **Buckle frame and plate**, copper alloy, complete. Oval buckle with ornate outside edge and folded rectangular plate with five rivets through it. L: 48mm. Ctx 8277, bedding layer, Building 2, Tenement B. Phase 5.

21 **Writing lead**, lead, complete. Pointed at one end and wedged at the other with an oval section. L: 63mm. Ctx 8974, fill of construction cut for north wall 9163=8973, Building 6, Tenement B. Phase 5.



Fig. 3.30 Small finds, Phase 5, nos 16–24

22 **Tuning peg**, worked bone, complete. Square head and cylindrical shank, perforation through the end of the shank. L: 58mm. Ctx 3903, pit 3901, Tenement B. Phase 5.

23 **Shears**, iron, complete. Small complete pair of shears with a simple loop bow. L: 103mm. Ctx 8259, Building 2, Tenement B. Phase 5.

24 **Adze**, iron, complete. Large, curved head with a splayed cutting edge. Perforation through the head for hafting onto a wooden handle. L: 244mm. Ctx 3978, garden soil, Tenement B. Phase 5.

Phase 6: mid-15th to mid-16th century

Just over half of the finds recovered from the site came from Phase 6 contexts (n=381). This corresponds with a period of renewed activity within the tenements, particularly in the buildings on the street frontage of Tenements A and B. Modifications were made to the buildings with internal walls, hearths and floors being added; the functions of some of the buildings may have changed during this period. The majority of the finds (75%) came from Tenement B, with much smaller assemblages of roughly equal size from Tenements A and C. The assemblage from Phase 6 is again predominantly nails (n=246), pins (n=54), lace tags (n=17) or loop fasteners (n=6). There are also two fragments of lead window came.

Tenement A

Building 1

All the finds from Building 1 are either nails (n=13), lace tags (n=4) or pins (n=11). They came mainly from occupation layers 7216, 7218, 7617, 8004 and 8033. Drawn wire pins with spiral wound heads were commonly used to fasten light clothing and headdress as well as for dressmaking and tailoring. They date from as early as the 13th century and remain unchanged in form into the late medieval/post-medieval period, where they are often recovered in large numbers. Lace tags were used to prevent the ends of laces from fraying and to ease threading; they were used on clothing and shoes and date mainly to the 15th–16th centuries.

Building 5

Building 5 produced two fragments from metal vessels and a repair. A robust cast L-shaped leg with a prominent central ridge from a cauldron or skillet (Fig. 3.31, no. 25) and a rim fragment from a sheet metal vessel both came from layer 4429. A sheet metal 'paper clip rivet' used to repair cracks in metal vessels and keep them watertight came from hearth 4512. The recovery of various elements from vessels may suggest a metalworker's supply for repair and reuse.

Other features

Other objects recovered from Tenement A include a large iron buckle with a sheet metal roller from garden soil 3565 and a fragment from a worked-bone stylus from robber cut fill 4020. The buckle is of a form commonly used with horse harness, the roller helping the straps run more smoothly through the frame. The stylus fragment (Fig. 3.31, no. 36) from robber trench 4019 is from the shank of the object; the head is missing. Generally, the heads are spherical with single or multiple collars below. This shank fragment has two bands of grooves along it (possibly to improve the grip) and a corroded iron point at the end. Bone styli are now thought to have been used as writing implements rather than for pricking holes (for guidelines) in parchment (Egan 1998, 272) as they are commonly found as together with wax tablets. They are late medieval in date, possibly continuing into the post-medieval period.

Tenement B

Building 2

Most of the finds from Building 2 are either nails (n=28), pins (n=17), lace tags (n=5) or loop fasteners (n=2) recovered from occupation and makeup layers. Other finds include dress accessories, a knife, a vessel leg, a trowel and a bone whistle. The dress accessories comprise a strap-end, two mounts and a button. The front and back plate from a long slender strap-end (Fig. 3.31, no. 30) came from layer 8453. There is a single rivet hole at the attachment end and a decorative knop at the other in the form of a cross. This style of strap-end dates to the 14th century. The two mounts, both from Building 2, one sexfoil (Fig. 3.31, no. 31) and the other double-lobed (Fig. 3.31, no. 33) came from levelling layer 8454 and occupation layer 8882 respectively. Both could have been used to decorate a belt, strap or harness. The sexfoil mount would have been attached by way of two small rivets, the double-lobed mount by two spikes that protrude from the back. The button from robber trench 8804 is a large circular discoidal button with an incised decoration in the form of an eagle on a shield with wings displayed and inverted. The eagle is a common heraldic device from the 12th to the 16th century often associated with St John the Evangelist. This form of the button dates to the late medieval to post-medieval period.

The very corroded remains of an iron scale-tang knife came from occupation layer 8679; only a short section of the blade survives. There is a single perforation through the tang for securing the scales to the tang. The vessel leg from robber trench 8804 is straight and is from a large cast vessel such as a skillet or cauldron (Fig. 3.31, no. 26). Vessels such as these were valued items, often of considerable age when they were discarded. One of very few tools from the site came from makeup layer 8607; this is a plasterer's trowel with a wide triangular blade and a cranked tang which would originally have been set in a wooden handle. It would have been used to apply and level plaster between masonry (Goodall 2011, 46). The fragment from a bone whistle from posthole 8905 has a crudely cut rectangular blow hole or 'window' in it.

Building 7

A very large number of nails (n=120) were recovered from Building 7, including 101 from dump layer 3897. A very corroded fragment from a knife came from another dump layer (4094); too little of it survives to say whether it is a whittle- or scale-tang type. Several fragments of lead waste, spillage and droplets, mainly from occupation layer 9052, gravel surface 9057 and layer 9062 in the southern part of Room 1, possibly indicate small-scale lead-working in the building.

Structure 11
The main finds from latrine Structure 11 are again nails (n=8), pins, lace tags and loop fasteners (n=9), mostly from fills 6457 and 6462. A lead spoon (Fig. 3.31, no. 29) with an oval bowl and a rough handle with diamond-shaped section came from fill 6510. There is a maker's mark in the form of a fleur-de-lys just below the junction of handle and the bowl.

Other features
Other finds from Tenement B include personal items, a fitting possibly from a book, knives, a spoon, horse gear, musical instrument tuning pegs and lead waste. The personal items comprise an incomplete buckle frame (Fig. 3.31, no. 37) with a simple folded plate and wrap-around pin from robber trench 3940 and a twisted wire toothpick/ear scoop with a loop at the top from occupation layer 9099. These simple, mass-produced objects were common from the early 13th century. A fan-tailed fitting (Fig. 3.31, no. 32) from pit 4144 may have been used to decorate a book cover; traces of leather survive on the back of the fitting. The attachment end has two tiny rivets through it and three decorative perforations, and the edge is chamfered. The item resembles a book clasp, but it lacks a hook.

Fragments from knives were recovered from bedding layer 6080 and demolition layer 6585; both whittle-tang and scale-tang types were represented but they were for the most part fragmentary and in very poor condition. The most complete is a scale-tang knife from layer 6585 with two perforations through the tang and a very damaged blade. The knives appear to be fairly uniform in size and are probably table knives used for dining.

The item of horse gear is a rowel spur (Fig. 3.32, no. 41) from demolition layer 6586; it is almost complete with only the rowel itself missing. The neck is long and low set with a pointed crest at the heel. The arms curve deeply to fit under the wearer's ankle and each arm has a figure-of-eight-shaped terminal through which there is a loop fitting to attach the spur to the leather straps. This form of spur dates to the 14th to 15th century.

Three worked-bone tuning pegs and a fragment from a whistle were recovered from the tenement. The tuning pegs are of two different forms. The first type, exemplified by the peg from cobbled yard 3505 (Fig. 3.32, no. 38), has a square-cut head and a tapering cylindrical shank, and a short section of the string remains *in situ* in the hole, which is through the base of the head. The two other pegs (Fig. 3.32, nos 39 and 40), from accumulation layers 6511 and 6535, have wedge-shaped heads and cylindrical shanks with a hole through the head end. All three pegs are designed for use on an instrument from the zither family, most likely a psaltery (Henig 1977).

Tenement C

A total of 37 objects were recovered from Tenement C, mostly from Building 3 and Building 8. The majority of the finds are again nails (n=18), pins (n=4) and lace tags (n=4).

Building 3
A metalworking tool with a wedge-shaped end (Fig. 3.31, no. 27) came from floor 6146; it is probably a hot chisel. Chisels were the principal blacksmiths' tool for cutting iron. The chisel would have been handheld and struck by a hammer. The circular section shank is long to ensure that the hand is kept well away from the heat but slender enough to be driven into soft hot metal (Goodall 2011, 9–10). The head is slightly expanded and burred through impact.

Building 8
A very corroded scale-tang knife (Fig. 3.31, no. 28) came from floor layer 6799. The back of the blade and the tang are in line and the cutting edge rises to meet the tip. The tang has two perforations through the surviving length. This form of knife dates from the 13th–16th century (Goodall 2011, 108, Type Q). A pair of scissors with circular, centrally placed finger loops were recovered from hearth rake-out 6712. Scissors with small blades would have been used for domestic tasks such as hair cutting, needlework or cloth cutting. Just over half of a small double oval buckle frame came from the same deposit.

Other features
Other finds from Tenement C include a writing implement, a button and a horseshoe fragment. The cast copper alloy stylus (Fig. 3.31, no. 35) is similar in form to those made of bone and came from demolition layer 6098. It has a globular head with three collars (or reels) below and a cylindrical tapering shank. The button is a solid, cast, biconvex button with a simple looped shank (Fig. 3.31, no. 34) from disuse layer 6703. The arm from a horseshoe with a plain profile and three rectangular nail holes came from pit 6834. The arm has a calkin at the tip and is of later medieval date (Goodall 2011, 363).

Catalogue of illustrated objects (Figs 3.31 and 3.32)

25 **Vessel leg**, copper alloy, incomplete. Large cast L-shaped vessel leg with a prominent ridge running down the centre. L: 67mm. Ctx 4429, accumulation layer, Building 5, Tenement A. Phase 6.

26 **Vessel leg**, copper alloy, incomplete. Solid, straight leg with a sub-rectangular section, from a skillet or cauldron. L: 67mm. Ctx 8803, robber cut 8804, Tenement B. Phase 6.

27 **Chisel**, iron, complete. Long shank with circular section expanded and burred head caused by hammer impact. The cutting edge is wedge-shaped. L: 202mm. Ctx 6146, floor layer, Building 3, Tenement C. Phase 6.

28 **Knife**, iron, incomplete. Scale-tang knife, very corroded (tang incomplete, blade damaged). The back of the blade and the tang in line, cutting edge rises to meet tip. The tang has two perforations through the surviving length.



Fig. 3.31 Small finds, Phase 6, nos 25–37

There are traces of a copper alloy shoulder plate. L: 220mm. Ctx 6799, floor layer, Building 8, Tenement C. Phase 6.

29 **Spoon**, lead, incomplete. Oval bowl folded back on itself rough (incomplete) handle with diamond-shaped section. Maker's mark in the form of a fleur-de-lys in a square stamped into the bowl just below the junction with the handle. L: 117mm. Ctx 6510, latrine Structure 11, Tenement B. Phase 6.

30 **Strap-end**, copper alloy, incomplete. Long slender front and back plate terminating in a knop in the form of a cross. Single perforation at the attachment end. L: 60mm. Ctx 8453, burnt layer, Building 2, Tenement B. Phase 6.

31 **Mount**, copper alloy, complete. Sexfoil sheet metal mount with two small perforations for attachment. L: 18mm. Ctx 8454, levelling layer, Building 2, Tenement B. Phase 6.

32 **Fitting**, copper alloy, complete. A fan-tailed plate decorated with three circular perforations and with two small rivet holes for attachment. L: 32mm. Ctx 4145, pit 4144, Building 7, Tenement B. Phase 6.

33 **Mount**, copper alloy, incomplete. Bar mount with a lobe at each end and a ridge at the centre. Integral spike on the back for attachment (second spike missing). L: 23mm. Ctx 8882, ash layer, Building 2, Tenement B. Phase 6.

34 **Button**, copper alloy, complete. solid, cast biconvex button with simple looped shank. L: 14mm. Ctx 6703, disuse layer, Tenement C. Phase 6.

35 **Stylus**, copper alloy, complete. Robust, cast stylus with a globular head and three decorative reels below. Cylindrical tapering shank, rounded tip. L: 66mm. Ctx 6098, Demolition layer, Tenement C. Phase 6.

36 **Stylus**, worked bone, incomplete. Shaft and tip fragment; the head is missing. Shaft has two bands of horizontal grooves around it and a corroded iron point at the end. L: 60mm. Ctx 4020, robber cut 4019, Tenement A. Phase 6.

37 **Buckle**, copper alloy, incomplete. Simple folded rectangular plate with two rivets. Plate is recessed for the pin and the frame the wrap-around pin is still. L: 31mm. Ctx 3813, robber cut 3940, Tenement B. Phase 6.

38 **Tuning peg**, worked bone, incomplete. Square-cut head and tapering cylindrical shank (broken). Perforation through the base of the head, short length of string still *in situ* in the perforation. L: 30mm. Ctx 3505, cobbled yard, Tenement B. Phase 6.

39 **Tuning peg**, worked bone, incomplete. Wedge-shaped head and tapering cylindrical shank (broken). Perforation for the string is through the head. L: 35mm. Ctx 6511, accumulation layer, Tenement B. Phase 6.

40 **Tuning peg**, worked bone, incomplete. Wedge-shaped head and tapering cylindrical shank (broken). Perforation for the string is through the head. L: 32mm. Ctx 6535, accumulation layer, Tenement B. Phase 6.

41 **Spur**, Iron, near complete. Rowel spur, almost complete, only the rowel is missing.



Fig. 3.32 Small finds, Phase 6, nos 38–41



Fig. 3.33 Small finds, Phase 7, nos 42 and 43

Long neck set low, pointed crest at the heel. Deeply curved arms with figure-of-eight-shaped terminals, each terminal has a rectangular double-hooked plate through it. L: 142mm. Ctx 6586, demolition layer, Tenement B. Phase 6.

Phase 7: late 16th to mid-17th century

An assemblage of 42 objects was recovered from Phase 7 contexts from Tenement B, Tenement C and garden soil. As in previous phases, nails (n=18), pins (n=6) and lace tags (n=9) predominate. Notable objects include a strap-end, two knives and two hinge pivots.

Tenement B

The 29 objects from Tenement B include nails, pins and lace tags from pits 3752 and 3759. The two buckle frames are both double oval in form; the first from pit 3772/6383 (fill 3822) is simple with lobes at the end of the central bar, the second from pit 6383 (fill 6384) has a more elaborate moulded outside edge. The single item of horse gear, an iron buckle frame, came from pit 3772/6383 (fill 3822). It is trapezoidal in shape and was designed to link harness straps of different widths. The decorative finial (Fig. 3.33, no. 42) from pit 3772/6383 is moulded with an acorn-shaped terminal and could be a handle from a door or drawer.

Tenement C

Tenement C produced a knife and a hinge pivot. The whittle-tang knife from pit 6047 (fill 6042) has a centrally placed tang; the blade back and cutting edge run parallel, before the blade back slopes quite steeply towards the tip. The tip of the blade is missing. There are indications on the X-ray plate of 'slag lines' from pattern welding running along the blade back. Knives of this form generally date to the Saxon period. The L-shaped hinge pivot from pit 6024 (fill 6018) is designed for a door, window or cupboard.

Other features

Other finds from Phase 7 contexts include a strap-end and a hinge pivot from garden soil 4118 and an incomplete scale-tang knife from ditch 3527 (fill 3571) on the former site of the cemetery. The strap-end is of simple form, a wide folded sheet with rounded outside edge and two *in situ* rivets for attachment to the end of a strap or belt. The hinge pivot is large and L-shaped (see above). The knife (Fig. 3.33, no. 43) has a blade back in line with the tang; the blade back and cutting edge run parallel (the tip of the blade is missing) (Goodall type O). The tang is also incomplete, but the surviving section has two tubular copper alloy rivets through it. There is evidence of a copper alloy shoulder plate on the X-ray. This form of knife is known from the 13th–16th century but is most common in the late medieval period (Goodall 2011, 107).

Catalogue of illustrated objects (Fig. 3.33)

42 **Finial**, copper alloy, incomplete. Decorative cast finial in the form of a stylised acorn; the attachment end is missing. L: 38mm. Ctx 3818, pit 3772, Pit Group 17, Tenement B. Phase 7.

43 **Knife**, iron, incomplete. Scale-tang knife with blade back in line with the tang, blade back and cutting edge run parallel (the tip of the blade is missing). Tang incomplete, with two tubular copper alloy rivets through the surviving length. Copper alloy shoulder plate indicated on X-ray. L: 147mm. Ctx 3571, ditch 3527. Phase 7.

Phase 8: late 17th to early 18th century

This phase saw renewed activity towards the rear of Tenement B with the construction of stone Buildings 9 and 10 together with associated wells and pits. The 16 objects from Tenement B come largely from the walls and floors of Building 9. The only finds from Tenement C were nails and a pin.

Tenement A

A horseshoe arm from layer 21033 (Trench 210) has a plain outline, narrow web and three rectangular nail holes through it. This is of later medieval date.

Tenement B

Building 9

A small number of objects were recovered from walls and floors associated with Building 9, including a pocket-knife, a spade iron and a hasp. The pocket-knife (Fig. 3.34, no. 44) from wall 3323 has a folding blade held in a sprung handle, closed along the back and possibly with organic scales. The pocket-knife, which evolved into the modern penknife, was a development of the post-medieval period (Goodall 1990, 839). The only tool from this phase is a spade iron from floor layer 3350 designed to fit over the end of a wooden spade to prevent wear. The iron is rectangular with a grooved mouth and straight flat side arms (both incomplete). This rectangular form dates to the 14th century and later (Goodall 2011, 79). The looped hasp from wall 3435 in Room 1 is a figure-of-eight-shaped hasp with a hook at one end. Hasps were used to hold gates and doors on buildings closed and to fasten the lids of coffers and chests. The hasp would have fitted over a projecting staple where it would have been secured by a padlock.

The U-shaped arm from a locking buckle (Fig. 3.34, no. 45) came from floor 3855. It has a spherical terminal decorated with an incised wyvern decoration. It would have been used to secure a purse to a belt.

Catalogue of illustrated objects (Fig. 3.34)

44 **Pocket-knife**, iron, incomplete. Folding blade held in sprung handle, closed along the back. L: 112mm. Ctx 3323, wall, Building 9, Tenement B. Phase 8.

45 **Locking buckle**, copper alloy, incomplete. The U-shaped arm from a locking buckle with spherical terminal decorated with an incised wyvern decoration. L: 40mm. Ctx 3855, floor layer, Tenement B. Phase 8.



Fig. 3.34 Small finds, Phase 8, nos 44 and 45

Phase 9: mid-18th to early 19th century

Nearly all the 48 identifiable objects recovered from Phase 9 were from contexts associated with the demolition of Building 9 and the backfill (fill 3378) of well shaft 6135/3313, both in Tenement B. The majority of the objects were nails (n=23) and lengths of lead window came (n=15). The other objects include a knife, a key, a brush, a ring, a lock plate and two fine wire pins.

The ring (Fig. 3.35, no. 46) from well shaft 6135/3313 is penannular with tapering terminals. This form of finger ring dates to the Anglo-Saxon and earlier medieval periods. Numerous examples were recovered from 11th-century contexts at Thetford (Rogerson and Dallas 1984, 69, fig. 110, nos 17–21) and one from a 12th-13th century context at Norwich (Margeson 1993, 5, fig. 1, no. 1).

Fixtures and fittings include a hinge plate, a hasp, a drop handle and a decorative finial. The pinned hinge plate from well shaft 6135/3313 tapers along its length with the hinge mechanism at the widest end and three perforations through the plate for attachment to a door, cupboard or chest. The curved drop handle (Fig. 3.35, no. 47) from the well is of simple form with a decorative moulding at the centre of the grip.

The handle from a long-handled brush also came from the well. The handle is well finished with a rounded end, a chamfered edge and a high polish. Bone brushes date to the 17th century and later (MacGregor 1985, 183).

The whittle-tang knife (Fig. 3.35, no. 48) from Building 9 demolition backfill has an incomplete parallel-sided blade and a handle made from an unmodified length of antler tine. Too large for a table knife, this could have been a carving knife or a craft knife; the rough surface of the handle would have given a very good grip. The incomplete key has a D-shaped bow and a stem that protrudes beyond the bit; this form of key was designed for use on a mounted lock. The lock plate is a simple oval sheet with a keyhole aperture and two small perforations for the attachment.

Fifteen sections of window came were also recovered from the demolition backfill. They range in length from 28–127mm and all have plain H-shaped profiles with reeding or tooth marks (6/20mm) running along the core. These marks are made by the toothed wheel of the lead mill on which the cames were produced in the post-medieval period. Mills were able to produce thinner and more flexible cames but as a conse-



Fig. 3.35 Small finds, Phase 9, nos 46–48

quence they tended to be more brittle and susceptible to breakage.

Catalogue of illustrated objects (Fig. 3.35)

45 **Ring**, copper alloy, complete. Penannular ring with tapering terminals. D: 30mm. Ctx 3378, well shaft 6135/3313 backfill, Tenement B. Phase 9.

47 **Drop handle**, copper alloy, complete. Curved drop handle with decorative moulding at the centre of the grip. L: 68mm. Ctx 3378, well shaft 6135/3313, Tenement B. Phase 9.

48 **Knife**, iron and antler, incomplete. Whittle-tang knife with an unmodified antler tine handle. The tang is centrally placed and the blade back and edge run parallel. The blade is incomplete. L: 220mm. Ctx 3190, demolition backfill, Building 9, Tenement B. Phase 9.

Phase 10: mid-19th century and later

Phase 10 saw the construction of Magdalen College School, which resulted in the demolition of Tenement A (the Greyhound) and Tenement B. A total of 92 objects were recovered from this phase from features associated with the demolition of Building 12 in Tenement A, Structure 14 in Tenement B and from rubble and dump layers across the site. Nails (n=32) make up a little under half the assemblage.

Tenement A

A tap, a handle and two shoe pattens were recovered from levelling layer 6621 in Building 12. The tap (Fig. 3.36, no. 49) has a hollow tapering shank, a cylindrical stem and a turned-down spout, and could have been used on a barrel, cistern or vessel, possibly in the Greyhound Inn. The handle (Fig. 3.36, no. 50), with its short shank and ring bow, is almost certainly for the tap, into whose vertical stem it would have fitted, and could be turned to control the flow of liquid. The two shoe pattens are of different forms although they both serve the same purpose. The first (Fig. 3.36, no. 51) has an oval frame with two ogival-shaped terminals, each with a central perforation, while the second has a 'crinkle-edged' frame with trapezoidal-shaped terminals and two perforations through each one. Pattens would have been attached to the underside of wooden clogs and were worn over footwear to raise the shoes up and protect them from dirt and damp. The crinkled-edged form was fashionable in the 17th and 18th centuries. The only other notable objects recovered from Building 12 were a medieval book clasp from robber trench 6606 that removed the west wall of the building and a lead spoon from robber cut fill 6594 (Fig. 3.36, no. 56). The book clasp is a

two-piece clasp with a hinged plate and loop (Howsam 2014, type A:1) which uses a strap-and-pin mechanism commonly found on manuscripts during the medieval period. The clasp would have been secured to a strap on the book cover, and the perforated loop element of the fastening would have fitted over a pin attached to the opposite cover. The terminal loop is for a cord used to pull the book shut. The terminal loop is decorated with incised grooves.

Tenement B

Building 10

A rectangular hand brush (Fig. 3.36, no. 57) with a diamond-shaped perforated finial at one end came from cellar backfill 3383. The brush has four rows of holes for the bristles and four grooves on the back for the copper wires that would have secured the bristles in place. The front and back of the brush have been stained green by the copper wire.

Structure 14

A whittle-tang knife, a spur and two worked-bone brushes came from Structure 14 demolition layer 3261. The knife (Fig. 3.36, no. 53) has only a tiny length of the blade surviving; the tapering bone handle with its flattened hexagonal section is intact. The near-complete rowel spur (Fig. 3.36, no. 55) has a short, bifurcated neck that angles downwards. The damaged rowel is still *in situ*. The arms are curved and have damaged figure-of-eight terminals, each with a circular riveted fitting hooked through it to attach the spur to the leathers. This type of spur dates to the early 17th century. The two long-handled bone brushes with lozenge-shaped heads are both complete and differ slightly



Fig. 3.36 Small finds, Phase 10, nos 49–57

in size and handle design. The smaller one has three rows of holes for the bristles (10/11/10) and three corresponding grooves in the back of the head for the wires that held the bristles in place (Fig. 3.36, no. 54). The handle is highly polished and has a rounded terminal. The larger brush has four rows of holes for the bristles and four corresponding grooves. The handle is highly polished and has a concave terminal. Both examples have patches of green staining on the heads from the copper wire.

Other features

Other notable finds from Phase 10 contexts include two whittle-tang knives with bone handles and a mount. The whittle-tang knife (Fig. 3.36, no. 52) from modern drain 3156, which cut into Structure 14, has a bone handle with a flattened hexagonal section, which is very damaged. The second knife, from robber cut fill 3052 (Building 9), has a cylindrical bone handle and very little of the blade surviving. The mount is circular, slightly domed with a central perforation for a rivet and incised concentric circle decoration. It could have been used to decorate a belt, strap or harness.

Catalogue of illustrated objects (Fig. 3.36)

49 **Tap**, copper alloy, complete. Tap with hollow tapering shank (with a circular perforation through the end), vertical cylindrical stem on top and a turned-down spout. L: 132mm. Ctx 6621, levelling layer, Building 12, Tenement A. Phase 10.

50 **Handle**, copper alloy, complete. Handle with short shank and oval ring bow. The expanded socket is triangular. L: 60mm. Ctx 6621, levelling layer, Building 12, Tenement A. Phase 10.

51 **Patten**, iron, near complete. Oval frame and ogival-shaped terminals with central perforations. One terminal still has a nail *in situ* to secure the pattern to the underside of the wooden clog. L: 197mm. Ctx 6621, levelling layer, Building 12, Tenement A. Phase 10.

52 **Knife**, iron and bone, incomplete. Whittle-tang knife with bone handle. The blade is very damaged. The handle has a flattened hexagonal section that tapers towards the shoulder. L: 132mm. Ctx 3187, modern drain 3156, cut into Structure 14. Phase 10.

53 **Knife**, iron and bone, incomplete. Whittle-tang knife with very damaged blade. Tapering bone handle with flattened hexagonal handle. L: 74mm. Ctx 3261, demolition backfill, Structure 14, Tenement B. Phase 10.

54 **Brush**, bone, complete. Long-handled brush with lozenge-shaped head. Three rows of holes (10/11/10) in the front of the head for the bristles and three corresponding grooves on the back of the head for the wires. Highly polished. Areas of green staining on the head. L: 154mm. Ctx 3261, demolition backfill, Structure 14, Tenement B. Phase 10.

55 **Spur**, iron, near complete. Rowel spur with short, bifurcated neck that angles downwards, the damaged rowel is still *in situ*. Arms are curved with damaged figure-of-eight-shaped terminals each with a circular riveted fitting hooked through it. L: 120mm. Ctx 3261, demolition backfill, Structure 14, Tenement B. Phase 10.

56 **Spoon**, Lead, incomplete. Spoon with a round (damaged) bowl and a flat round-ended handle. The handle is decorated with a narrow band of incised grooves with hatching in between, which snakes around the handle ending in a curl at the end. L: 204mm. Ctx 6594, robber cut fill, Building 12, Tenement A. Phase 10.

57 **Brush**, worked bone, incomplete. A rectangular hand brush with a diamond-shaped (perforated) finial at one end. Four rows of holes (13/10/10/14) for the bristles and four grooves on the back for the copper wires. The front and back of the brush have been stained green by the copper wire. L: 90mm. Ctx 3383, cellar backfill, Building 10, Tenement B. Phase 10.

WORKED SHELL OBJECTS *by Rebecca Nicholson*

Pierced scallops were identified in two contexts. A large left (upper) valve of king scallop (*Pecten maximus*) came from a modern context (6593) and so is of uncertain provenance. The valve is broken but of 123mm height with a roughly circular hole (5.6mm x 3.9mm) just below the umbo and an oval hole (9.4mm x 5.5mm) close to the margin of the shell above the posterior auricle. These perforations indicate that that the shell had been hung or perhaps nailed to a surface. *Pecten maximus* is widely distributed in the north-east Atlantic, from northern Norway to north Africa, inhabiting sand or gravel substrates from low water down to 100m (Ktalav 2016, 326). Two superimposed right valves from smaller scallops each had a pair of small perforations on each side of the umbo, at equal distances from it, indicating that these shells had been hung or attached to a surface. These were found in the fill (4277) of Phase 3 grave 4278. Scallop shells with similar perforations have been interpreted as pilgrimage badges, obtained at the tomb of St James the Apostle in Santiago de Compostela, north-west Spain, from the 12th century onwards (Ktalav 2016). Unfortunately, these finds cannot be firmly associated with the skeleton since the fill also contained fragments of residual animal bone, pottery and disarticulated human bone. The grave was situated near the southern edge of the cemetery that bordered onto Tenement A and was largely removed by a later medieval boundary ditch.

IRON SLAG AND RELATED HIGH-TEMPERATURE DEBRIS *by Lynne Keys*

Methodology

Over 150kg of slag and related debris were presented for examination. This represented a targeted sample of an estimated total of up to 290kg focussing on the buildings, structures and pit groups that contained significant quantities of slag and related debris. Most was recovered by hand during excavation although a significant quantity of evidence came from soil samples (shown as in the quantification spreadsheet) taken during excavation and processed afterward. Some iron was found amongst the slag and was handed to the relevant specialist for x-radiography and analysis. It is not considered in this report unless directly relevant to the smithing activity. For this report the assemblage was examined by eye and categorised on the basis of morphology and magnetic properties. Each slag type in each context was weighed; smithing hearth bottoms were individually weighed and measured toobtain statistical information.

Explanation of terms and discussion of the slag types in the assemblage

Activities involving iron can take two forms, smelting or smithing. Smelting is the manufacture of iron from ore and fuel in a smelting furnace. The products are a spongy mass called an unconsolidated bloom consisting of iron with a considerable amount of slag still trapped inside, and slag (waste). There is no evidence that smelting took place on the Magdalen College site, despite the presence of a possible bloom in pit 5002 (fill 5000).

Smithing involves the hot working (using a hammer) of the bloom to remove excess slag (primary smithing) or, more commonly, the hot working of one or more pieces of iron to create or to repair an object (secondary smithing). As well as bulk slags, including the smithing hearth bottom (a plano-convex slag cake which builds up under the tuyère hole – hottest part – where the air from the bellows enters the hearth), smithing generates micro-slags; these can be hammerscale flakes from ordinary hot-working of a piece of iron (making or repairing an object) and/or tiny spheres from bloom smithing or high-temperature welding used to join or fuse two pieces of iron. Hammerscale, because of its tiny size, is usually only recovered by taking soil samples from fills and deposits but it is very magnetic and its presence can be detected using a magnet; it is most prevalent in archaeological contexts in the immediate area of smithing, in the vicinity of the anvil and between it and the smithing hearth.

In looking for foci of smithing, the number of smithing hearth bottoms in features in a particular area is usually taken into account. Iron slag, especially the larger slags (bulk slags) such as smithing hearth bottoms could, however, be subject to removal for recycling elsewhere. Slag might be recycled in yard metalling, as hard bedding, or as reclamation material; occasionally it was used as bedding in beam slots to keep wood above any water that might seep into the cut.

Table 3.22: Quantification of smithing hearth bottoms

Phase	*Smithing hearth bottoms*
1	13
2	2
3	1
4	24
5	28
6	46

Given the smithing evidence that the Magdalen College micro-slag samples provide, the quantity of bulk slags (larger slags such as smithing hearth bottoms) are surprisingly limited (Table 3.22). It may be that later activity removed or redeposited some, or that some collection for recycling elsewhere was taking place in Phases 1 to 3. If recycling was taking place, it seems to have broken down as time went on, particularly in Phase 6.

Hammerscale

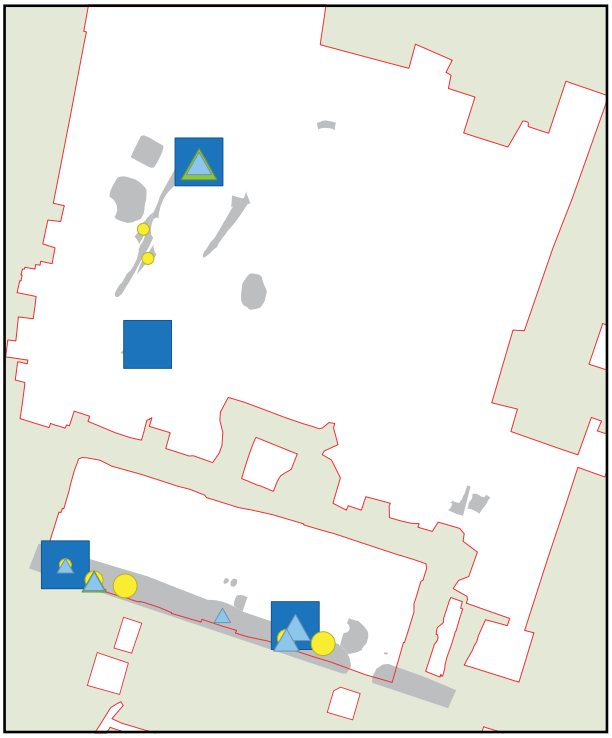
Without the material from soil samples, there would be virtually no evidence for smithing activity on the site over the extended period it appears to have taken place. Sampling of deposits in all periods produced ample evidence for both ordinary hot-working of iron and high-temperature welding, with very little spatial differentiation discernible between the two. Ironworking activity seems – at least until the later phase of the site – to have taken place mainly along the street frontage of Tenements A and B. There was no difference in the type of smithing taking place in the two tenements.

Undiagnostic slags

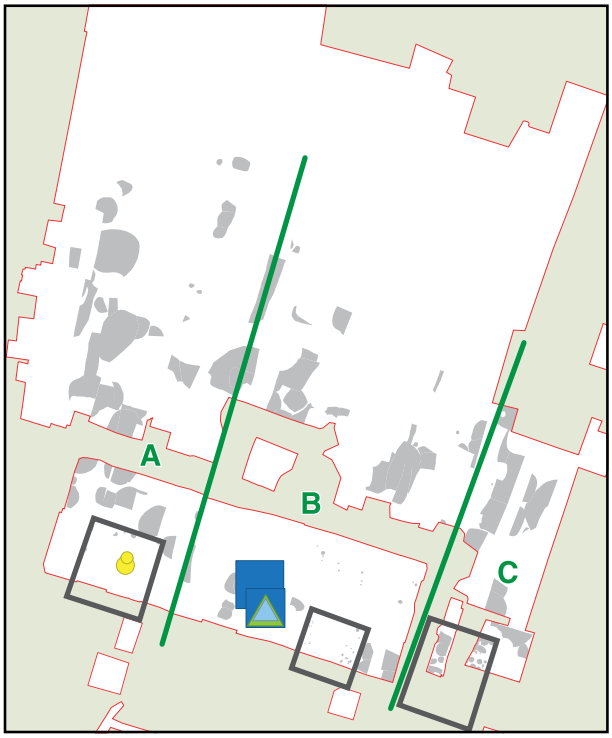
Slag described as undiagnostic cannot be assigned to smelting or smithing either because of morphology or because broken up during deposition, redeposition or excavation. The Magdalen College material is substantial and almost certainly derives from smithing activity.

Other high-temperature debris

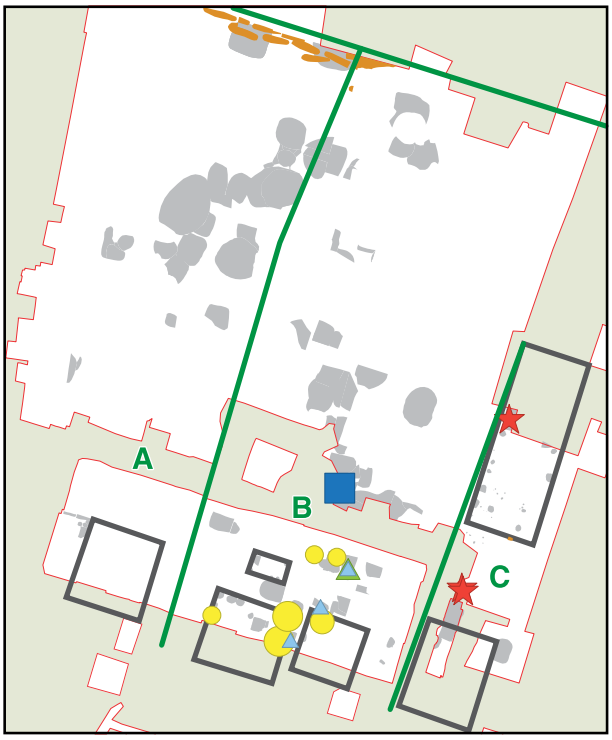
Other types of debris in the assemblage may derive from variety of high-temperature activities – including domestic fires – and cannot be taken on their own to indicate ironworking was taking place. These include fired clay, vitrified hearth lining, and cinder. If found in association with ironworking they are almost certainly products of the process.



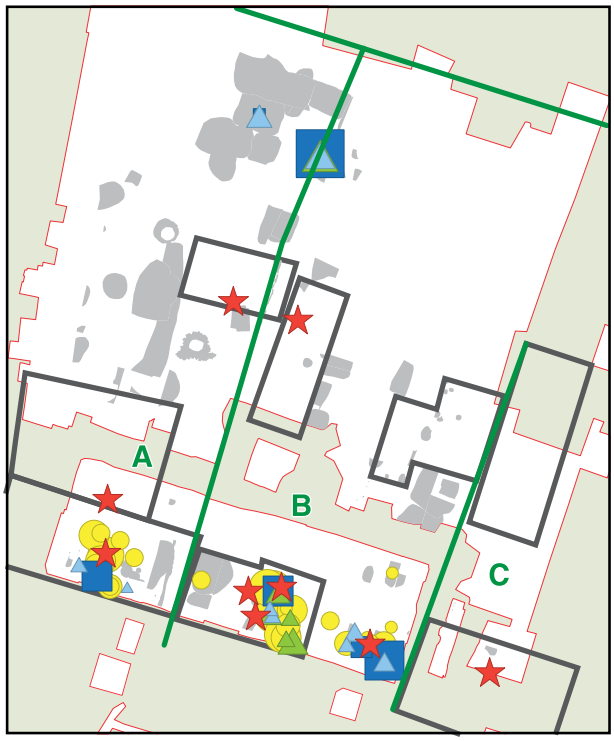
Phase 1 (10th-mid 11th century)



Phase 2 (late 11th-mid 12th century)



Phase 3 (late 12th-early 13th century)

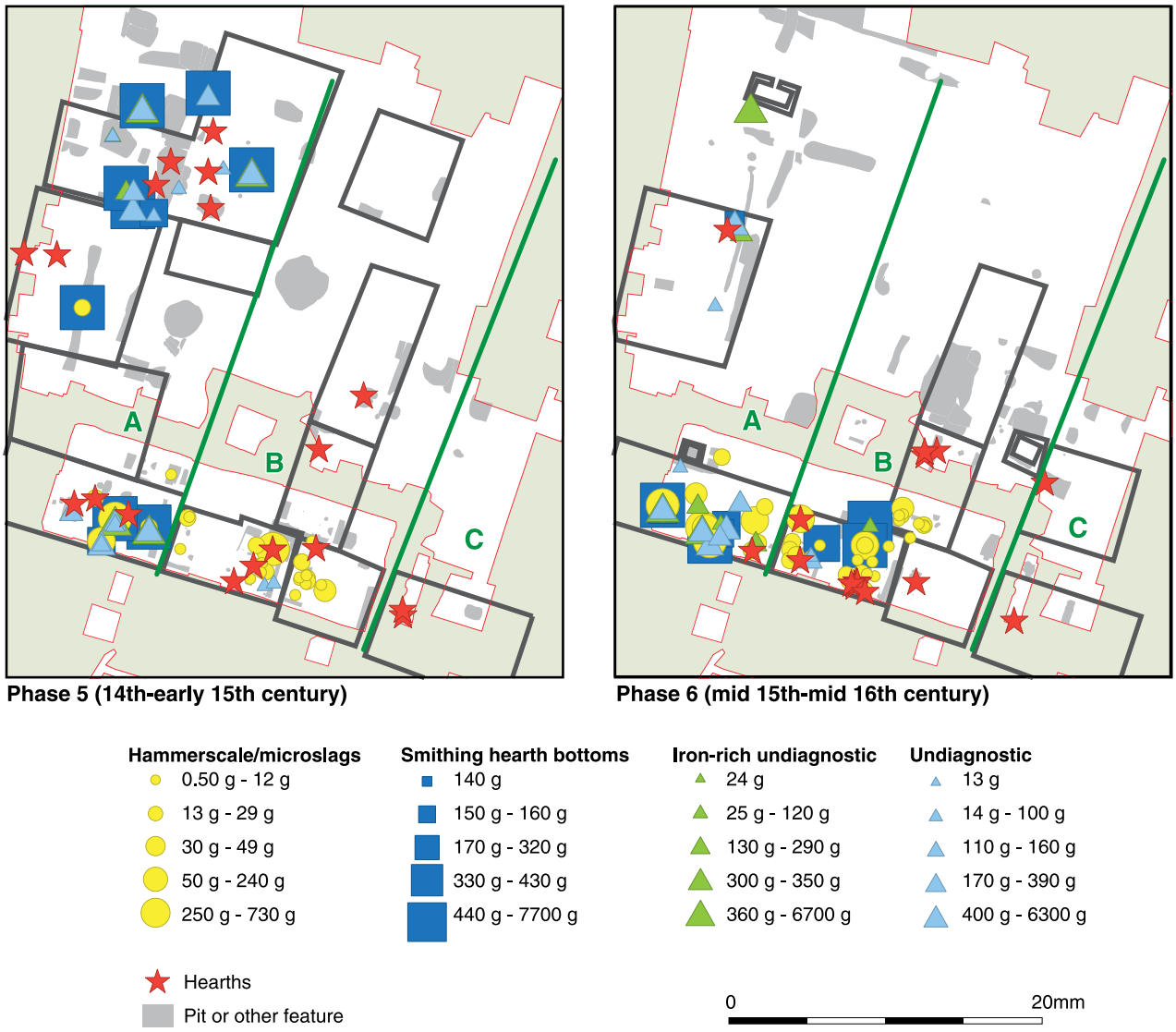


Phase 4 (13th century)

Fig. 3.37 (above and right) Slag distribution by phase

Iron objects

Other finds which provide support for smithing are iron objects in the form of unfinished objects, waste pieces and/or iron objects with hammerscale (from the smithing process) still adhering. Unfortunately, owing to soil conditions which did not promote preservation, very few such objects could be identified amongst the many fragments of corroded iron recovered (see L. Allen above). It is therefore unclear what kinds of objects the smiths were making or repairing over the long period they worked in the area that was (or became) Tenements A and B.



Whetstones

A number of these were recovered from areas in which smithing took place; some were in direct association with discarded slag in floor deposits or pits (see Shaffrey above). They would have been used to remove any adhering hammerscale or iron that was extraneous to the finished object and to sharpen iron blades.

Discussion of the activity by phase (Fig. 3.37)

Phase 1: 10th to mid-11th century

The slag (total weight 9.4kg) in this phase is from the area where Tenements A and B later stood. Evidence for ironworking took the form of smithing hearth bottoms and micro-slags (both flake hammerscale and smithing spheres from ordinary hammering of hot iron as well as high-temperature welding). Despite its relatively small size, the assemblage reveals smithing was taking place, possibly in the area that later became Tenement A. Evidence predating the tenements is patchy and is scattered along the street frontage within Ditch 1 and to the north-west within Ditch 2. Pit 5002 is of interest as it contained one smithing hearth bottom and what may be a bloom (Appendix 4). If the slag is indeed a bloom it indicates iron objects were not only being made from pre-prepared bars or rods of iron, but, possibly, blooms which may have come straight from an iron-smelting furnace or via distribution or trade in a roughly worked state. Pit 9361, which cut Ditch 1, contained seven smithing hearth bottoms and undiagnostic slag.

Phase 2: late 11th to mid-12th century

A small assemblage of slag weighing 1.7kg was recovered and lacked bulk slag types. Within Tenement A, soil samples from postholes 7895 and 7896 of Structure 1 produced micro-slags that were probably present as floor debris. The Tenement B assemblage was recovered from Pit Group 4 pits 9802 and 9827; each pit produced a smithing hearth bottom and pit 9827 also contained a small quantity

of undiagnostic slag, some of it iron rich. It is of interest that three whetstones (frequently used by smiths to file iron objects) were associated with Tenement B in this phase. Two were in the south-east corner of Tenement B, the other was an upper levelling fill of Ditch 1.

Phase 3: late 12th to early 13th century

Tenement B was the focus of smithing activity in this phase, in particular Structure 2. Pit 9330 within the structure produced a total of over 1.9kg of micro-slags diagnostic of secondary smithing, and there were smaller quantities from posthole 9325 (171g) and 8478 (17g). The material from the pit included flake hammerscale that was pressed into sandy mortar which may be indicative of the makeup of the smithy floor. In Pit Group 6, pit 9116 contained a moderate quantity of hammerscale flakes and pit 9132 had 349g of very small undiagnostic slag, while pit 6494 produced a smithing hearth bottom. Discrete pit 9192 contained a significant quantity of hammerscale. Tenement A produced no slag.

Phase 4: 13th century

It is in this phase that we can truly say smithing took off, some 29.43kg of slag being recovered from its features. Room 1 of Building 1 in Tenement A contained several hearths (7252, 7261, 7686 and 7254). Predating hearth 7686 were occupation layers 7681, 7689 and 7692, all of which contained much broken hammerscale flake and spheres indicative of both ordinary smithing and high-temperature welding; 7692 additionally contained iron offcuts. Burnt layer 7671, which was contemporary with the hearth, contained a significant quantity of hammerscale flake and micro-slags, as did the contemporary occupation layer 7679 and possible rake-out pit 7704. Located to the rear (north-east corner) of the tenement, Pit Group 11 produced over 22kg of slag and related material. The largest quantity (almost 21kg) came from pit 3808 and included 15 smithing hearth bottoms, making it one of the few features with such a significant quantity of this slag type. Pit 3783 produced only 817g of slag, including one smithing hearth bottom. In the absence of micro-slags, which would remain near the smithing area, this assemblage of bulk slag probably represents dumping of large slags produced in the Tenement A forge.

Most of the smithing evidence from Tenement B came from Building 2, and in particular Room 2, which contained several hearths (8739, 8747, 8799, 9282). Soil samples from charcoal layer 8784 produced 482g of hammerscale flake and occasional spheres, iron flakes, and some tiny undiagnostic slag. This layer was on the north side of the room, north of hearths 8799 and 8739, indicating they were probably smithing hearths. On the south side of the room lay laminated floor surface 8997; it contained broken hammerscale flake, tiny spheres, iron flake and tiny fragments of iron wire. The wire is intriguing evidence for one type of object being produced or worked up in the forge, perhaps for needles, pins or similar. The micro-slags from hearth 9282 (some very broken flake hammerscale and numerous very tiny spheres) indicate high-temperature welding was being undertaken at this hearth. A small area of burnt clay (9702), perhaps a hearth remnant, located externally to Building 2, contained large flakes of hammerscale and smithing spheres, as well as tiny fragments of undiagnostic slag. Hammerscale and micro-slags were also recovered from pits 8780 (near hearth 8747), 9323 and 9332 (adjacent to hearth 9282), the last of these also containing a smithing hearth bottom. Pit 9743 contained very little in the way of micro-slags but did produce one smithing hearth bottom.

Room 1, in contrast, produced only a small quantity (21g) of flake hammerscale and micro-slags from charcoal layer 8283 in Room 1. East of the building, micro-slags were recovered from pits 9248=9441 and 9658.

Phase 5: 14th to early 15th century

A total of 36.3kg of slag and related high-temperature debris were recovered from this phase. Bulk slags begin to appear more frequently in features to the rear of the tenement buildings and may represent attempts to remove some of the large quantity of slag produced by the intensive smithing taking place.

Within Tenement A, Room 1 of Building 1 was again the main source of material. Stone-built structure 7832/7833 was probably the base of a hearth or furnace, within which charcoal-rich layer 7826 contained 704g of broken hammerscale flake and other material. Layer 7831, a fill of the flue, also produced a large quantity (almost 1.4kg). Pit 7841, to the west of the hearth, contained just over 2kg of slag which included two smithing hearth bottoms. The bulk slags (including the smithing hearth bottoms) had hammerscale flakes and tiny spheres adhering, and hammerscale flakes and tiny spheres indicate that the deposit was undoubtedly near the anvil. The rake-out pit (8063) and associated stake-holes (8073) produced almost 10kg of bulk slags (smithing hearth bottoms and undiagnostic types) but no micro-slags. Rectangular hearth 7227 produced 302g of material (undiagnostic slag and a piece of iron with flake hammerscale adhering). A soil sample from 7673, possibly the base of a robbed-out hearth or a spot where something of intense heat had been placed on the floor, contained 24g of broken hammerscale flake and spheres, as well as some fired clay, and gravel and mortar floor 7820 produced 518g of slag including a smithing hearth bottom.

Slag was also recovered from Buildings 4 and 5. Makeup layer 3450 in Building 4 contained 6.2kg of slag including three smithing hearth bottoms and much undiagnostic slag, and hearth 4935 contained

1.38kg of slag including two smithing hearth bottoms. Within Building 5, burnt layer 4788 contained 1.65kg of slag, which included three smithing hearth bottoms and some undiagnostic slag; this is not a significant enough to indicate smithing was occurring in Building 5. In the contemporary Pit Group 14, 1.4kg of slag in the form of two smithing hearth bottoms was recovered from pit 3521. Pit 4418 contained 7.98kg in the form of six smithing hearth bottoms, undiagnostic slag and some coal, which probably represents opportunistic dumping of material from nearby smithing activity, perhaps from Buildings 4 and 5 or further south towards the frontage of the tenement.

Room 2 of Building 2 in Tenement B also continued to be a focus of evidence, although the quantities were smaller. Floor layer 8993 contained 385g of large, unbroken hammerscale flake, very tiny spheres and undiagnostic dribbles, and laminated occupation layer 8971 produced much material indicative of very high-temperature welding; it probably lay near a smithing hearth and was probably contemporary with hearth 8711. Hearth 8711 contained a little broken hammerscale flake and tiny spheres. Layer 8991, probably associated with the hearth, produced broken hammerscale flakes, tiny smithing spheres and broken iron flakes, as did layer 8992.

Building 6 produced micro-slags diagnostic of nearby secondary smithing from floor layers (9117, 9140, 9146, 9157) and occupation layer 9614, as well as from hearths 9134 and 9160. Occupation layer 9614 additionally contained a whetstone.

Phase 6: mid-15th to mid-16th century

A total of 56.7kg of slag was recovered from this phase. The occupation layers of Building 1 Room 1 invariably contained smithing micro-slags in larger or smaller quantities, and hearth 8015 contained broken hammerscale flake and iron flakes, evidence it had been used for ordinary hot-working of iron objects rather than high-temperature welding. Layer 7201 contained 5.8kg of slag, including nine smithing hearth bottoms, and also contained some undiagnostic slag (664g). Rather than being evidence of smithing in this room the slag may have been dumped here; it could equally represent levelling material for a rebuilding. Layer 7634=7813 contained 13kg of material related to smithing activity, including five smithing hearth bottoms and fragments of iron – either smith's offcuts or waste from the ironworking itself. The piece was flat, and 5–8mm wide. Gravel makeup layer 7817 also contained fragments of iron. Cobbled surface 7811 had incorporated into it one smithing hearth bottom and undiagnostic slag which would have given it extra strength, and was overlain by occupation layer or made ground 7809 which produced two smithing hearth bottoms.

In this phase, Building 5 had two smithing hearth bottoms and some undiagnostic slag incorporated into hearth 4512; it also contained a whetstone. Overlying midden deposit 4422 contained one smithing hearth bottom but nothing more. In the adjacent Pit Group 14, levelling deposits over pit 4418 (see also Phase 5) contained a very large quantity (21.23kg) including 20 smithing hearth bottoms, significant quantities of undiagnostic slag, and fragments of burnt, laminated coal. All of this material probably originated in the smithies further to the south.

In Tenement B, the occupation layers in Building 2 Room 3 contained smithing micro-slags. All these deposits were probably associated with the earliest hearth (8681=8878) and were perhaps remnants of the earlier smithy. Occupation layer 8677 contained one iron wire or needle/pin-like fragment. Levelling layer 8690 contained 7kg of material including two smithing hearth bottoms, as well as many burnt flint inclusions within the slag; the flint may have formed part of the hearth superstructure and would have facilitated slag removal from the iron during smithing. In Room 4, hearth 8232 contained some broken hammerscale flake and tiny spheres, while hearth 8245 (=8232) produced similar material, as well as iron flakes.

Small quantities of broken flakes and spheres occurred in various hearths and charcoal layers in Room 1 of Building 7. The quantities, however, were never very large.

CLAY TOBACCO PIPES *by John Cotter*

Introduction

A combined total of 347 pieces of clay pipe weighing 1626g were recovered from 81 contexts from the three excavation areas. These comprise 289 pieces of stem, 47 pieces of bowl (from a minimum of 42 bowls) and 11 mouthpieces. A total of 15 pipes bearing a maker's mark were noted (13 on bowls and 2 on stems). Clay tobacco pipes were produced in England from the second half of the 16th century onwards and fell out of use during the early 20th century. Their typological development over this period, combined with decoration and makers' marks, makes them a valuable tool for dating post-medieval contexts. Most of the pipes here are local Oxford products but a small number of regional products have also been identified including pipes from west Oxfordshire, Winchester (Hants), Broseley (Shropshire) and London.

Methodology

The pipes were catalogued and recorded on an Excel spreadsheet. The catalogue records, per context, the spot-date, the quantity of stem, bowl and mouth fragments, bowl type and minimum number of bowls, the overall fragment count and weight. Additional fields record the number and type of makers' marks (if present), while any other details of note (decoration, condition, parallels etc)

were recorded in a comments field. Full catalogue details are available in the project archive.

The assemblage

Though fragmentary, the condition of the material is quite fresh and includes several complete bowls (mostly early thicker-walled types). One exceptionally well-preserved 17th-century pipe bowl still has 220mm of stem attached (Fig. 3.38, no. 1). A mixture of fairly fresh and fairly abraded material is however generally the rule.

Given the relatively large extent of the excavations the collection is comparatively small. This reflects the fact that much of the area was built over by the 19th century and thus relatively little material of this date came to be deposited. The bulk of the assemblage (260 pieces, or 75%) came from the northern area of the site, with pipe numbers dropping sharply further south, towards the High Street. Construction of the High Street frontage of the college during the 19th century would have removed many earlier post-medieval rubbish pits and almost certainly explains the low number of pipes from this area. Differences in the size of the three excavated areas (largest in the north) must also be part of the explanation.

Most of the material comes from levelling layers and floors. Excluding unstratified material, the highest number of pieces from a single context is the 20 pieces from context 4111, a Phase 8 levelling layer in the northern area. Another 18 pieces came from context 3002, a Phase 9 layer of made ground also in the northern area. Other contexts contained much fewer pieces. A Phase 8 floor in Building 9 produced 13 pieces, including two pipe bowls probably datable to *c* 1670–90 (3350). Even the well-preserved 17th-century pipe (Fig. 3.38, no. 1) came from a Phase 8 levelling layer in the central area. A small number of pieces are, however, from pit contexts, including three bowls of *c* 1650–90 from a Phase 8 cesspit in the northern area (pit 21715).

Bowls

Most of the pipe bowls are local Oxford types of the mid-17th century through to the 18th century, though showing London influences, but there are a few non-local pipes too. The main local bowl types have been classified by comparison with the published local typology where a limited number of alphabetic codes (A–D) were used to cover bowls forms up to *c* 1790 (Oswald 1984). Other bowls types (early and late), including all 19th-century bowls, have been classified using codes based on Atkinson and Oswald's (1969) London pipes typology, with bowl types assigned an alphanumeric code (eg AO22). This does not however signify that the bowls are necessarily from London, although London's influence on regional bowl styles increased significantly during the course of the 18th century and later. The chronological range of bowl types from the site is shown in Table 3.23.

Makers' marks

A total of 15 marked pipes were recovered (13 on bowls, 2 on stems), representing a minimum of nine individual marks/makers, listed below in roughly chronological order.

MH. One example (Fig. 3.38, no. 2). The earliest mark/bowl from the site. A complete bowl of Type A (*c* 1630–55) with the impressed maker's mark 'MH' in relief on the underside of a small circular heel. The initials are ligatured with small spray-like

Table 3.23: Clay tobacco pipe bowls by type and date

Regional style	*Bowl type*	*Bowl date*	*Bowls (minimum number of vessels)*	*Makers' marks*
Oxford	A	*c* 1630–55	5	1
Oxford	A/B	*c* 1630–90	2	0
London	AO9	*c* 1640–60	2	0
London	AO10	*c* 1640–60	1	0
Oxford	B	*c* 1650–90	9	0
London	AO13	*c* 1660–80	2	0
London	AO15	*c* 1660–80	1	0
London (West Country-style)	AO16	*c* 1660–80	1	1
Oxford (developed Type B)	BDEV	*c* 1670–1730	1	0
Oxford	C	*c* 1690–1720	1	0
N/A (misc, spurred)	MISC SPUR	*c* 1700–1900	1	1
London	AO26	*c* 1740–1800	3	1
Oxford	D	*c* 1750–90	2	0
London	AO26/27	*c* 1770–1860	6	6
London	AO28	*c* 1820–60	5	3
Total			42	13

Two makers' marks on stem fragments not included in totals

fillers above and below the initials and the whole enclosed within a circle of pellets (or possibly small lozenges). This is clearly recognisable as the mark of the Oxford pipemaker Miles Higges, who was active *c* 1630–43. He was the first Oxford pipemaker we know of who marked his products. They are moderately common finds from Oxford sites. An unusually large group of seven Higges pipes was identified from the Provost's Garden, Queen's College, including two variants of the mark here (Higgins 2020a, fig. 6.15, nos 13–15; our mark being nos 13 and 15). Miles Higges was married in 1630 and died in 1643 (ibid.).

WB. One example (Fig. 3.38, no. 3). A complete West Country-style bowl (AO16, *c* 1660–80) with a typical prominently 'chinned' bowl. Teardrop-shaped heel with incuse maker's mark 'WB' within heart-shaped border with scroll fillers above the initials and a small fleur-like filler below. Le Cheminant illustrates a complete (but larger) bowl of *c* 1660–80 from the Thames foreshore, London, with exactly the same mark as here (Le Cheminant 1981, fig. 20.17). He also states that this mark is known from several examples at Winchester and the maker was perhaps William Bates (1658–67) or William Boys (1671–8). The piece is neatly made and well burnished.

BEN ABBOTT. One example (Fig. 3.38, no. 4). A small piece of burnished stem bearing a complete Broseley-style square maker's mark in relief letters on the top of the stem. The name arranged in three rows within divider lines: 'BEN/ABB/OTT' for Benjamin Abbott of Ramsden in west Oxfordshire. Recent work by David Higgins suggests stems with this mark (sometimes accompanied by initials on the bowl spur) should now be dated *c* 1740–80 rather than *c* 1760–80 as previously thought (Higgins 2021). The mark is fairly common from Oxford sites with several examples known from 15 Paradise Street (ibid., fig. 14.3) and St John's College (Higgins 2020b, fig. 10.19, no. 48). A variant of this mark (without divider lines) is also known from St Ebbe's Church (Oswald 1984, fig. 54.25B).

SAM RODEN. One example. Comprising three fresh joining stems with a total length of 174mm (Fig. 3.38, no. 5). Well burnished. Stem bore diameter *c* 2mm. Bears a square Broseley (Shropshire) maker's mark in relief letters on the top of the stem. The name arranged in three rows within divider lines: 'SAM/RO*/DEN'. A decorative barley-sugar twist occurs on the stem 10mm away from the top of the mark – closer to the bowl-end. An eight-pointed star filler inserted after the 'RO'. Oswald lists two Broseley pipemakers with this name: Sam Roden I, born 1702 and probably still alive *c* 1750, and Sam Roden II, who lived *c* 1780–1841 (Oswald 1975, 191). Higgins illustrates an identical stem mark from Birmingham which he dates, stylistically, to *c* 1750–90, stating that it was made by one of the 'various makers named Samuel Roden' who lived in the Broseley area (Higgins 2009, fig. 9.3.46). In line with this more recent research, the stem from Magdalen College should also date to *c* 1750–90. This is the only datable clay pipe mark from the backfill layer of Tenement B (3190) which also produced the remarkable assemblage of over 3600 pipeclay wig/hair curlers (see R Allen, below). Other pipe stems from the same context date no later than the late 18th or early 19th century. A glass bottle seal from this context bears the date 1769; pottery from the context dates to *c* 1770/80–1830.

SAVELL. One example (Fig. 3.38, no. 6). A near-complete, large, spur bowl probably of London AO26 ('New type' *c* 1740–1800) but not very different from AO28 (*c* 1820–60). It features the impressed maker's mark 'SAVELL' on the back of the bowl with a scroll-like filler below it and traces of a milled circle to the left of the 'S'. Spur broken off; probably pointed. Knife-cut rim but slightly wiped or smoothed afterwards. Non-local. Possibly by the London maker John Savell II, of Moorfields and other addresses, active *c* 1763–90 (Oswald 1975, 145).

CP. Six pipe bowls, three plain and three decorated (Fig. 3.39, nos 7 and 8). Bowl form (AO27/28) recorded here as a hybrid of AO27 (*c* 1770/80–1830) and AO28 (*c* 1820–60) but appears slightly closer to AO28. These have cylindrical spurs (or narrow heels) with a flat base which has untrimmed seams. An identical maker's mark 'C/P' in large relief moulded letters occurs on either side of the spur on all six examples – making this the commonest maker's mark from the site. They all come from the northern area (OXMALE12) but are unstratified. Most examples show evidence of smoking. The three decorated bowls comprise one complete example (Fig. 3.39, no. 7) and two more fragmentary examples. All three are decorated with large moulded vertical ribbing or fluting and a single horizontal line/ridge just below the rim. The spurs and maker's marks are identical to the three plain examples. The three plain examples (Fig. 3.39, no. 8) comprise one complete bowl and two others with large chips from the rim. These are by an, as yet, unidentified Oxford maker. Excavations in the city at 15 Paradise Street uncovered a significant dump of clay pipe production waste and possibly traces of the kiln itself. The assemblage here included 14 bowls with exactly these initials and on similar bowls (Higgins 2021). These included plain examples (ibid., fig. 34.23), armorial examples, with the Hanoverian royal arms (ibid., fig. 34.24), and the front rim of a bowl with moulded vertical ribbing, as here, and considered to be by the same maker (ibid., fig. 34.25). David Higgins suggests a production date of *c* 1770–80 for the 'CP' maker based on bowl typology and the distinctive style of the armorial bowls. Other 'CP' bowls, including ribbed/fluted examples, are known from other Oxford sites including Oxford Castle and

the Old Radcliffe Infirmary. Some of the 'CP' marked bowls from the Cooper Callas site also have a small internal cross stamp on the base of the bowl – a typical feature of some clay pipes of the second half of the 18th century (ibid.). This internal cross stamp also occurs on the ribbed pipe here (Fig. 3.39, no. 7). The relatively high number of pipes by this maker from Magdalen College might suggest he had some kind of business arrangement with a nearby shop or other outlet (perhaps the Greyhound Inn) for the sale of his pipes to inhabitants of the college.

RB. One example (not illustrated). Damaged bowl base lacking rim. 18th-century spurred type with unknown maker's mark on either side of spur 'R/B'. 50mm of stem attached. The mark is illustrated from St Ebbe's Church, where Oswald suggests a closing date of *c* 1780 for the context (Oswald 1984, fig. 54.25A).

WT. One example (not illustrated). Joining fragments from near-complete bowl of London AO28 (*c* 1820–60) with large cylindrical heel or spur



Fig. 3.38 Clay pipes, nos 1–6

with flat end/terminal. Relief moulded maker's name on spur probably 'W/T'. Uncertain maker, *c* 1820 (Oswald 1984, fig. 55.29A–B).

Miscellaneous marks. Two examples (not illustrated). Two identical bowls of spurred type AO28 (*c* 1820–60). One complete and both with stems up to 100mm long. Both with a very small, moulded star or asterisk mark on either side of the heel. Otherwise plain.

Mouthpieces tipped with red paint or green glaze

Two damaged mouthpieces (one 18th-century, the other 19th-century) appear to have been tipped with red paint or sealing wax. A third damaged 19th-century mouthpiece was tipped with a light green glaze. The practice of mouthpiece tipping is thought to date from the later 18th century onwards as a precaution against burning the smoker's lips. Though fairly rare, they are known from several other Oxford sites.

Catalogue of illustrated pipes (Figs 3.38 and 3.39)

1 **Near-complete 17th-century bowl** with unusually long piece of stem still attached (220mm long, behind spur). Large chip/piece missing from left side of rim (50%) and bowl below. Spur bowl of Oxford Type B (*c* 1650–90) with conical spur with flat end/terminal. Milling around back third of surviving bowl. Bowl and stem with fair to good quality burnish. On the angle of the barrel-shaped or sub-biconical bowl is a faint seam or slight flaw, possibly a coil-mark from adding extra clay to the bowl during manufacture. Faint seam mark down the axis of the whole pipe including the bowl. Stem bore diameter 3mm. Stem thickness behind bowl 10mm; at slender end 8mm. Stem almost dead straight with only very slight curvature down its length. Off-white/ivory-coloured clay (at present). Fine sandy fabric, probably Shotover Hill clay, Oxford. Smoked. Two identical Type B bowls also from the same context. Bowls possibly within *c* 1660–80, as spurs in this group are fairly pronounced/conical. Ctx 6713, levelling layer, Building 12, Tenement A. Phase 8.

2 **Complete bowl of Type A** (*c* 1630–55) with impressed maker's mark 'MH' in relief on the underside of heel. By the Oxford pipemaker Miles Higges (active *c* 1630–43). Ctx 3002, made ground. Phase 9.

3 **Complete West Country-style bowl** (AO16, *c* 1660–80). Teardrop-shaped heel with incuse maker's mark 'WB'. A Winchester product, possibly by the maker William Bates (1658–67)



Fig. 3.39 Clay pipes, nos 7 and 8

or William Boys (1671–8). Ctx 3372, floor, Building 9, Tenement B. Phase 8.

4 **Small piece of burnished stem** bearing a complete square maker's mark 'BEN/ABB/OTT' for Benjamin Abbott of Ramsden in west Oxfordshire, *c* 1740–80. Ctx 8409, sample 5527, charcoal-rich layer in cellar of Building 11, Tenement B. Phase 9.

5 **Three joining stems** with a total length of 174mm. Well burnished. Square Broseley maker's mark in relief letters on the top of the stem: 'SAM/RO*/DEN'. Decorative barley-sugar twist 10mm from the top of the mark. Date *c* 1750–90. Ctx 3190, demolition layer, Building 9, Tenement B. Phase 9.

6 **Near-complete spur bowl** probably of London AO26 ('New type' *c* 1740–1800). Impressed maker's mark 'SAVELL' on back of the bowl with a scroll-like filler below it and traces of a milled circle to the left of the 'S'. Possibly by the London maker John Savell II, active *c* 1763–90. Ctx 3189, demolition layer. Phase 10.

7 **Complete bowl**. Hybrid of London bowl forms AO27/28. Moulded ribbed/fluted decoration. Relief 'C/P' maker's mark on heel. Maker unknown but mark/bowl datable *c* 1770–80. Small cross-shaped stamp on internal base of bowl (not shown). Unstratified.

8 **Near-complete bowl**. Plain. Hybrid of London bowl forms AO27/28. Relief 'C/P' maker's mark on heel. Maker unknown but mark/bowl datable *c* 1770–80. Unstratified.

WIG CURLERS *by Rebecca Allen, with analysis provided by Dana Goodburn-Brown*

Introduction

The assemblage comprises a total of 1719 complete and 1907 partial wig curlers, to the author's knowledge the largest assemblage of such objects ever found archaeologically. All the wig curlers were recovered by hand excavation from a single context (3190) dated to the late 18th century. This was a rubble backfill/demolition deposit over Building 9 in Tenement B. The deposit contained clay pipes and pottery dated 1780–1830 and wine bottles of mid- to late 18th-century date. The wig curlers are all in good condition, including the partial curlers, which have predominantly snapped through the thinner middle section.

Pipeclay wig curlers were used by wig makers between the late 17th and 18th centuries. They were employed in the production and refreshing of wigs to curl hair in sections before it was sewn into the complete wig. Paper was wrapped around the curlers and then individual sections of hair were wound around the curlers and secured in place with hair pins. The wigs, with curlers in place, were then boiled in water and removed whilst still wet, wrapped in paper, placed onto a baking tray and encased in a pastry layer to protect the contents from burning or overheating while they were heated in an oven to fix the curls. It is thought that wig makers would use local bakeries to bake the hair for their wigs. Once baked, the pastry and paper were removed and the curlers removed from the curled hair, which would then be sewn into the wig in sections to create coiffured wigs. The wigs would be set and scented with wig powder in the 'powder room', a small room where the wigs and powders were kept and where wearers could go to refresh and store their wigs. Ceramic wig curlers were replaced in the late 18th century by wooden curlers which did not heat to such high temperatures and were less damaging to the hair (Le Cheminant 1978, 189).

Methodology

The 1719 complete wig curlers have been fully recorded (Table 3.24). Also recorded fully were ten partial curlers which have newspaper print visible on their middle sections and three which have handwritten text on them.

The complete wig curlers were measured and categorised by form. They have also been separated by the makers' stamps or production marks visible on both ends of the curlers. The stamps in this assemblage are of four types representing at least two different makers. Two kinds of production marks have been distinguished on the curlers without stamps: dimples on the ends (hereafter dimple-ended curlers) and flat-ended curlers cut with a blade or wire leaving horizontal marks on the ends of the curlers. It is likely that the stamped curlers were also cut at the ends in a similar fashion but have then been finished and covered by the addition of the stamps.

The methodology and measurements recorded follow Le Cheminant (1978, 187–91). The length, inner and outer diameter, extent of burnishing, whether curlers have been turned or hand-finished, and the makers' marks have been recorded. Also recorded was evidence of any staining, burning or adhering residues on the curlers.

Forms

The vast majority of curlers (1708 complete examples) have the form of a waisted cylinder (Fig. 3.40, nos 1, 5 and 6). The overall range of lengths of the waisted curlers is 53–80mm, with the majority falling between 62mm and 70mm. Their diameter at their narrowest point ranges from 5–15mm. This gives some indication of the size of curls present in the wigs and suggests that the wigs are likely to have had a range of curls of different sizes. The variation in size related both to the length of the hair sections being curled and the tightness of the curl that was required (Galke 2018, 116). The curlers

could be used in the elaborate long wigs of the early type but could also be for the back of the later wigs like the chevalier wig style which had horizontal side curls with the rest of the hair drawn into a ponytail.

A smaller number of curlers (11 complete examples) are of subconical (tapering) form (Fig. 3.40, no. 2). These were used to create long tight, cylindrical curls that sat on the sides at the front of the wig. The examples in the assemblage are 88–90mm long, 12–18mm in diameter at their wide end and 9–14mm in diameter at their narrow end.

Manufacture

Many of the curlers in this assemblage show evidence of turning, probably on a lathe, as the indentations where the lathe punctured the ends of the curler to hold them in place are still evident on the dimple-ended curlers. The flat-ended and WB-stamped curlers show signs of having been cut, possibly with a knife or wire, and some of the broken curlers have a small hollow shaft running through them, so it is possible that they were threaded and shaped on a lathe in groups and then separated into shorter lengths, after which the hole was covered over and the stamp applied to finish them. There is one partial dimple-ended wig curler which, rather than the indented clamp marks likely made by being held at either end while being shaped on a lathe, has a concave end. A partially obscured number 518 was scratched or hand-cut onto this end (Fig. 3.40, no. 3) and could be a production number or possibly a size identifier.

The majority of the wig curlers appear to have been burnished; the surface has patches of high shine and in some cases horizontal lines can be seen on the surface, suggesting that they have been burnished with a lengthways action. The WB-stamped varieties tend to have an even finish, best evident on the concave central lengths of the curlers where the high shine is well preserved; the ends appear to have been worn and have lost the glossy shine in places. Some of the less well-finished curlers of the dimple- and flat-ended varieties are irregular in form and have an uneven surface, possibly evidence of being hand-finished and smoothed into shape. It has been argued that evidence of smoothing is due to an attempt to remove mould marks, but in this large collection there is very little evidence to suggest that moulds were used in the production of these curlers, and the smoothing is unlikely to be due to this.

Four different makers' marks are present on the waisted curlers, bearing the initials of two different makers (Fig. 3.40, no. 4; Table 3.24):

a) WB with a single dot below and coronet above
b) WB with a dot above and below
c) WB alone
d) AI

Types a and b are also present on subconical curlers (b only being observed on incomplete subconical curlers). The WB stamps are incuse and the AI stamps are in relief.

Single examples of curlers with one of the WB maker's marks have previously been found in Oxford at Longwall Street (Poole 2021) and in a late 18th-century context at Market Street (Cannon 2002). The mark has been recorded across Britain from mid- to late 18th-century deposits, but is particularly common in the London area, suggesting a London manufacturer (Le Cheminant 1978, 190). It has also been found in the eastern USA, including an assemblage from George Washington's childhood home in Virginia, showing that this unidentified manufacturer supplied not only multiple areas in England but also the colonies (Galke 2018, 116–18). The origin of the AI mark is not known.

It is thought that pipeclay curlers were often manufactured as a sideline by clay pipe makers (Le Cheminant 1978), but the makers' marks from this site cannot be linked to any documented producers. The WB marks found on the curlers have no connection to the WB mark seen on a clay pipe from this site, which is of much earlier date (mid- to late 17th century; see Cotter above).

Evidence of use and other materials found on the curlers

There are patches of grey, orange and brown discolouration on some of the curlers, providing evidence of burning. A small number of curlers are completely blackened, and these show evidence of where paper was wound around the curlers during the hair curling process, visible by square or rectangular marks of lighter colour which are less highly burnt. The relatively small number of burnt curlers shows that this was a fairly rare occurrence and that generally the curlers were not exposed to excessive heat.

A total of 41 complete waisted curlers have newsprint visible on their middle sections, left behind by the wet paper drying during the heating process and staining the surface of the curlers. Much of the print is unreadable, as it appears backwards and upside down and is very faint, but in a few instances there are identifiable letters or in a few cases words (Fig. 3.40, no. 1). The partial wig curlers which have newspaper print visible on them were also recorded and categorised by type as far as the incomplete measurements allowed.

There are also three waisted wig curlers which have words handwritten in ink across one end; these comprise two instances of 'Strong' and one of 'Flat' or 'Plat' (Fig. 3.40, no. 5).

Some of the curlers of both waisted and subconical form have adhering residue present on the surface, in the form of small metallic patches or a brown/orange granulated substance which has hardened. This substance has been recorded as paste and is likely to be wig powder which was

used to set and refresh wigs. This provides evidence that these wig curlers were not just used in the production of new wigs but also the refreshing of pre-set wigs, and that sections of hair from previously constructed wigs could be removed, reshaped and returned to the creation leaving behind the setting powder on the curlers. The metallic patches visible on the curlers appear to be the same powder heated to a greater extent.

Analysis of the residues adhering to the curlers was carried out by Dana Goodburn-Brown at the CSI: Sittingbourne laboratory using stereo microscopy, Fourier transform infrared microscopy (FTIR), scanning electron microscopy (SEM) and SEM with energy dispersive fluorescence (EDS XRF), together with X-radiography. The analysis detected metallic elements in the chemical makeup along with the presence of burnt animal bone, both of which point to the paste being remnants of wig powder. Hair powder recipes varied in their ingredients, but animal products were regularly added to make the powder last: 'manufacturers of hair powder routinely increased their profits by adulterating their product with inexpensive materials such as plaster of Paris, quick lime, powdered marble, powdered rice, burned bone, cuttlefish bone or chalk' (Galke 2018, 122). Similar analysis on wig curlers from George Washington's childhood home showed that plaster made from crushed oyster shell had been used to adulterate the hair powder recipe to make it go further (ibid., 120).

On 495 of the complete curlers – including both waisted and subconical examples – dark or light lines are present running parallel to the length of the curler. Analysis was carried out on two curlers which had dark lines on the surface (Fig. 3.40, no. 6). This proved to be a very fine metallic residue, probably from hair pins which were used to attach and secure the hair to the curler during the curling process. Identical results were also found on the curlers from George Washington's childhood home, suggesting the use of iron-alloy hair pins (Galke 2018, 121).

Discussion

Male wig fashions changed dramatically between the mid-17th and mid-18th centuries. The early wigs had large, elaborately curled styles inspired by Louis XIV of France, which would have needed large volumes of hair and multiple curlers to achieve, but over time wigs became shorter and more refined in style with fewer curls and less volume, which mimicked a natural head of hair and were cheaper and easier to maintain. By the end of the 17th century, wig wearing had become commonplace for everyday use, but the fashion started to die out in the late 18th century, hastened by William Pitt's 1795 tax on hair powder (Martin 2000). By the early 19th century, wig wearing was generally only seen in professional or ceremonial contexts, for example by judges, and wigs were rarely employed for daily use. Dr Martin Routh, who was President of Magdalen College from 1791 until his death in 1854, is said to have been the last man in England to wear an ordinary wig in private life.

From 1748 until 1775/6, the tenement between the stables and the Greyhound Inn (Tenement B) was leased by a John Broughton. *Jackson's Oxford Journal* for 4 February 1775 mentions the death of an elderly man named Broughton, an eminent barber and peruke (wig) maker. It is very likely that the large assemblage of wig curlers found in Tenement B provides direct evidence for Broughton's peruke business. It is possible that the curlers were dumped following Broughton's death, or as a result of declining business with the general shift away from wig wearing in the late 18th century, despite the presence of a potential customer nearby in the form of Dr Routh.

WORKED FLINT *by Mike Donnelly*

The excavations yielded a small assemblage of 25 struck flints and a moderate amount of burnt unworked flint, largely made up of small fragments

Table 3.24: Quantification of complete wig curlers

Form	*End treatment*	*No. of curlers*	*Burnished*	*Evidence of use*			
				Burnt	*Residue*	*Lines*	*Newsprint*
Waisted	Stamped: WB, coronet above, single dot below	873	805	21	78	251	19
	Stamped: WB, dot above and below	132	128	2	13	39	3
	Stamped: WB	4	4	0	0	2	0
	Stamped: AI	32	32	1	3	14	1
	Dimple end	187	169	17	12	46	2
	Flat end	480	350	52	52	140	16
Subconical	Stamped: WB, coronet above, single dot below	10	10	2	2	3	0
	Flat end	1	1	0	0	0	0
Total		1719	1499	95	160	495	41



Fig. 3.40 Wig curlers

(435 pieces, 1531g; Appendix 5). One gunflint of post-medieval date was recovered from a Phase 10 context. Otherwise, the flints were largely components of a blade industry with a date range spanning the late Upper Palaeolithic through to the earlier Neolithic, though the most likely date for the material is the Mesolithic period. One thumbnail scraper of probable early Bronze Age date was also recovered. The flints were recovered in features of far more recent date and are clearly residual. Overall, the assemblage was very sparse in its nature, and was largely early prehistoric in date, but very probably was made up of several phases of flint-knapping activity, most likely spanning several thousand years rather than being a single Mesolithic camp site.

Chapter 4

Environmental Evidence

MAMMAL AND BIRD BONE *by Ian Smith*

Introduction

An assemblage of 4676 identified fragments was recovered from the excavations. The bones were recovered by hand collection and from the residues of soil samples that were sieved to 0.5mm. Most of the counted bones (number of identified fragments per species (NISP) 3885; 83%) were recovered by hand collection on site (Tables 4.1 and 4.2) but a substantial group (NISP 791; 17%) came from sieved soil samples (Table 4.3). The largest groups by area are from Tenements A and B (Table 4.2). Each of the phase groups produced some recorded sieved bones and in Phase 6 nearly a quarter of the assemblage is from sieving (Table 4.1). The sieved fraction is vital as a check on the biases inherent in hand collection (Payne 1972).

A full record of the assemblage, together with all the methodologies employed, metrical analyses, full details of butchery, fragmentation and pathologies can be found in the digital archive and, with associated metadata, in Appendix 6.

Table 4.1: Summary of proportions of counted bones and teeth from hand collection and sieving

Phase	*Hand-collected*	*Sieved*	*Percentage sieved*	*Total*
1	105	19	15.3	124
2	326	63	16.2	389
3	594	118	16.6	712
4	682	130	16.0	812
5	765	90	10.5	855
6	1009	331	24.7	1340
7	319	22	6.4	341
8	61	16	21.9	77
9	24	2	7.7	26
Total	3885	791		4676

Taphonomy: bone surface texture and condition

The surface texture of 83% of the assemblage has been classed as good, 17% as moderate and only 1% as poor (Table 4.4). Carnivore gnawing affects relatively high proportions of bones throughout the assemblage.

Butchery

Many of the cattle, sheep and pig bones exhibit evidence of dismemberment (secondary butchery), jointing (or tertiary butchery evidence *sensu* Rixson 1988), food preparation or serving. Some of the chicken, goose, and rabbit bones were also butchered (Table 4.5). In most of the phases the proportion of cattle bones bearing chop marks is higher than in the sheep and pigs. Fine cut marks are more common on the caprine and pig bones than on the cattle bones in most phases and this, as well as the high frequency of chop marks on the cattle bones, is quite widely recognised and has also been seen, for instance, at Trinity College (Powell 2023). Sawing marks are present on a cattle horn core and pelvis, a sheep/goat metatarsal and a sheep horn core from Phase 3, on a cattle horn core from Phase 8 and a fragment of sawn antler was recorded in Phase 5. No butchery was recorded on any of the dog or horse bones.

Phase 1: 10th to mid-11th century

Sheep and sheep/goat bones dominate this fairly small assemblage, followed by those of cattle and pigs. Butchery, in the form of chop marks, was recorded on five cattle bones including a pelvis which had been chopped through across the 'neck' of the ilium from medial and with adjacent and associated fine cut marks consistent with joint preparation. The sheep bones include one mandible from an animal of about 6–12 months, one of 1–2 years, two of 3–4 years and two (including one identified only as sheep/goat) of 4–6 years old at death following the occlusal wear stages of Payne (1973). A single pig mandible was from an animal of over 24 months old (Stage D: Halstead 1992).

Dog bones, from a minimum of three animals, were recovered from five contexts but the lack of associated bones may suggest redeposition or the inadvertent burial of bones scattered across the surface.

A horse metacarpal came from an animal with a withers height of 1.281m following May (1985), which equates to 12.5 hands.

A few domestic fowl or Galliforme (cf *Gallus gallus*) bones include an immature coracoid.

Table 4.2: Hand-collected taxa by phase and tenement or other area

	Taxa	*Tenement A*	*Tenement B*	*Tenement C*	*Other areas*	*Total*
Phase 1					**105**	**105**
Mammals						
Cattle	*Bos taurus*				32	32
Sheep	*Ovis aries*				19	19
Sheep/goat	*Ovis/Capra* sp.				30	30
Pig	*Sus scrofa domesticus*				15	15
Horse	*Equus* sp.				3	3
Dog	*Canis familiaris*				4	4
Medium mammal	Mammalia				2	2
Phase 2		**102**	**170**	**35**	**19**	**326**
Mammals						
Cattle	*Bos taurus*	27	56	10	3	96
Sheep	*Ovis aries*	10	28	4	2	44
Sheep/goat	*Ovis/Capra* sp.	33	52	11	4	100
Pig	*Sus scrofa domesticus*	9	12	5	1	27
Horse	*Equus* sp.	11	2		7	20
Dog	*Canis familiaris*		1			1
Cat	*Felis catus*		1		1	2
Roe deer	*Capreolus capreolus*			1		1
Deer	*Dama/Cervus* sp.		1			1
Medium mammal	Mammalia		2		1	3
Birds						
Chicken	*Gallus gallus*	4	6	1		11
Fowl	*Gallus gallus* size	3	1			4
Duck	*Anas* cf *platyrhynchos*		1			1
Goose	*Anser* sp.	2	4	1		7
Lapwing	*Vanellus vanellus*	1				1
Bird	*Gallus/Anas* size		3	1		4
Bird	Aves			1		1
Amphibians						
Frog	*Rana temporaria*	2				2
Phase 3		**338**	**180**	**23**	**53**	**594**
Mammals						
Cattle	*Bos taurus*	102	71	5	22	200
Sheep	*Ovis aries*	66	21	2	8	97
Sheep/goat	*Ovis/Capra* sp.	118	34	11	19	182
Pig	*Sus scrofa domesticus*	26	15	2	3	46
Horse	*Equus* sp.	8	8	1	1	18
Dog	*Canis familiaris*	1	1			2
Cat	*Felis catus*		1			1
Red deer	*Cervus elaphus*	2				2
Hare	*Lepus* sp.		1			1
Rabbit	*Oryctolagus cuniculus*		1			1
Medium mammal	Mammalia			1		1
Birds						
Chicken	*Gallus gallus*	5	2	1		8
Fowl	Galliforme *Gallus gallus* size	5				5
Goose	*Anser* sp.	4	1			5
Duck	*Anas* cf *platyrhynchos*		1			1
Crow	*Corvus corone/frugilegus*		21			21
Bird	*Gallus/Anas* size	1	2			3

Table 4.2 continued

Taxa		Tenement A	Tenement B	Tenement C	Other areas	Total
Phase 4		**400**	**215**	**41**	**26**	**682**
Mammals						
Cattle	*Bos taurus*	138	74	13	4	229
Sheep	*Ovis aries*	61	24	7	1	93
Sheep/goat	*Ovis/Capra* sp.	83	51	9	9	152
Goat	*Capra hircus*		1			1
Pig	*Sus scrofa domesticus*	59	37	6	6	108
Horse	*Equus* sp.	10	1		1	12
Dog	*Canis familiaris*	2	1			3
Cat	*Felis catus*	1	2			3
Fallow deer	*Dama dama*	1				1
Large mammal	Mammalia	1				1
Medium mammal	Mammalia		3			3
Birds						
Chicken	*Gallus gallus*	14	11	1	2	28
Fowl	Galliforme *Gallus gallus* size	3	2	1		6
Fowl	*Gallus/Phasianus* sp.		1			1
Goose	*Anser* sp.	8	5	3	2	18
Goose	*Anser/Branta* sp.	1	1	1		3
Duck	*Anas* cf *platyrhynchos*	14				14
Crow family	*Garrulus/Pica/Corvus monedula*	1				1
Crow family	Corvidae	1				1
Bird	*Gallus/Anas* size	2	1		1	4
Phase 5		**252**	**301**	**26**	**186**	**765**
Mammals						
Cattle	*Bos taurus*	99	113	12	58	282
Sheep	*Ovis aries*	31	32	5	27	95
Sheep/goat	*Ovis/Capra* sp.	33	56	6	40	135
Pig	*Sus scrofa domesticus*	36	40		34	110
Horse	*Equus* sp.	10	14		2	26
Dog	*Canis familiaris*		1			1
Cat	*Felis catus*				1	1
Fallow deer	*Dama dama*	3	1		1	5
Deer	*Dama/Cervus* sp.				1	1
Hare	*Lepus* sp.	1	1			2
Rabbit	*Oryctolagus cuniculus*	2	1			3
Large mammal	Mammalia		1			1
Medium mammal	Mammalia	2	4			6
Birds						
Chicken	*Gallus gallus*	19	12		4	35
Fowl	*Gallus/Phasianus* sp.		1			1
Fowl	Galliforme sp. *Gallus gallus* size	6	7	1	2	16
Goose	*Anser/Branta* sp.		2		1	3
Goose	*Anser* sp.	9	10		11	30
Swan	*Cygnus* sp.		1			1
Duck	*Anas* cf *platyrhynchos*		2	1	1	4
Bird	*Anser/Branta* size				2	2
Bird	*Gallus/Anas* size		2	1	1	4
Bird	Aves	1				1

Table 4.2 continued

Taxa		Tenement A	Tenement B	Tenement C	Other areas	Total
Phase 6		**188**	**613**	**61**	**147**	**1009**
Mammals						
Cattle	*Bos taurus*	64	137	14	44	259
Sheep	*Ovis aries*	23	114	10	32	179
Sheep/goat	*Ovis/Capra* sp.	32	142	21	43	238
Pig	*Sus scrofa domesticus*	31	47	9	12	99
Horse	*Equus* sp.	1	1		4	6
Fallow deer	*Dama dama*	2				2
Deer	*Dama/Cervus* sp.		1			1
Hare	*Lepus* sp.		3			3
Rabbit	*Oryctolagus cuniculus*	3	28	1		32
Dog/cat	*Canis/Felis* sp.		1			1
Cat	*Felis catus*		6			6
Rat	*Rattus* sp.		1			1
Large mammal	Mammalia	2			1	3
Medium mammal	Mammalia				1	1
Birds						
Chicken	*Gallus gallus*	7	51	1	2	61
Fowl	*Gallus/Phasianus* sp.		1			1
Fowl	Galliforme *Gallus gallus* size	13	30	2	1	46
Goose	*Anser* sp.	3	21	2	2	28
Goose	*Anser/Branta* sp.	1	2	1	2	6
Teal	*Anas crecca*		2			2
Duck	*Anas* cf *platyrhynchos*	2	10		1	13
Duck	Anatidae cf *Aythya/Bucephala/Clangula*		1			1
Snipe	*Gallinago gallinago*		1			1
cf wader	cf Scolopacidae		2			2
cf plover	cf Charadriidae		1			1
cf lark	cf Alaudidae	1	2			3
cf thrush	cf *Turdus* sp.		2			2
Bird	*Anser/Branta* size	2			1	3
Bird	*Gallus/Anas* size	1	4		1	6
Bird	cf small Passerine		1			1
Bird	small non-Passerine		1			1
Phase 7		**1**	**260**	**31**	**27**	**319**
Mammals						
Cattle	*Bos taurus*	1	105	7	12	125
Sheep	*Ovis aries*		52	10	7	69
Sheep/goat	*Ovis/Capra* sp.		41	9	1	51
Fallow deer	*Dama dama*		2		1	3
Pig	*Sus scrofa domesticus*		33	2	2	37
Rabbit	*Oryctolagus cuniculus*		5		2	7
Hare	*Lepus* sp.		6			6
Birds						
Chicken	*Gallus gallus*		10	3		13
Fowl	Galliforme *Gallus gallus* size		1		1	2
Goose	*Anser* sp.		1		1	2
Duck	*Anas* cf *platyrhynchos*		2			2
Bird	*Gallus/Anas* size		2			2

Table 4.2 continued

Taxa		Tenement A	Tenement B	Tenement C	Other areas	Total
Phase 8			**40**	**10**	**11**	**61**
Mammals						
Cattle	*Bos taurus*		5	1	2	8
Sheep	*Ovis aries*		7	2	1	10
Sheep/goat	*Ovis/Capra* sp.		7	3	2	12
Pig	*Sus scrofa domesticus*		2		1	3
Horse	*Equus* sp.				1	1
Deer	*Dama/Cervus* sp.		1			1
Rabbit	*Oryctolagus cuniculus*		8	1	2	11
Birds						
Chicken	*Gallus gallus*		5	1	2	8
Fowl	Galliforme sp. *Gallus gallus* size		1	1		2
Turkey	*Meleagris gallopavo* f. *domestica*		1			1
Goose	*Anser* sp.		1			1
Duck	*Anas* cf *platyrhynchos*		1			1
Bird	*Gallus/Anas* size		1	1		2
Phase 9		**3**	**18**	**3**		**24**
Mammals						
Cattle	*Bos taurus*		5	3		8
Sheep	*Ovis aries*		5			5
Sheep/goat	Ovis/Capra	1	3			4
Pig	*Sus scrofa domesticus*		3			3
Birds						
Chicken	*Gallus gallus*	2	1			3
Goose	*Anser/Branta* sp.		1			1
Total		1284	1797	230	574	3885

Table 4.3: Taxa from the sieved soil samples by phase and tenement or other area

Taxa		Tenement A	Tenement B	Tenement C	Other areas	Total
Phase 1					**19**	**19**
Mammals						
Cattle	*Bos taurus*				5	5
Sheep	*Ovis aries*				3	3
Sheep/goat	*Ovis/Capra* sp.				4	4
Dog	*Canis familiaris*				1	1
Birds						
Fowl	Galliforme *Gallus gallus* size				5	5
Amphibians						
Frog	*Rana* sp.				1	1
Phase 2		**24**	**8**	**26**	**5**	**63**
Mammals						
Cattle	*Bos taurus*		1	5		6
Sheep	*Ovis aries*	6	2	2		10
Sheep/goat	*Ovis/Capra* sp.	7		8	3	18
Pig	*Sus scrofa domesticus*	1		3	1	5
Dog	*Canis familiaris*	2		1		3
Roe deer	*Capreolus capreolus*			1		1
House mouse	*Mus musculus domesticus*	2				2
Vole	*Microtus agrestis*			1		1

Table 4.3 continued

	Taxa	Tenement A	Tenement B	Tenement C	Other areas	Total
Birds						
Chicken	*Gallus gallus*		2			2
Fowl	*Gallus gallus* size	3			1	4
Woodcock	*Scolopax rusticola*			1		1
Bird	*Gallus/Anas* size			1		1
Small passerine	Passeriformes	2		1		3
Amphibians						
Frog	*Rana* sp.	1	3	2		6
Phase 3		**33**	**64**	**19**	**2**	**118**
Mammals						
Cattle	*Bos taurus*	5	13	3		21
Sheep	*Ovis aries*	7	5	4		16
Sheep/goat	*Ovis/Capra* sp.	10	13	5		28
Pig	*Sus scrofa domesticus*	2	5	2		9
Rabbit	*Oryctolagus cuniculus*		1			1
Mole	*Talpa europaea*			1		1
Shrew	*Sorex* cf *araneus*		1			1
House mouse	*Mus musculus domesticus*		2			2
Birds						
Chicken	*Gallus gallus*	1	6	1		8
Fowl	Galliforme *Gallus gallus* size	1	10	1		12
Goose	*Anser* sp.		2			2
cf lark	cf Alaudidae		1		1	2
Bird	*Gallus/Anas* size		1			1
Small passerine	Passeriformes		1			1
Amphibians						
Frog	*Rana* sp.	4	2	2	1	9
Toad	*Bufo* sp.	3	1			4
Phase 4		**38**	**73**	**19**		**130**
Mammals						
Cattle	*Bos taurus*	5	10			15
Sheep	*Ovis aries*	4	6	4		14
Sheep/goat	*Ovis/Capra* sp.	3	11	3		17
Pig	*Sus scrofa domesticus*	5	11	1		17
Cat	*Felis catus*			1		1
Rabbit	*Oryctolagus cuniculus*		1			1
House mouse	*Mus musculus domesticus*		1			1
Mouse	*Mus/Apodemus* sp.		1			1
Birds						
Chicken	*Gallus gallus*	1	4	4		9
Fowl	Galliforme *Gallus gallus* size	6	6	2		14
Goose	*Anser* sp.	3	5			8
cf duck	Anatidae cf *Anas* sp.	1	1			2
Snipe	*Gallinago gallinago*	1	1			2
Pigeon	*Columba* sp.			1		1
Pigeon family	Columbidae		1			1
cf wader	cf *Scolopacidae* sp.			1		1
cf thrush	cf *Turdus* sp.	1	1			2
cf lark	cf Alaudidae	4				4
Bird	*Gallus/Anas* size		2			2
Bird (small non-passerine)	Aves	1	2			3
Small passerine	Passeriformes	1	4			5
Bird	Aves	2		1		3
Reptiles						
Grass snake	*Natrix natrix*		1			1

Table 4.3 continued

	Taxa	Tenement A	Tenement B	Tenement C	Other areas	Total
Amphibians						
Frog	*Rana temporaria*			1		1
Frog	*Rana* sp.		1			1
Toad	*Bufo* sp.		2			2
Toad/frog	*Bufo/Rana* sp.		1			1
Phase 5		**25**	**54**	**10**	**1**	**90**
Mammals						
Cattle	*Bos taurus*	4	7			11
Sheep	*Ovis aries*	1	4			5
Sheep/goat	*Ovis/Capra* sp.	5	7	2		14
Pig	*Sus scrofa domesticus*	2	4	1		7
Rabbit	*Oryctolagus cuniculus*		2			2
Rodent	Rodentia	1				1
House mouse	*Mus musculus domesticus*	1				1
Birds						
Chicken	*Gallus gallus*	1	8	1	1	11
Fowl	Galliforme *Gallus gallus* size	6	3	1		10
Goose	*Anser* sp.		3			3
cf goose	cf *Anser* sp.		1			1
Duck	Anatidae cf *Aythya/Bucephala/Clangula* sp.	1				1
Woodcock	*Scolopax rusticola*			3		3
Pigeon	Columbidae sp.		1			1
cf pigeon	cf Columbidae		1			1
Crow family	Corvidae		2			2
Crow/rook	*Corvus corone/frugilegus*			1		1
cf magpie	Corvidae cf *Pica pica*	1				1
cf thrush	cf *Turdus* sp.		1			1
cf lark	cf Alaudidae		1			1
cf small passerine	cf Passeriformes			1		1
Bird	*Gallus/Anas* size	1	5			6
Bird	Aves		4			4
Reptiles						
Snake	Ophidae	1				1
Phase 6		**53**	**249**	**24**	**5**	**331**
Mammals						
Cattle	*Bos taurus*	2	10	1	2	15
Sheep	*Ovis aries*	5	23	3	1	32
Sheep/goat	*Ovis/Capra*	9	34	7	1	51
Pig	*Sus scrofa domesticus*		17	2		19
Dog	*Canis familiaris*		1			1
Fallow deer	*Dama dama*		2			2
Cat	*Felis catus*	9	4			13
Rabbit	*Oryctolagus cuniculus*	1	28			29
cf black rat	*Rattus* cf *rattus*	1				1
Rat	*Rattus* sp.		1			1
Black rat	*Rattus rattus*		2			2
Rodent	Rodentia		1			1
House mouse	*Mus musculus domesticus*	1				1
Field vole	*Microtus agrestis*		1			1
Medium mammal	Mammalia		1			1
Common shrew	*Sorex araneus*	1	1			2
Shrew	*Sorex* sp.		1			1
Birds						
Chicken	*Gallus gallus*	5	25	2		32
Fowl	Galliforme *Gallus gallus* size	9	43	4		56

Table 4.3 continued

	Taxa	*Tenement A*	*Tenement B*	*Tenement C*	*Other areas*	*Total*
Goose	*Anser* sp.		10		1	11
Duck	*Anas* cf *platyrhynchos*		8			8
cf teal	*Anas* cf *crecca*			1		1
Duck	Anatidae cf *Aythya/Bucephala/Clangula* sp.		5			5
Woodcock	*Scolopax rusticola*		1			1
Snipe	*Gallinago gallinago*	2	1			3
cf wader	cf Scolopacidae		1			1
Pigeon	Columbidae			1		1
cf magpie	Corvidae cf *Pica pica*	1				1
Crow family	Corvidae		2			2
cf thrush	cf *Turdus* sp.		1	2		3
cf lark	cf Alaudidae	1	2			3
Bird	*Anser/Branta* size		1			1
Bird	*Gallus/Anas* size	3	7	1		11
Small passerine	Passeriformes		4			4
Small passerine	cf *Passer domesticus*		1			1
Bird	Aves	1	6			7
Amphibians						
Frog	*Rana temporaria*		2			2
Frog	*Rana* sp.	2	1			3
Toad	*Bufo* sp.		1			1
Phase 7			**22**			**22**
Mammals						
Cattle	*Bos taurus*		3			3
Sheep/goat	*Ovis/Capra* sp.		1			1
Pig	*Sus scrofa domesticus*		1			1
Rabbit	*Oryctolagus cuniculus*		3			3
Birds						
Duck	*Anas* cf *platyrhynchos*		2			2
cf lark	cf Alaudidae		2			2
Bird	*Gallus/Anas* size		8			8
Small passerine	Passeriformes		1			1
Bird	Aves		1			1
Phase 8			**11**	**5**		**16**
Mammals						
Cattle	*Bos taurus*		1			1
Sheep	*Ovis aries*		2	1		3
Sheep/goat	*Ovis/Capra* sp.		1	1		2
Dog	*Canis familiaris*		1			1
Rabbit	*Oryctolagus cuniculus*			1		1
House mouse	*Mus musculus domesticus*		1			1
Birds						
Chicken	*Gallus gallus*		1			1
Fowl	Galliforme *Gallus gallus* size		3	1		4
cf pigeon	cf Columbidae			1		1
Small passerine	Passeriformes		1			1
Phase 9		**2**				**2**
Birds						
Chicken	*Gallus gallus*	2				2
Total		175	481	103	32	791

Table 4.4: Surface texture of the bone by phase

Phase	Condition Good	Moderate	Poor	% good	Total
1	88	34	1	72	123
2	302	70	7	80	379
3	554	117	6	82	677
4	631	149	4	80	784
5	703	122	2	85	827
6	1070	226	3	82	1299
7	302	38		89	340
8	64	8		89	72
9	23	3		88	26
Total	3737	767	23		4527

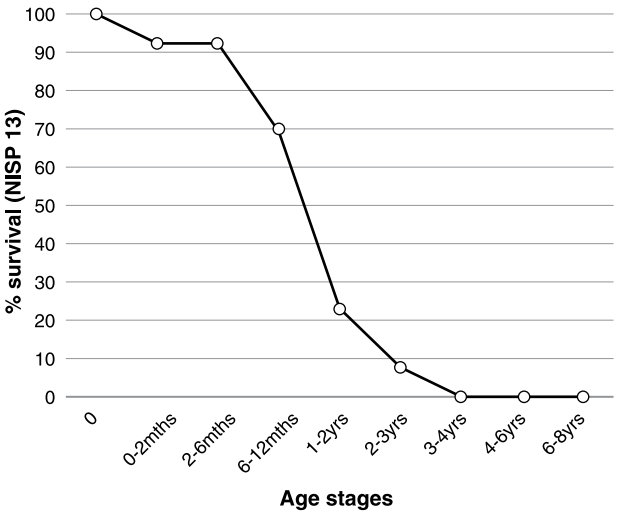


Fig. 4.1 Sheep age at death in Phase 2 based on mandibular data

Phase 2: late 11th to mid-12th century

Main domesticates

Most of the bones came from pits, with small numbers from ditch fills and occupation layers. Sheep and sheep/goat are the most frequent of the domesticates by NISP, and this is especially evident in the sieved material. Most of the sheep and sheep/goat were killed by 2–3 years of age (Fig. 4.1) which is suggestive of the meat production model of Payne (1973, 282). It is probable that this profile does not accurately reflect the overall management of sheep in the region, however, since a high level of infant mortality is expected, regardless of the economic model (Payne 1973), and is not seen here. Such infant mortalities are doubtless reflected wherever the ewes gave birth, although taphonomic factors also discriminate against the survival of younger sheep (Munson and Garniewicz 2003) and so they may be absent or poorly represented in the archaeological record. In addition, issues of price, status, and dietary preference may have affected the profile through the uneven distribution of lamb and mutton joints or carcasses by age and body part.

Table 4.5: Pre-depositional taphonomic evidence by phase

Taphonomy	Chopped (%)	Fine cut mark (%)	Sawn (%)	Burnt (%)	Carnivore gnawed (%)	Part digested (%)	Rodent gnawed (%)	NISP
Phase 1	**7.8**	**0.9**	**0**	**1.7**	**15.7**	**0.9**	**0**	**115**
Cattle	13.5	2.7	0	5.4	10.8	0	0	37
Sheep	5.5	0	0	0	16.4	1.8	0	55
Horse	0	0	0	0	0	0	0	3
Pig	6.7	0	0	0	33.3	0	0	15
Bird	0	0	0	0	0	0	0	5
Phase 2	**9.2**	**2.2**	**0.3**	**2.0**	**14.5**	**0.8**	**0**	**358**
Cattle	15.3	2	0	2	16.3	0	0	98
Sheep	6.6	0.6	0	2.4	18.6	1.2	0	167
Pig	20	0	0	0	13.3	3.3	0	30
Horse	0	0	0	0	5.0	0	0	20
Deer	33.3	33.3	33.3	0	0	0	0	3
Bird	0	10	0	2.5	0	0	0	40
Phase 3	**9.8**	**2.4**	**0.6**	**0.9**	**15.6**	**0.3**	**0.2**	**654**
Cattle	15.1	0.9	0.9	0.9	13.3	0	0	218
Sheep	8.1	4	0.7	1	21.5	0.7	0	297
Pig	11.5	3.8	0	1.9	11.5	0	0	52
Horse	0	0	0	0	7.1	0	0	14
Red deer	50	0	0	0	0	0	0	2
Rabbit	0	0	0	0	0	0	0	2
Bird	0	0	0	0	2.9	0	1.4	69

Table 4.5 continued

Taphonomy	*Chopped (%)*	*Fine cut mark (%)*	*Sawn (%)*	*Burnt (%)*	*Carnivore gnawed (%)*	*Part digested (%)*	*Rodent gnawed (%)*	*NISP*
Phase 4	**10.3**	**2.5**	**0.0**	**0.8**	**11.3**	**0**	**0.3**	**760**
Cattle	19.6	2.6	0	0.9	11.7	0	0	230
Sheep	9.5	2.3	0	1.5	16	0	0.4	263
Goat	0	0	0	0	0	0	0	1
Pig	6.7	5	0	0	12.6	0	0	119
Horse	0	0	0	0	8.3	0	0	12
Fallow deer	0	0	0	0	0	0	0	1
Rabbit	0	0	0	0	0	0	0	1
Bird	0	0.8	0	0	0.8	0	0.8	133
Phase 5	**13.2**	**4.2**	**0.1**	**0.4**	**6.4**	**0.1**	**0.2**	**811**
Cattle	21.1	2.1	0	0	8.8	0	0	284
Sheep	10.7	4.9	0	0.4	7.8	0.4	0.4	243
Pig	18	7.2	0	0	6.3	0	0	111
Fallow deer	0	40	0	0	0	0	0	5
Horse	0	0	0	0	0	0	0	17
Deer	0	0	100	0	0	0	0	1
Rabbit	0	0	0	0	0	0	0	5
Bird	0.7	4.1	0	1.4	0.7	0	0.7	145
Phase 6	**11.4**	**3.3**	**0**	**1.4**	**7.9**	**0.1**	**0.7**	**1255**
Cattle	25.8	1.5	0	0	9.5	0	0.4	264
Sheep	11.5	5.0	0	1.7	9.6	0	0.4	479
Pig	13	3.5	0	0.9	18.3	0.9	0.9	115
Horse	0	0	0	0	0	0	0	6
Fallow deer	25	0	0	0	0	0	0	4
Deer	0	0	0	0	100	0	0	1
Rabbit	0	1.8	0	7.1	1.8	0	1.8	56
Bird	1.2	2.7	0	1.5	1.5	0	1.2	330
Phase 7	**11.3**	**4**	**0**	**1.6**	**9.7**	**0**	**0.8**	**124**
Cattle	17.9	2.6	0	5.1	2.6	0	0	39
Sheep	15.6	6.7	0	0.0	13.3	0	0	45
Pig	0	12.5	0	0	37.5	0	0	8
Fallow deer	0	0	0	0	0	0	0	2
Rabbit	0	0	0	0	0	0	0	5
Bird	0	0	0	0	8	0	4	25
Phase 8	**16.1**	**5.7**	**1.1**	**0**	**10**	**0**	**0.4**	**280**
Cattle	28.9	3.1	3.1	0	8.2	0	0	97
Sheep	15.8	11.9	0	0	14.9	0	0	101
Pig	0	0	0	0	10.3	0	0	29
Horse	0	0	0	0	0	0	0	1
Fallow deer	0	0	0	0	0	0	0	1
Deer	0	0	0	0	0	0	0	1
Rabbit	0	0	0	0	0	0	0	12
Bird	2.6	2.6	0	0	5.3	0	2.6	38
Phase 9	**19.2**	**15.4**	**0**	**0**	**3.8**	**0**	**0**	**26**
Cattle	50.0	12.5	0	0	12.5	0	0	8
Sheep	11.1	0	0	0	0	0	0	9
Pig	0	33.3	0	0	0	0	0	3
Bird	0	33.3	0	0	0	0	0	6
Total	498	145	9	44	450	8	16	4383

Cattle bones were underrepresented in the occupation layers when compared to the pits, so while some debris was allowed to accumulate in the domestic areas, larger bones were presumably moved away from areas of occupation. From the cattle mandible tooth wear evidence it appears that one animal was 8–18 months old, one was a young adult, two were adults and three were senile (stage I of Halstead 1985).

At least twelve cattle bones from Tenement B bear evidence for butchery in the form of chop marks, including a femur from Pit Group 7 which had been chopped through at the level of the trochanter minor and across its mid-shaft (Lauwerier 1988, L21; table 9, L39). This probably represents reduction to a pot-sized or household joint. The butchered bones from Tenement C include a cattle ulna from pit 6375 which had been chopped from the lateral side impacting the articulation (ibid., L4) and from pit 6920 a pelvis that had been chopped at an oblique angle across the ilial 'neck' from the medial aspect. Dismemberment (by chopping through articulations) and jointing therefore appear to be represented.

One pig mandible has an unworn second molar, with the third molar visible in the crypt and is judged tentatively to have been at 6–12 months at death, when the animal would have reached an optimum size in terms of meat.

Other fauna

Small numbers of horse, cat, chicken, goose, duck, field vole (*Microtus agrestis*) and frog bones were recovered from the fills of pits and from boundary ditches. Some consumption of wild birds including lapwing (*Vanellus vanellus*), woodcock (*Scolopax rusticola*) and small passerine is suggested from this period. A roe deer mandible was recovered by sieving from pit 6860, Pit Group 8, suggesting some venison consumption. A worked, wedge-shaped fragment of red or fallow deer antler, 51.8mm long and 22.99mm in diameter, came from Pit Group 4 (pit 9827, fill 9822).

Phase 3: late 12th to early 13th century

A total of 712 fragments (NISP) were recovered from Phase 3, 118 of which came from sieved samples. The greatest quantity came from features and deposits within Tenement A (NISP 338 hand-collected and NISP 33 from sieving).

Main domesticates

Sheep and sheep/goat account for 53% of the hand-collected and 59% of the sieved assemblage, while cattle account for 38% of the hand-collected and 28% of the sieved and pig only 9% of the hand-collected and 12% of the sieved assemblage overall.

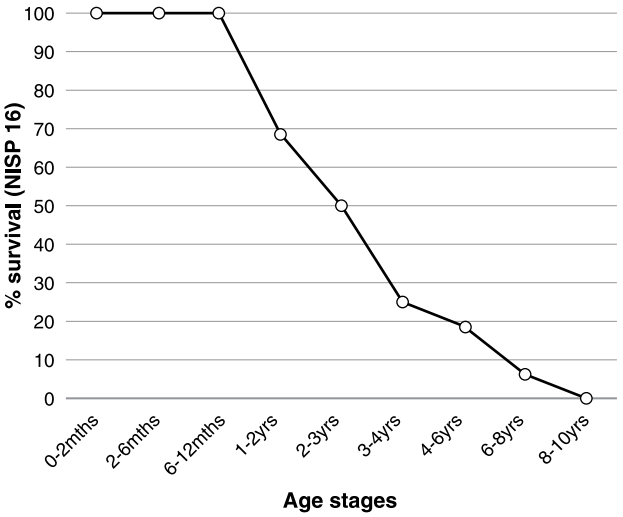


Fig. 4.2 Sheep age at death in Phase 3 based on mandibular data

Most of the cattle mandibles come from subadults of 30–36 months old and adult animals (age classes E and G of Halstead 1985). Single mandibles are from younger animals of 2–16 months and 18–30 months, old adults and senile animals (Halstead's stages B, D, H, and I) and two are young cattle of 8–18 months old and young adults (Halstead's stages C and F respectively). From a sample of 14 cattle mandibular third molars, one had a hypoconulid that is considered abnormal in that it is essentially missing (and at most comprised a thin enamel ridge).

Very few cattle bones could be sexed although one pelvis is recorded as a 'probable female' and another bears a pronounced ilio-pubic ridge and is considered to be from a female (Grigson 1982, 8). Measurements on two cattle metacarpals and two metatarsals suggest an average withers height of 1.11m based on the conversion factors of Foch (1966).

The sheep were largely killed by 4–6 years of age and, in one case, between 4 and 8 years. It appears that sheep were reaching a more advanced age than in the previous phase (Fig. 4.2). Following the suggested age stages of Jones (2006, 177) sheep were killed at ages spanning 10–24 months to 7 years plus. As in Phase 2, taphonomic and cultural factors have probably biased the profile.

Other fauna

Smaller numbers of equid (probably horse), red deer, dog, cat, hare and rabbit bones were also recovered and the few bird bones include chicken, goose and crow (*Corvus corone/frugilegus*) as well as probable lark (cf Alaudidae) and a small passerine. Mole, shrew, house mouse, frog and toad bones were also identified and reflect the fauna living alongside the human occupants, although as a burrowing animal the mole may be intrusive.

Tenement A

Sheep and sheep/goat account for the majority (60%) of the bones from the main common domesticates. Most of the recorded cattle bones derive from a series of pit fills, especially from Pit Group 3, and all parts of the skeleton are represented including horn cores, mandibles, forelimbs, hindlimbs and feet. The cattle bones include a scapula in which the glenoid has been divided approximately between its cranial and caudal halves and a femur which is divided at mid-shaft probably for the preparation of joints.

Equid bones (*Equus* sp.), probably horse, were recovered from seven pit fills but were mostly fragmented and isolated. Head, forelimb, hindlimb and foot parts are present and there appears to be no pattern of selection or evidence of bone working.

A red deer pelvis bears butchery marks that divided the pubis and a red deer radius from pit appears to have been divided at mid-shaft. Both probably attest to the consumption of venison.

Tenement B

In contrast to Tenement A, cattle bones are more frequent than those of caprines. Most bones from both tenements are from pit fills, and so at first sight this disparity does not appear to relate to context type.

A small number of equid bones came from Pit Group 6, including associated mandibular parts, a distal tibia and a complete radius. Although fragmentary, a minimum of two equids are represented in pit 6303 and they include associated left and right mandibular parts from a male of advanced age. Tooth wear, including advanced bevelling in the second premolars of this individual, is described in the digital archive and seems likely to relate to bit-wear damage as described by Brown and Anthony (1998). Based on this evidence, one of these equids may have been a mount, possibly stabled here, the remains of which were eventually disposed of at the tenement. The extreme tooth wear apparent on the right mandible makes assessment of any occlusal features that might differentiate between equid species impossible, and the measurement of several teeth is similarly problematic. The approximate occlusal lengths of this specimen are small even when compared to those of a donkey, although a small Welsh mountain pony specimen in the author's reference collection does have similar diminutive dimensions, so whether this was a male horse or donkey is unresolved.

An associated group of crow or rook (*Corvus corone/frugilegus*) remains including paired coracoids, scapulae, humeri, radii and ulnae, with the furcula, a femur and carpometacarpus also present came from Pit Group 6. In addition to their association, most of the parts are complete and all are in good condition with no signs of butchery. The presence of these bird remains could arguably relate to the recovery of fat but they could alternatively signal the death or disposal of a scavenging crow.

Tenement C

Only 42 identified fragments were recovered, 19 of them by sieving. Mandibular, forelimb, hindlimb and foot bones of cattle, sheep/goat and pig are represented, although the totals for individual anatomical parts and zones are small throughout. A sheep/goat femur from pit 7187 is chopped through at its proximal end at the level of the trochanter minor.

Phase 4: 13th century

Main domesticates

Sheep and sheep/goat comprise the largest group of bones (NISP 276), followed by those of cattle (NISP 244) and then pig (NISP 125).

The cattle mandibular remains are sparse and fragmentary but include a single specimen from a 1–8 month old calf (stage B), another specimen from an animal of 18–30 months (stage D), one subadult of 30–36 months old (stage E) and one adult (stage G) following Halstead (1985). The cattle teeth include five mandibular third molars of which one had a hypoconulid comprising only a thin ridge at the root and which continued part way to the crown (to level with the occlusal end of the bovine pillar which sits between the hypocone and protocone) (Hillson 2005, 16).

The cattle major limb bones are well represented, and the radius, scapula, metacarpal, tibia, femur, humerus, and ulna are common. In the scapula, the glenoid is the most common part, for the radius it is

Table 4.6: Phase 4 cattle epiphyseal fusion evidence

	Unfused	*Fused*	*% fused*	*Fusion age (months)*
Early fusing				
Acetabulum	0	6	100	6–10
Scapula, tuber	0	1	100	7–10
Humerus, distal	0	2	100	12–18
Radius, proximal	0	7	100	12–18
Phalanges, proximal	1	18	95	18–24
Middle fusing				
Tibia, distal	1	10	91	24–30
Metapodials, distal	2	10	83	24–36
Calcaneus, tuber	0	6	100	36–42
Late fusing				
Femur, proximal	2	6	75	30–42
Humerus, proximal	0	2	100	42–48
Radius, distal	2	4	67	42–48
Ulna, proximal	5	1	17	42–48
Femur, distal	2	3	60	42–48
Tibia, proximal	0	5	100	42–48

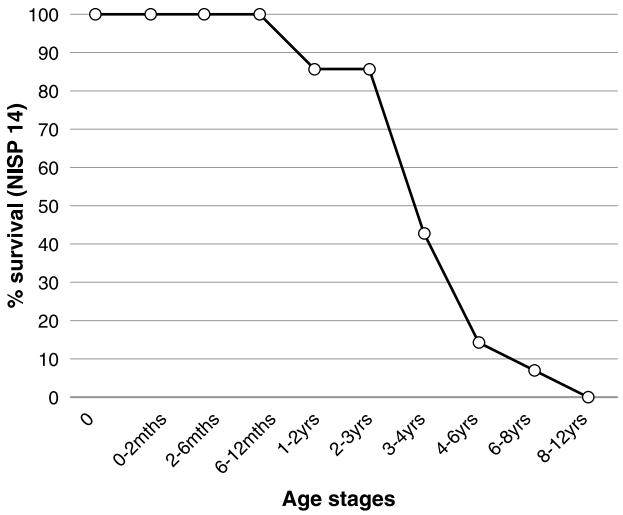


Fig. 4.3 Sheep age at death in Phase 4 based on mandibular data

the medial proximal shaft and in the pelvis it is the ischial/acetabular portion which is most frequent. Whilst the range of elements is taken to reflect what was brought to the tenements and site, the under-representation of various bone ends, and late fusing parts suggests some taphonomic processes have further mediated the skeletal part frequency. Carnivore gnawing was recorded in 11.7% of the cattle bones (Table 4.5) in this phase and this may be a major source of these skeletal biases.

The cattle epiphyseal evidence (Table 4.6) suggests most carcasses or joints were from cattle over two years old following Reitz and Wing (1999, 76). Unfused epiphyses and the bones of calves may be underrepresented given the skeletal biases noted above.

The sheep/goat mandibles include nine that were identified as sheep and five to the level of sheep/goat (Halstead *et al.* 2002). Inclusive of both sheep/goat and sheep, two animals were aged at 1–2 years, two were at 2–3 years, five were at 3–4 years, four were at 4–6 years, and one was 6–8 years old (Fig. 4.3). The lack of data indicating infant mortality may well reflect that lambing and such deaths took place elsewhere.

The pig mandibular data is based on fragmentary specimens but four animals were aged under 6 months, five were at 6–12 months, one was at 12–24 months and one was over 24 months old (Halstead 1992).

Other fauna

Bones of horse, dog and cat were also recovered but do not show any evidence of butchery or skinning and whether a single rabbit metacarpal comes from an animal prepared for the table is uncertain. An unshed fallow deer antler may be evidence of small-scale antler working. House mouse bones attest to the presence of this commensal animal living locally and frogs, toads and a grass snake indicate damp grassland in the vicinity. Bones from a range of domestic and wild birds were also recovered.

Bird bones

The proportion of birds as compared to the other domesticates increases dramatically in this phase, as compared to Phase 3, and remains high and indeed increases in succeeding phases. This trend is particularly reflected in the fauna recovered by sieving (Fig. 4.4) where birds make up 49% of the cattle, sheep, pig, and bird grouping, and even in the hand-collected bones birds still comprise 12% of the assemblage. A similar increase in the proportion of birds was also seen in contemporary deposits at Westgate (Smith forthcoming a) where the author raised the possibility that it might perhaps be linked to a more rigorous following of Benedictine teaching in the high medieval period (Holmes 2018, 128).

The bones confidently identified as chicken (domestic fowl: *Gallus gallus*) comprise 37% of the bird identifications (NISP 37) with a duck associated bone group (ABG) excluded, and there are 21 other fowl-sized Galliforme fragmentary specimens present, many of which may well be from chicken. Geese are also common (NISP 29) mostly identified to *Anser* sp. (and plausibly domestic geese) but including three identified to *Anser*/*Branta* sp. which could be either domestic or wild. This order of frequency (in the chickens and geese) is common to ecclesiastical, high-status and urban sites of the period (Holmes 2018, 84). Passerines and waders, including snipe, are also present.

Tenement A

Sheep bones are slightly more common than those of cattle in both the hand-collected and sieved group from Tenement A. The occupation layers and laminated floor layers from Building 1 produced only a single cattle tibia fragment and food waste remains comprising the fragmentary bones of sheep, pig, goose, probable chicken, duck species and of small perching birds (Passeriformes). It appears probable that trample led to the fractured state of the more delicate bones. An associated sheep humerus, radius and ulna were recovered from Room 1, suggesting a foreleg of mutton. The presence of unshed fallow deer antler (part skull and antler) from hearth 7254 suggests the possibility that some small-scale acquisition and working of antler may have taken place here. Also within Building 1, Room 1 was the remains of a single duck (*Anas* cf *platyrhynchos*) including the paired humeri, radii, ulnae, tibiotarsi and tarsometatarsi.

Tenement B

Over half of the recorded bones from this tenement are from pit fills. Sheep (including sheep/goat) are the most common among the three main domesti-

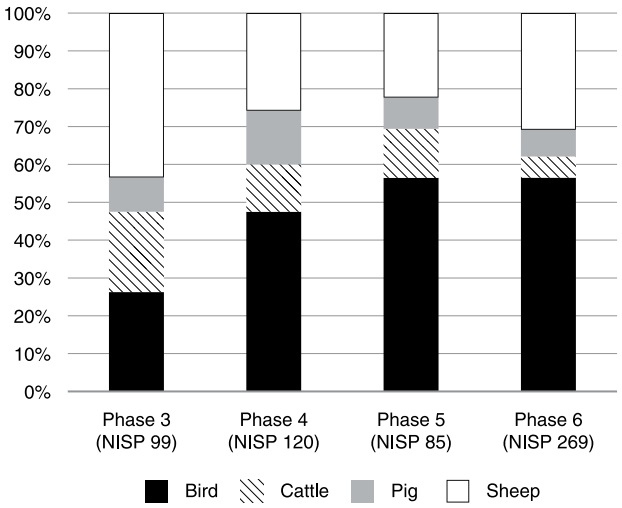


Fig. 4.4 Relative proportions of main domesticates and birds from sieved samples by phase (NISP 673)

cates from sieved samples, whereas cattle bones are found in approximately equal numbers to sheep and sheep/goat in the hand-collected majority.

A cattle humerus from pit 8296 bears chop marks that divided the distal shaft adjacent to the epicondyles and which indicate that it was jointed. The shaft also bears multiple fine cut marks that do not relate to tertiary butchery, and which suggest beef carved at the table. In general, a greater proportion of chop marks were recorded for cattle bones than for either sheep or pig and fine cut marks were more commonly recorded in the pigs as compared to either cattle or sheep (Table 4.5). A goat horn core was recovered from Building 2, Room 2, the only firm example of goat from this site.

Tenement C

Only 41 identified bones (NISP) were retrieved by hand collection from Tenement C, with an additional 19 recovered by sieving. The bones came from a range of contexts but mainly pit fills and levelling layers, From the hand-collected fraction the cattle, sheep, pig NISP ratio is 13:16:6 and the same ratio from the small number of bones recovered by sieving is 0:7:1. Occasional bones of cat, chicken, goose, pigeon and an unidentified wader (cf Scolopacidae sp.) were also recovered.

Phase 5: 14th to early 15th century

Cattle account for most of the identified bones recovered by hand collection (NISP 282) followed by sheep and sheep/goat (NISP 230) and pig (NISP 110) while sheep and sheep/goat are most frequent in the smaller sieved assemblage (NISP 19) followed by cattle (NISP 11) and pig (NISP 7). Other identified mammals include horse, dog, cat, fallow deer, hare, rabbit and house mouse. Bird bones are frequent in both the hand-collected and the sieved assemblages (NISP 145).

Main domesticates

The epiphyseal fusion evidence (Table 4.7) demonstrates the presence of some calves among the cattle bones, and although the numbers are small, there are, for instance, equal numbers of unfused and fused pelvic acetabula. Whilst the presence of calf bones is confirmed, it is possible that, since they are small and relatively delicate, they are underrepresented due to dog gnawing and other taphonomic processes. Among the remains of older animals, one cattle skull is notably flat aborally (Grigson 1976, 126) and the intercornual ridge is a high double arch (ibid., 128).

The sheep age-at-death profile (Fig. 4.5) is notable in that around 36% of the animals were culled at 3–4 years (based on Payne 1973) or 2.5–4.5 years (based on Jones 2006). The numbers are modest, and the earliest part of the profile may be skewed if lambing mainly took place elsewhere, but the profile arguably reflects an emphasis on management for wool, although it is possible that more than one economic aim was pursued. It is possible that this sheep age-at-death profile reflects management in the Cotswolds or Chilterns, but flocks more local to Oxford could also be represented. The beginning of the 14th century saw a peak in the sheep population, but their numbers declined temporarily in the late 14th to early 15th century, when English wool production fell, although wool was still a major economic concern throughout this period and Oxfordshire was amongst the more productive counties (Trow-Smith 1957, 137–41).

Measurements of the distal condyles of two metacarpals from Pit Group 14 are both notably short in length but their proportions are those

Table 4.7: Phase 5 cattle epiphyseal fusion evidence

	Unfused	*Fused*	*% fused*	*Fusion age (months)*
Early fusing				
Acetabulum	4	4	50	6–10
Scapula, tuber	0	8	100	7–10
Humerus, distal	2	4	67	12–18
Radius, proximal	0	11	100	12–18
Phalanges, proximal	4	31	89	18–24
Middle fusing				
Tibia, distal	2	5	71	24–30
Metapodials, distal	2	16	89	24–36
Calcaneus, tuber	2	5	71	36–42
Late fusing				
Femur, proximal	1	4	80	30–42
Humerus, proximal	2	2	50	42–48
Radius, distal	1	1	50	42–48
Ulna, proximal	2	3	60	42–48
Femur, distal	1	3	75	42–48
Tibia, proximal	3	1	25	42–48

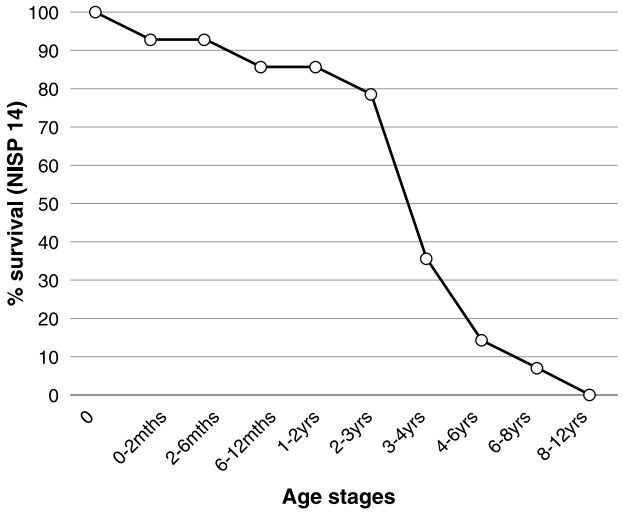


Fig. 4.5 Sheep age at death in Phase 5 based on mandibular data

typical of sheep (plausibly females) in that they are dainty and gracile, and they bear multiple other features at the distal end (Boessneck 1969; Zeder and Lapham 2010) that indicate that they are from sheep. A calculation following Teichert (1975) remarkably suggests sheep of 0.486m and 0.472m respectively at the withers. This is smaller than recent Soay sheep which are around 0.55m at withers (Hajdukiewicz 2014).

The pig mandibles comprise three from animals aged less than 6 months at death, five aged 6–12 months, and one aged 12–24 months following Halstead (1992). Some of these pigs may have been killed in their first late autumn or early winter, to suit the needs of the consumer.

Other fauna

Horse bones include a possible carcass or partial carcass comprising the left and right-hand side metatarsals, in association with three lateral metatarsals, both grand cuneiforms, a 1st, 2nd and 3rd phalanx, and various associated vertebrae (including the sacrum) and the ribs (see below). Occasional dog and cat bones came from dump deposits and garden soil. Fallow deer remains include antler and post-cranial bones, with one metatarsal bearing cuts probably relating to dismemberment. Other wild fauna include hare and rabbit, which were probably food animals, as well as house mouse, snake, domestic fowl, goose, duck, swan, woodcock, pigeon, crow/rook and possible magpie, thrush, lark and small passerine.

Tenement A

The bones from Tenement A are widely distributed by context type but almost half (NISP 111) came from pit fills. The cattle, sheep, pig hand-collected ratio in Tenement A is 99:64:36, and mandibular, forelimb, hindlimb and foot parts are present in each case. The same ratio among the sieved remains is 4:6:2.

A rabbit humerus was recovered from an occupation layer (7242) in Building 1 and a rabbit femur came from a doorway/threshold context (8043). These probably relate to food preparation and consumption. Although the value of rabbit meat fell after the 13th century, it was still valuable at this time and, for instance, was sought-after for feast day menus at the end of the 14th century (Sykes and Curl 2010, 125). It is possible that rabbits were supplied to Oxford from estate warrens (see also Worley and Evans 2006, 316).

Occupation layer 3676 in Building 4 produced a group of bones that suggest the disposal of a horse carcass (or partial carcass). There are no signs of any bone working so it is likely that the presence or deliberate disposal of a horse carcass (or partial carcass) onto an occupation layer signals disuse or abandonment. No evidence of carnivore gnawing was recorded in this group nor any kind of butchery and so it seems improbable in this case that this horse was butchered to feed to either dogs or humans (cf Poore *et al.* 2006, 221).

A large group (NISP 123) of bones from Building 4 was recovered from a disuse layer and included a fragment of worked (sawn) red or fallow deer antler. Parts of the head, forelimb, hindlimb and feet of cattle, sheep, pigs were recorded perhaps suggesting the transport of whole carcasses to the area in this phase. One cattle pelvis from this layer with a butchered acetabulum was identified as female. Small numbers of chicken, goose and duck bones were also present. It is plausible that during a period of disuse this building was a convenient place to dispose of various types of waste, including from butchery, food preparation and small-scale antler working.

A section of shed fallow deer antler from pit 3919 has some shallow cut marks that suggest shaving of small amounts of antler from the surface. Clearly some shed antler was collected and worked, perhaps for medicinal use (Sykes 2010, 54).

Tenement B

A large proportion of the bones from Tenement B are from pit fills, followed in frequency by floors and laminated and other occupation layers. The hand-collected cattle, sheep, pig ratio is 113:88:40 and that from sieving 7:11:4. Head, forelimb and hindlimb bones are present from each of these domesticates and a pig humerus bears fine cut marks and chop marks (including Lauwerier 1988, L10, L18) that suggest dismemberment (or secondary butchery) and jointing (or tertiary butchery) *sensu* Rixson (1988) as well as filleting.

A swan (*Cygnus* sp.) femur was recovered from pit 3901. Swan has been recorded frequently from high-status urban and ecclesiastical sites during the medieval period, especially the late medieval period (Holmes 2018, figs 3.20 and 3.23).

A goose (*Anser* sp.) carpometacarpus also from pit 3901 has fine cut marks and was chopped through distally. Since there is no meat at this part of the wing, this butchery is plausibly associated with the recovery of flight feathers (for quills or arrow flights) from a goose at slaughter (cf Serjeantson 2009, 188; Coy 1989, 35). Butchery of a similar nature was recorded in Phase 3 at Westgate (Smith forthcoming a).

Tenement C

Most of the bones from Tenement C came from pits and comprised elements from cattle, sheep, pig and chicken as well as a small bird (cf passerine).

Samples from a laminated occupation layer in Building 3 produced two right-hand-side coracoids and a scapula from woodcock, a crow or rook radius, and from the same context, by hand collection, a duck (*Anas* cf *platyrhynchos*) furcula bearing a fine cut mark possibly made at the table.

Phase 6: mid-15th to mid-16th century

With 1009 hand-collected bones (NISP) and 331 identified bones recovered by sieving, this is the largest assemblage by phase. Sheep and sheep/goat provide the majority of bones in both the hand-collected and sieved assemblages overall, and bird bones are especially frequent and diverse.

The main domesticates

The cattle mandibles include four from animals aged 1–8 months at death (stage B of Halstead 1985), one aged 30–36 months (stage E), one from an adult (stage G) and two from animals that are judged to be elderly or senile (stage I of Halstead 1985).

Most of the metapodia are from cattle of young adult or greater age or cattle over 2 to 3 years of age following Reitz and Wing (1999, 76) but the cattle epiphyseal fusion evidence (Table 4.8) provides evidence of calves, reflected by a small number of unfused phalanges and small spongy unfused major appendicular bones. There are often taphonomic biases against unfused epiphysial ends (Reitz and Wing 1999, 182–4) and carnivore gnawing affected 9.5% of the counted cattle bones in the phase (Table 4.5) and so may have introduced a bias against calf bones.

The sheep and sheep/goat mandibles include 22 identified as sheep and 11 as sheep/goat. The kill-off pattern appears to represent a wool production profile (Payne 1973, 284), where large numbers of sheep are kept to an advanced age (Fig. 4.6). Eleven sheep calcanei were measured following Boessneck (1969, 353) and in all cases the results indicate that they are sheep. This is also the case for 21 such determinations from Phase 3 and later; all were consistent with sheep and not goats.

Based on five sheep metapodials, the animals were an average 0.58m at withers, ranging from 0.53m to 6.1m following Teichert (1975). The average falls within the range suggested by a group of sheep metacarpals of medieval date from various sites in southern England (University of Southampton 2003).

The pig mandibles include three from piglets less than 6 months old at death, and two from animals of 6–12 months (following Halstead 1992). As is usual in the management of domestic pigs, they were killed at a young age as dictated by culinary tastes or what was judged the best pork and bacon-bearing age and possibly to avoid feeding them through the winter.

Table 4.8: Phase 6 cattle epiphyseal fusion evidence

	Unfused	*Fused*	*% fused*	*Fusion age (months)*
Early fusing				
Acetabulum	1	4	100	6–10
Scapula, tuber	0	6	100	7–10
Humerus, distal	0	11	100	12–18
Radius, proximal	0	7	100	12–18
Phalanges, proximal	3	37	93	18–24
Middle fusing				
Tibia, distal	2	5	71	24–30
Metapodials, distal	2	13	87	24–36
Calcaneus, tuber	1	5	83	36–42
Late fusing				
Femur, proximal	10	4	29	30–42
Humerus, proximal	0	4	100	42–48
Radius, distal	1	4	80	42–48
Ulna, proximal	2	2	50	42–48
Femur, distal	6	5	45	42–48
Tibia, proximal	5	0	0	42–48

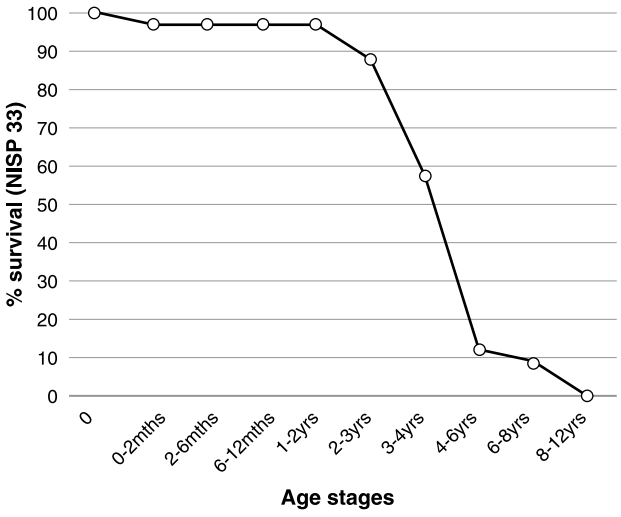


Fig. 4.6 Sheep age at death in Phase 6 based on mandibular data

Other fauna

Other mammals include horse, fallow deer, dog, cat, hare, rabbit, black rat, house mouse, vole and common shrew and amphibians include frog and toad. The significant collection of bird bones include chicken (domestic fowl), goose, duck including possible teal, woodcock, snipe, pigeon, possible wader (cf Scolopacidae), possible lark, possible plover, crow and possible magpie, as well as small passerine(s).

Bird bones

The fowl bones, inclusive both of those identified to the level of chicken and of other Galliformes of chicken size (NISP 196) are represented by all major wing, leg, and axial parts (Fig. 4.7). The humerus and radius (wing bones) are most frequent, a pattern seen commonly in archaeological assemblages (Bovy 2002, 976). Axial parts were similarly underrepresented from deposits of comparable date at 4a Merton Street (Worley and Evans 2006, 318). Approximately a quarter of these fowl bones are spongy, small and clearly immature, and this suggests the possibility that chickens were reared nearby. Possibly this high proportion of immature birds represents the killing of many male chickens (non-egg-layers) at an early age.

The goose bones from the phase (NISP 45), most of which were recovered from Tenement B (NISP 33) appear to reflect the presence of most anatomical parts and to suggest the supply of whole geese as one might expect.

Tenement A

With a cattle, sheep, pig NISP ratio of 66:69:31, it is notable that the proportion of sheep bones is low when compared to that in the group from Tenement B (see below) using this measure, but the significance of this finding is limited by the small total number of bones (NISP 241). Some division of cattle and sheep carcasses into left and right sides is indicated by the sagittal splitting of multiple vertebrae.

The bones of chickens and probable chickens comprise the largest group of taxa after the three main domesticates, followed in frequency by the bones of cats and geese. A femur and tibiotarsus of snipe were recovered from a laminated occupation layer in Building 1, Tenement A, probably from a bird prepared for the table. The bones from this Pit Group 14 include a complete and fused metatarsal of fallow deer.

Tenement B

With a cattle, sheep, pig NISP ratio of 147:313:64, it is notable in that the proportion of sheep is significantly higher than from the smaller assemblage from Tenement A. There is a relatively large amount of sieved bone which derived from 121 samples (NISP of 249), greater than Tenements A and C combined and this an important consideration when comparing the assemblages, particularly the proportion of smaller fauna including the birds.

Left and right pelves of black rat (*Rattus rattus*) were recovered from Building 2, Room 3. The species does not dig tunnels (MacDonald and Barrett 1993, 268; Lovegrove 2007, 217) and so is less likely to occur intrusively in archaeological deposits than some other rodents. Black rats had a wide distribution in England from the 13th to 14th centuries, resurgent after a period of absence in post-Roman times, and were the only rat species in England until the 18th century (Rielly 2010, 143; Yalden 1999, 162; Lovegrove 2007, 217). There is evidence that black rats were present in Oxford from the late 11th to 12th century (Worley and Evans 2006, 319).

Laminated occupation layers and hearth contexts in Building 2 produced chicken (domestic fowl) and probable chicken bones as well as some cattle, sheep, pig and goose bones and a coracoid from a small bird (a thrush-sized passerine) as well as a toad ilium. Twenty rabbit bones were also recovered, some from a levelling layer (8219) that also produced a snipe humerus, and a snipe coracoid was recovered from a laminated occupation layer (9026). The remains from an occupation layer (8629) in Room 3 include a cattle hyoid with a fine cut mark that most probably indicates removal of the tongue. A woodcock coracoid was identified from Building 2, Room 3 (pit 8945) and the distribution of rabbit, chicken and other bones within this building suggests that they were probably cooked here and that some bones were inadvertently dropped or discarded and were then trodden into the flooring material.

The sheep and sheep/goat bones from Building 7 comprise a good proportion of meat-bearing parts including two right and three left pelves, six humeri, and eight radii. Rabbit bones came from seven contexts in Building 7 and from Room 2

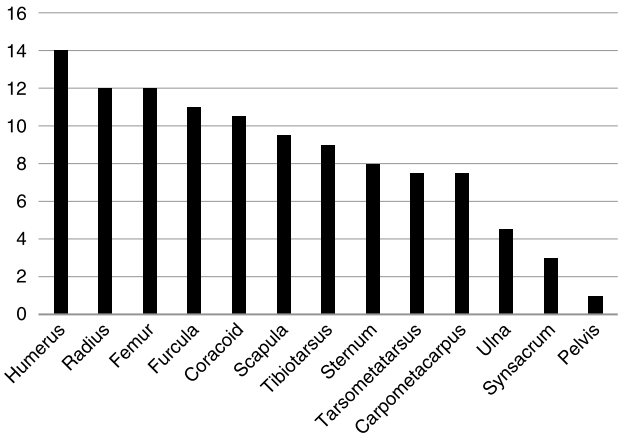


Fig. 4.7 Phase 6 Galliforme bone relative frequency (NISP 196)

(hearth deposit 4171) there is a butchered rabbit tibia with shallow 'shaving' marks that represent filleting.

Tenement C

The small assemblage from Buildings 3 and 8 include some chicken, goose (*Anser* sp.), pigeon (Columbidae), duck (including probable teal *Anas* cf *crecca*) and small passerine (cf *Turdus* sp.) bones along with those of cattle, sheep, pig, and rabbit.

Phase 7: late 16th to mid-17th century

With a total NISP of only 341, this is a is small assemblage.

The main domesticates

There are roughly equal numbers of cattle and sheep bones, with cattle, sheep, pig ratios of 125:120:37 hand-collected and 3:1:1 sieved. Cattle bones include a wide range of skeletal parts including some mandibles (with deciduous dentition) and foot bones, but the humerus, followed by the mandible and pelvis are best represented. The relatively high representation of humeri suggests that joints of beef were commonly purchased and there is some evidence for tertiary butchery (*sensu* Rixson 1988) of cattle forelimbs from Tenement B. Certainly, meat-bearing parts are well represented. Carcasses of cattle and sheep appear to have been divided into left and right sides, as demonstrated by multiple vertebrae divided in the sagittal plane, although such butchery was probably undertaken elsewhere. The four cattle mandibles recovered were clearly all from calves of approximately 1–8 months.

Other fauna

Fallow deer bones comprise tibiae and a phalange, two of which came from garden soil. Other mammals include rabbit and hare, and both domestic and wild birds are represented: chicken, goose, duck, possible lark and passerine.

Tenement A

There is a single recorded bone from Tenement A, a butchered cattle tibia which was recovered from garden soil.

Tenement B

Multiple joints of beef are represented in pit 3772 including four cattle humeri chopped through their mid-shafts and numerous small, spongy, calf-sized meat-bearing bones and six hare bones were recovered from pits 6383 and 3772. Based on the parts present, all could have come from a single hare although arguably their distribution suggests that more than one hare is represented. There are also three rabbit bones (a humerus, ulna, and 4th metacarpal). A fallow deer tibia came from garden soil.

Bird bones recovered from sieved samples include several small passerines including a carpometacarpus and partial humerus from lark *(*cf *Alaudidae*) and eight largely fragmented bones are from chicken/duck-sized birds, five of which were spongy, small, and clearly immature. A duck (*Anas* cf *platyrhynchos*) tibiotarsus, radius and scapula also came from Pit Group 17.

Tenement C

Thirty-one bones from this tenement came from a series of pit fills and included cattle, sheep, sheep/goat, pig and chicken. A sheep metacarpal suggests a sheep of *c* 0.63m at the withers (following Teichert 1975).

Phase 8: late 17th to early 18th century

A small assemblage of only 77 identified bones was recovered, including cattle, sheep/goat and pig as well as dog, rabbit, red or fallow deer, house mouse, chicken, goose, duck, possible pigeon, small passerine and, significantly, turkey (see below).

Tenement B

Several ribs from pig and probable sheep had been butchered in a manner consistent with tertiary butchery (Rixson 1988), finer cuts parting the flesh and preceding the chopping into joints.

A turkey (*Meleagris gallopavo*) coracoid was hand recovered from backfill 3340 of well 3328 (identified following the criteria of Tomek and Bocheński 2009). A fine cut mark affects the lateral side of this coracoid and it is probable that the bone was chopped through adjacent to this. The turkey had been introduced to Britain by the mid-16th century (Fothergill 2014), and there are now several records from late 16th- or 17th-century deposits from sites in Oxford, providing evidence for luxury dining. This includes potentially college-related finds from Jesus College (late 16th century: Strid 2014, 231), New College (16th to 17th century: Smith forthcoming b) and Corpus Christi College (late 17th century: Broderick 2016), as well as examples from non-college sites at the Ashmolean Museum Extension (late 16th to mid-17th century: Strid 2020) and St Ebbe's (17th century: Wilson 1984).

Tenement C

A very small assemblage of cattle, sheep and sheep/goat bones were recovered. Few conclusions can be drawn although meat-bearing bones of cattle and sheep are present as well as a few rabbit, chicken, possible chicken or duck and possible pigeon.

Phase 9: mid-18th to early 19th century

Only 26 bones were recovered, from cattle, sheep, sheep/goat, pig, chicken, and goose. Two cattle ribs had been chopped through and sawn across their axial length and two cattle radii and a cattle ulna had also been butchered.

Discussion

The mammal and bird bone assemblage mainly consists of food animal remains (*sensu* Serjeantson 2000). The bone waste from various stages of butchery and preparation of joints or pot-sized portions or kitchen waste are present from the late Saxon period onward. Beef and lamb or mutton were important in all periods and the increasing proportion of mutton as opposed to lamb and the later increase in veal reflect changing national agricultural and economic priorities in the rise of the wool and dairy industries. Working animals including horses and dogs and possibly also companion animals, as well as commensals (voles, mice), are also represented in the faunal remains from the tenements. Small-scale recovery of horn is suggested by a few sawn horn cores in Phase 3 and Phase 8 and some (again small-scale) working of antler (including from fallow deer) is suggested in Phases 2, 4 and 5.

While there are always difficulties comparing the relative contribution of mammal and bird bones, it is clear that in addition to beef, mutton and pork, the meats of chicken and other domestic and wild birds were of some importance to the inhabitants of the tenements (Fig. 4.4).

In the late 11th century (Phase 2), sheep were important and ubiquitous across much of Britain as a 'milch animal' (Trow-Smith 1957, 74) and from the beginning of the 13th century England was important as a wool manufacturing nation (ibid., 133). Whilst some cultural factors have probably affected the age-at-death profile (Fig. 4.1), some sheep flocks may have been managed with the aim of providing meat to developing markets in the urban centres. By Phase 3, the rise of the wool trade (ibid., 133) is plausibly reflected in the increased proportion (25%) surviving to 3–4 years and beyond (Fig. 4.2). Again, in Phase 4, although not based on a large sample, it is suggested that the rise of the wool industry (ibid., 89) is again reflected in the proportion of sheep that were kept beyond 4 years (Fig. 4.3; Payne 1973).

It is likely that there were differences in the disposal of the bones of food animals and those of other animals. In Phase 1 it is possible that the remains of deceased dogs became scattered widely by chance. Similarly, perhaps, in Phase 3 Tenement A a relatively thin spread of largely isolated and fragmented horse bones within the pits may relate to incidental burial from surface scatters or to redeposition from earlier features. Horses were generally not eaten by people at this time (Serjeantson 2000, 183–4) and there is some evidence that at medieval urban sites, horse carcasses were disposed of in a different manner to food refuse (Grant 1984, 182). Meanwhile the associated horse remains from the Phase 4 occupation layer in Tenement A, Building 4, appear possibly to signal abandonment.

In the high medieval period, a predominance of domestic fowl and wild birds can be seen as a signature of high-status sites (Holmes 2018, 79) and here, in Phase 4, the high proportion of birds and the presence of some wild species appears to signify that the inhabitants were not poor. The butchery of goose in Phase 5 suggests the recovery of quills (on a small scale and probably as just one of the processes involved in the preparation of a goose carcass) was one of the activities undertaken on the tenements.

Increasing regulation of butchery practices in Oxford can be traced from the 14th to 15th century (Wilson *et al*. 1989, 260, 262) and this can be related to differences between the processing of calves and adult cattle which have been noted at other tenements in Oxford (Wilson 1984, 266) and at the Westgate site (Smith forthcoming a). So, by Phase 6, given the increasing proportion of calf (as compared to older cattle) mandibles, it may be the case that few adult cattle heads were brought to the tenements implying that primary butchery of adult cattle was being undertaken in a prescribed place outside the city walls, but that whole calves were brought in. It is possible that some of these specimens could be residual, considering the nature of the contexts (garden soil, for instance), but the fact that half of the mandibles are from calves corresponds to a trend seen elsewhere in English urban centres which appears to relate to an increasing availability of veal and the associated rise of dairying in this period (Gidney 2000, 176; Serjeantson 2000, 187; Smith 2008, 345; Grau-Sologestoa and Albarella 2019). Again, in Phase 8 a high proportion of calves reflects the supply of veal to Oxford and the increasing importance of the cattle-based dairy industry.

Whilst an increase in the proportion of birds is widely recognised in the late medieval period (even on lower-status sites) the proportion of birds here (in Phase 6) is particularly high (Fig. 4.4) and this, together with the presence of small passerines, suggests a degree of wealth (Holmes 2018, 78–9; cf Poore *et al*. 2006, 252–3). Although bird bones are common throughout the phase, the proportion clearly varies with context type and it is likely that small bird bones commonly accumulated in occupation deposits whereas many larger mammal bones would be removed and dumped in refuse pits. This distribution bears comparison with that seen at New College where small bird bones (and other small or fragmented bones) were commonly trodden into floor deposits (Smith forthcoming b).

FISH BONE *by Rebecca Nicholson*

Fish remains were recovered from most of the 394 sieved bulk soil samples. Following assessment, fish remains were fully recorded from those samples from Phases 1–6 which produced at least 50 identifiable items as well as samples with lower numbers of bones where these dated from Phases 1–4 and/or included less commonly occurring taxa. This resulted in a recorded sieved assemblage comprising 6207 items from an estimated assemblage of over 7000 potentially identifiable fragments (Table 4.9). In addition, some 39 fish bones were hand-collected on site (Table 4.10).

Much of the fish bone is in good condition, the best-preserved material coming from the laminated occupation layers, mostly from Tenements A and B. Although these deposits were often charcoal rich, very few fish bones were charred or burnt indicating that in most cases the fish remains did not originate in hearth sweepings or spreads of ash but were instead discarded on the floors of the buildings, or in pits, from dining or other activities taking place within the tenements.

A full record of the assemblage, together with all the methodologies employed, metrical analyses, full details of butchery, fragmentation and pathologies can be found in Appendix 7 and, with associated metadata, in the site archive.

Phase 1: 10th to mid-11th century

Only 90 fish bones were identified from late Saxon contexts. The bones from sample 3339, from pit 5083, Pit Group 1 (fill 5097), were mainly eel and herring vertebrae but a few bones of perch, small pike, bullhead and burbot were also present. A significant proportion of the herring and eel vertebrae were distorted in a manner typical of mastication suggesting that the feature probably included latrine waste. Sample 4100, from pit 6961 (fill 6962) included a small number of right-eyed flatfish (plaice/flounder or dab) bones as well as several small perch and gurnard vertebrae. A few herring and eel vertebrae were recovered from Ditch 1 fill 7716 and from pit 5002 (fill 5001); the latter also included cleithra from eel with reconstructed lengths of 0.38 and 0.52m.

Table 4.9: Quantification of fish bones and scales (NISP) from sieved soil samples

		Phase						
Taxon		*1*	*2*	*3*	*4*	*5*	*6*	*Total*
Shark/ray	Elasmobranchii			1	4	16	2	23
Ray family	Rajidae				2	1	1	4
Ray	*Raja* sp.					4		4
Thornback ray	*Raja clavata*			1	3	3	2	9
Eel	*Anguilla anguilla*	45	291	91	65	303	738	1533
Conger eel	*Conger conger*				3	7	11	21
Herring family	Clupeidae		10	36	139	48	57	290
Herring	*Clupea harengus*	28	479	479	533	833	412	2764
Sardine	*Sardina pilchardus*		1	13	50	15	1	80
	cf *Sardina pilchardus*					1		1
Twaite shad	*Alosa fallax*						1	1
Shad?	cf *Alosa* sp.						1	1
Salmon/trout	Salmonidae		1			2	8	11
Salmonid?	cf Salmonidae						1	1
Grayling?	cf *Thymallus thymallus*+			1				1
Pike	*Esox lucius*+	3	11	4	4	3	100	125
Pike?	cf *Esox lucius*				1			1
Carp family	Cyprinidae		124	6	16	42	158	346
Bleak	*Alburnus alburnus*+		3			3	6	12
Roach	*Rutilus rutilus*+		15		1	8	15	39
Roach?	cf *Rutilus rutilus*		1			1	1	3
Dace	*Leuciscus leuciscus*+			1			1	2
Dace?	cf *Leuciscus leuciscus*		1	1				2
Chub	*Squalius cephalus*+						1	1
Chub/dace	*Squalius/Leuciscus*		3				3	6
Gudgeon	*Gobio gobio*+		4	1		1		6
Minnow	*Phoxinus phoxinus*+		2			4		6
Minnow?	cf *Phoxinus phoxinus*					1		1
Tench	*Tinca tinca*+					1	2	3
Stone loach?	cf *Barbatula barbatula*+		8					8
Bullhead	*Cottus gobio*+	1	3			2		6

Table 4.9 continued

Taxon		Phase 1	2	3	4	5	6	Total
Cod family	Gadidae		5	25	62	55	132	279
Cod family	*Gadus morhua*			1	1	10	10	22
Pollack	*Pollachius pollachius*						1	1
Cod/pollack	*Gadus/Pollachius*			10	1	7	8	26
Haddock	*Melanogrammus aeglefinus*				5	6	26	37
Whiting	*Merlangius merlangus*		3	6	28	20	30	87
Ling	*Molva molva*			3		1	6	10
Burbot	*Lota lota*+	3						3
Burbot?	cf *Lota lota*		2					2
Hake	*Merluccius merluccius*						2	2
Stickleback family	Gasterostidae					1		1
3-spined stickleback	*Gasterosteus aculeatus*		1			30		31
Gurnard family	Triglidae	1		2	2	8	47	60
Red gurnard	*Chelidonichthys cuculus*						2	2
Tub gurnard	*Trigla lucerna*			1	1		13	15
Red/tub gurnard	*Chelidonichthys/Trigla*				1		1	2
Perch	*Perca fluviatilis*+	4	1	4		2	25	36
Ruffe?	cf *Gymnocephalus cernua*+		1		1			2
Scad	*Trachurus trachurus*					1	1	2
Grey mullet	Mugilidae						1	1
Mackerel family	Scombridae					1		1
Mackerel	*Scomber scombrus*		2	3		5	5	15
Flatfish	Pleuronectidae/Scophthalmidae	1				4	8	13
Right-eyed flatfish	Pleuronectidae	1	1	3	14	7	80	106
Plaice	*Pleuronectes platessa*			1	2		27	30
Flounder?	cf *Platychys flesus*						3	3
Sole?	cf *Solea solea*					1	1	2
	Unidentified	3	30	4	18	21	29	105
	Total	90	1003	698	957	1479	1980	6207

Table 4.10: Quantification of hand-collected fish remains (NISP)

Taxon		Phase 4	5	6	7	8	Total
Conger eel	*Conger conger*		1	3			4
Salmon/sea trout	*Salmo* sp.			1			1
Pike	*Esox lucius*			2			2
Cyprinid	Cyprinidae			2			2
Chub	*Squalius cephalus*			1			1
Cod family	Gadidae		2	4		1	7
Cod	*Gadus morhua*	2	4	5	1		12
Saithe/pollack	*Pollachius* sp.			1			1
Cod/saithe/pollack	*Gadus/Pollachius*			1			1
Haddock	*Melanogrammus aeglefinus*	1		1			2
Ling/torsk	*Molva/Brosme*		1				1
Hake	*Merluccius merluccius*	1					1
Gurnard	Triglidae					1	1
Right-eyed flatfish	Pleuronectidae			1			1
Plaice	*Pleuronectes platessa*			1			1
Unidentified				1			1
Total		4	8	24	1	2	39

Phase 2: late 11th to mid-12th century

Over 1000 fish bones were identified, mostly from pit 5058, fill 5060 (sample 3336, Pit Group 3) in Tenement A and pit 7428, fill 7427 (sample 5231, Pit Group 2, Tenement A). In addition to large numbers of clupeid (largely herring) and eel vertebrae, which comprised 49% and 29% of the Phase 2 assemblage respectively, the assemblage from 5060 was dominated by small freshwater fish bones, from species including roach, gudgeon, bleak, minnow, dace or juvenile chub, juvenile pike, bullhead and three-spined stickleback as well as possible burbot, ruffe and stone loach. In contrast, the sample from pit 7428 almost exclusively comprised herring and eel vertebrae and eel cranial bones, from fish of 0.24m–0.68m long. There were also occasional bones from small pike, small cyprinid, small perch and tiny gadid. Sample 5132 from pit 7667 (Pit Group 2) included a single large salmon or sea trout caudal vertebra as well as herring vertebrae.

Other contexts with smaller fish assemblages include pit fills 6491, 6873 and 6880 (samples 4055, 4090, 4091 from pits 6492, 6876 and 6881, Pit Groups 7 and 8, Tenement B and C respectively). Sardine was identified among the clupeids, as well as herring and there were bones of eel, whiting, small flatfish and mackerel. Eel, small cyprinid (including roach) and small pike bones from occupation layer 7715 in Tenement A may derive from discarded table waste (plate scrapings). Calcined herring and eel bones from layer 7191 of hearth 7195 (Tenement C) clearly derived from redeposited ashes.

Phase 3: late 12th to early 13th century

Tenements A and B

Almost all the identified fish remains from Tenements A and B (NISP 363) came from pits (Pit Groups 3 and 6 and pit 9192). Like the assemblage from Phase 2, clupeid (all or mostly herring) and eel bones comprised 69% and 20% respectively of the recovered assemblage from Tenement A and 60% and 21% of the assemblage from Tenement B. Other fish include ray(s), mackerel, small and large gadids including whiting and cod/saithe or pollack, large ling, right-eyed flatfish (plaice, flounder or dab), tub gurnard, small pike and small cyprinid including dace.

Tenement C

Of the fish remains from occupation deposit 7164 in Structure 4, over 88% of the 331 bones were clupeid, mostly but not entirely herring vertebrae from all parts of the vertebral column. Thirteen bones have been identified as sardine, mainly vertebrae but including a diagnostic opercular. The remaining bones came from eel, small gadids including whiting, small flatfish, small elasmobranch (shark or ray family) and gurnard.

Only herring and eel bones were recovered from deposit 6698 above hearth 6700 in Structure 4, including eel cleithrum from very large fish of calculated 0.74m and 0.93m long. These would have been mature females and, as large specimens, relatively expensive. None of the bones from this deposit appeared heated, so it is likely that they became mixed in at some point after the ashes had cooled.

Phase 4: 13th century

Contrasting with the earlier periods, most fish remains (NISP 843) derived from occupation layers, floor deposits or charcoal layers rather than from pits.

Tenement A

Fish remains were frequent in samples from occupation deposits in Room 1 of Building 1 and also from posthole 7281 in the same room. Of the 546 identified bones, 70% were clupeid, mainly herring but also including sardine, and only 4.5% were eel. Small cyprinids were common. Other fish include whiting, haddock and medium-sized cod, plaice, tub gurnard, thornback ray as well as small freshwater fish: cyprinids including roach, small pike and possibly ruffe. Hand-collected bones comprised large cod postcleithrum and supracleithrum fragments, the latter possibly chopped through, as well as part of a large haddock cleithrum: these bones from the back of the head of large or very large gadids could have come from dried fish. Sample 3148 from drain fill 4140 (Structure 7) included small bones mainly of herring but also of sardine, eel and small gadid. Sample 5134, from occupation layer 7679, included a few herring, small pike and eel vertebrae.

Tenement B

Of the 292 identified bones, which mostly came from occupation and floor deposits in Building 2 (Rooms 1 and 2) but also from Pit Group 12, 70% are clupeid (mostly herring with occasional sardine) and 11% are eel. Other taxa include ray, small gadid including whiting, haddock, red gurnard, conger eel and small flatfish as well as occasional freshwater fish: tiny cyprinid and possible pike. A single hake precaudal vertebra was hand-collected from pit 9671.

Phase 5: 14th to early 15th century

The fish assemblage, comprising 1466 identified bones, came from a mix of occupation and floor deposits, pit fills and other feature fills associated with Tenements A, B and C.

Tenement A

Sample 3183 from pit 4301 (fill 4308), of Pit Group 14 included bones of herring and eel (42% and 10%

of the assemblage respectively) as well as a collection of small and tiny freshwater fish bones that included 30 three-spined stickleback bones, and 34 small cyprinid bones including 14 pharyngeals of roach, bleak, minnow and gudgeon. There were also two bullhead vertebrae. Apart from these small bones, there were occasional ray dermal denticles and haddock, small gadid, small conger eel and mackerel vertebrae. A significant proportion of the herring and eel bones were dark brown and oily and distorted, consistent with cooking and subsequent mastication, and it is likely that the feature contained plate scrapings and/or latrine waste.

Samples 5064 and 5068, which were taken from the fills of a drain (group 8077) and linear cut in Building 1, Rooms 1 and 3, included a well-preserved bone assemblage again numerically dominated by herring bones, with occasional sardine, occasional eel, red or tub gurnard, small gadid, mackerel and possible scad, together with small salmonid, small pike and cyprinid. Unusually for this site, there were also 11 large and very large posterior caudal vertebrae probably of cod as well as a cod cleithrum fragment and a single large ling posterior caudal vertebra. These bones may indicate the consumption of stockfish, as discussed further below.

Tenement B

Apart from a relatively small group of fish bones from pit 10202, all the recorded fish remains came from occupation or floor deposits in Room 2 of Building 2 and Room 1 of Building 6. Preservation in these deposits was good and again the assemblage is dominated by the small bones of clupeid, mainly herring (66%) and eel (21%), with bones from the head and vertebral column present and very small numbers of vertebrae distorted consistent with mastication in this case. A fairly large conger eel premaxilla was hand retrieved from floor surface 8993 in Building 2, Room 1. The range of other taxa is very similar to assemblages from previous phases and areas, comprising small gadid including whiting as well as flatfish (plaice, flounder or dab and possibly sole), medium-sized cod and haddock, small conger eel, ray(s) and mackerel, salmon or sea trout and cod, saithe or pollack, the last identified only from a large posterior caudal vertebrae and cleithrum fragments. Exclusively freshwater fish included roach, tench, perch, small pike and stickleback. The hand-retrieved bones comprised two large and very large cod supracleithra, a very large cod postcleithrum and a cleithrum fragment from a cod of around 1m long, all of which may have come from preserved stockfish.

Tenement C

Apart from a very large gadid abdominal vertebra, all the recorded fish remains came from occupation deposit 7121 (sample 5), Room 1 of Building 3 and were mainly from sea fish: herring, whiting, haddock, large gadid, gurnard and flatfish. Freshwater fish are represented by eel and a ceratohyal from a pike of in excess of 0.35m.

Phase 6: mid-15th to mid-16th century

The greatest quantity of fish remains, almost 2000 identified items, was recovered from soil samples taken from the laminated and often charcoal-rich occupation layers in the buildings in Tenements A, B, and C, with significant assemblages also recovered from cesspit fills (Structure 11) in Tenement B.

Tenement A

Occupation layers in Room 1 of Building 1 proved to include a variety of mostly well-preserved fish remains (22% herring, 31% eel, 26.5% gadid, 16% other taxa). The gadid bones included cranial and post-cranial bones of whiting and haddock as well as posterior caudal vertebrae and a post-temporal from large cod. Other fish remains included the distinctive thornback ray buckler, various tub gurnard bones (occasionally calcined), a small plaice premaxilla and other fairly small flatfish bones. There were also several pike vertebrae and a dentary fragment, several small cyprinid vertebrae including barbel type, and two large salmon or sea trout vertebrae. It seems likely that these accumulated from the dispersed remains of meals prepared and eaten in the room or nearby.

Tenement B

Fish remains mostly derived from samples taken from occupation layers, floor surfaces, a charcoal layer and a hearth deposit in Rooms 3 and 4 of Building 2 and an occupation layer in Room 1 of Building 7 as well as a layer of silt in Building 6, a general dumped deposit and the cesspit fills of Structure 11.

A large assemblage of 739 fish bones and, occasionally, scales was recovered from samples taken from surfaces within Room 3 in Building 2. Although deposit 8868 was described as burnt, there was no evidence of the fish bones having been burned and most bones from this building were in good condition. Thirty-five percent of the identified bones were eel, from a minimum of five fish. Measurements taken on the cranial bones indicated that the eels ranged in size from 0.32m to 0.77m. Clupeid cranial and post-cranial bones, all probably herring, accounted for 21.5% of the assemblage and flatfish bones for around 8% although a collection of bones from occupation deposit 8685 probably come from a single plaice. The distribution of flatfish bones, all of which come from occupation deposits, indicates that these were probably discarded as entire fish or fish frame, something that may also be true of other fish in the assemblage including tub gurnard and smaller gadids including whiting and

haddock. Freshwater fish accounted for 21.5% of the assemblage and were mainly small pike and cyprinids including roach and dace or young chub but there were also a few pike bones from larger fish of up to *c* 0.4m. These remains again included cranial bones and vertebrae suggesting that entire fish or fish frames accumulated in the occupation layers. There are also a few large gadid bones as well as occasional remains of fairly small conger eel, mackerel, scad, grey mullet, perch and salmonid.

Far fewer fish bones were recorded from Room 4 in Building 2 and 41% were from at least two eels. Herring account for an additional 31% of bones with the remainder comprising small numbers of bones of plaice, flounder or dab, small gadid(s), small conger eel, gurnard, and pike of up to about 0.4m total length, as well as a large salmon or sea trout and small cyprinids including roach, dace and a chub of *c* 0.35m.

Occupation deposit 9021 (sample 5114) from Room 1 in Building 7 included bones from a similar suite of fish, dominated by bones of herring and eel but in each case possibly from only a few individuals. Right-eyed flatfish including plaice, red and tub gurnard, small and medium-sized pike, perch and small cyprinid including roach were also identified. A very large cod caudal vertebra and a large conger eel articular also came from this building.

Stone-lined cesspit Structure 11 included a suite of fish bones in good or fair condition. A couple of eel vertebrae showed the typically corroded appearance indicative of having been digested but none of the bones were clearly masticated (chewed). Although numerically dominated by bones of eel and herring, the fills also included posterior caudal vertebrae from large and very large cod and ling, bones typically found in dried stockfish. This indicates that the feature contained kitchen or table waste in addition to any faecal material. Bones from smaller cod include head bones, suggesting that some cod were purchased as whole and probably fresh fish. Other taxa identified from bones in the cesspit include conger eel, gurnard, right-eyed flatfish, pike, small cyprinid, perch, salmon or sea trout and possibly shad. One pike dentary came from a large fish.

A pair of pharyngeal bones, one from a tench of *c* 0.23m, was recovered from sample 5023 (silt layer 9615, Building 6) as well as a fragment of pike palatine bone and several whiting, small gadid, clupeid and right-eyed flatfish bones.

Tenement C

Two samples (5002 and 5005) came from occupation layers in Room 2 of Building 3 and samples 4003 and 4005 came from Room 1 of the same building. The fish remains from Room 2 were more abundant and mainly from small fish: eel, herring, cyprinid including roach, together with occasional gurnard, small- to moderate-sized flatfish and small gadid including whiting. Measurements on the eel bones indicated a range of fish sizes from 0.30–0.73m. A single sardine vertebra was also present, as was a large cod cleithrum fragment. The smaller assemblage from Room 1 included a large cod otolith as well as three large ling precaudal vertebrae, a large cod, saithe or pollack caudal vertebra and several flatfish vertebrae, one probably flounder. Three hand-collected bones from made-ground deposits comprised a very large cod precaudal vertebra, a very large cod cleithrum fragment and a large haddock cleithrum fragment.

Fishing the waters around Oxford

The consistent presence in the Magdalen samples of bones from small and tiny freshwater fish, particularly cyprinids and immature pike (picarel) but also perch, bullhead, ruffe and even stickleback, is a feature of many Oxford sites where samples from cesspit, rubbish pit and occupation deposits have been sieved (eg Nicholson 2006; 2010; 2019; 2020). It illustrates the importance of local freshwater fisheries to the townsfolk, where fishermen operated using a range of nets and traps in the free waters such as those which stretched from Magdalen Bridge in the east to Godstow in the west (Prior 2011, 61).

Another feature of the Magdalen assemblage that augments findings from previously reported excavations is that burbot, now extinct in Britain, occurs in samples of late Saxon and possibly Norman date but does not appear thereafter, and that the identified bones are from small individuals (eg Nicholson 2019). This suggests that burbot were living in rivers flowing in or close to Oxford while the settlement was developing and were probably caught together with other immature fish. It seems likely, however, that increasing urban development and the construction of mills and weirs led to increasing levels of pollution and obstruction in the Thames and the Cherwell which may have led to the decline of this fish locally. In recent centuries burbot were confined to rivers in the east of England, such as the Great Ouse.

Fish marketing and consumption

Although large freshwater fish such as mature chub, bream and pike commanded a high price – 12d for a pike compared to ¼d for herring in 15th-century Staffordshire (Dyer 1988) – small freshwater fish such as those which were common in the Magdalen samples would have been very much cheaper. However, despite being bony and not considered palatable today, it is worth noting that 'minnows' and 'roches et perches' (roach and perch) even feature in the account rolls of wealthy households such as such as those of John de Multon of Frampton in 1343–4 (Magdalen College, Oxford Estate Paper 85/2).

The centuries after the Norman Conquest saw the increasing imposition of fast days or 'fish days',

days when meat of quadrupeds was proscribed, initially for clerics but increasingly for lay people too. Apart from Lent, eating meat (excluding fish and other kinds that were classed as fish, such as the flesh of marine mammals) was forbidden on all Fridays and Saturdays and Wednesdays too until the early 15th century. This had the obvious effect of stimulating the fishing industry and of increasing fish consumption. However, while the wealthy had access to a diverse range of fish both from the coastal markets and from their own fishponds or moats, the general townsfolk would have relied far more heavily on preserved fish along with fish caught locally in areas where the rights to local fisheries were not entirely owned by religious houses and wealthy landowners. Salt fish fell out of favour with the abolition of compulsory fish days at the end of the 16th century, along with the imposition of a salt tax in 1643 (Wilson 1991, 51).

While the fish remains are relatively diverse, the samples from the Magdalen tenements all appear to conform to a fairly standard pattern, numerically dominated by herring and eel with a lesser but consistent presence of small gadids, mainly or entirely whiting as well as haddock, flatfish which are predominantly plaice, gurnards and small freshwater fish. The co-occurrence of herring and eel is typical of sites in Oxford and elsewhere, especially during the late Saxon and medieval periods, and it seems likely that much of the fish prepared and eaten was preserved. Herrings would have been pickled or salted in barrels, and, from the 13th century, some smoked 'red' herrings may also have been eaten (Wilson 1991, 33). Prior to the 14th century herrings were salted on the shore without gutting and would have perished quite quickly; later methods involved gutting and soaking in brine before packing in barrels with layers of salt (ibid.). Among the clupeid bones, most of which are herring, are occasional examples of sardine (pilchard). These fish shoal around the coast of Devon and Cornwall in late summer and autumn and were the source of an important fishery. However, since sardines also appear in the English Channel and southern North Sea their presence at Magdalen does not necessarily demonstrate the activity of this important regional industry.

Eels too may have been salted; they were imported in large quantities from Flemish merchants (Wilson 1991, 37) but were also commonly kept in millponds and some are likely to have been caught locally and eaten fresh. Measurements taken on several eel cranial bones show that both immature and mature eels were eaten in all periods represented in the Magdalen assemblage, although most were in the size range 0.3–0.5m.

At some point after the Norman Conquest (Phase 3) larger gadids including cod, ling and hake appear in the bone assemblage. These are likely to have been sold as preserved fish. Whiting and haddock may have been preserved by drying or wet salted, although in this case as whole fish. Barrels of dried haddock, dried plaice, barrelled salmon, eels, and various types of dried and salted cod and related large gadids referred to by a range of names such as 'croplings' and 'titling' were imported into London in the 15th century (Cobb 1990, cited in Locker 2001) and some of these seem likely to have been brought to Oxford.

Stockfish, which were wind dried and had to be beaten and given a long soaking before cooking, were widely traded originally from northern Scotland but from Bergen and other Hanseatic ports in the 13th–15th centuries and subsequently from Iceland, the Faroes and Newfoundland. Along with herrings, these fish were often considered to be a food for the masses (Wilson 1991, 45), although both also feature in the household accounts of wealthy families and institutions. Hake, identified in Tenement B in pit 9671 (Phase 4) and occupation layer 6440 (Phase 6), has a south-western distribution so it is possible that some fish were being purchased by fishmongers from merchants operating in that area, although hake was imported into Southampton during the 14th century (Locker 2001, 79) and may have been subsequently distributed to towns such as Oxford.

Certainly, keeping fish fresh on the journey inland to Oxford would have been difficult, especially in the summer months, and particularly when the Thames probably became unnavigable due to obstructions caused by mills and fish weirs by the later medieval period, a situation not resolved until the 16th century (Prior 2011, 36; Bond *et al.* 2019). It is therefore possible that flatfish and even fish such as gurnards, grey mullet and scad were also salted, but the possibility that these were sold as fresh fish cannot be discounted: 16th-century documents show that fresh sea fish was available in Oxford, brought by rippiers (coachmen) operating from the ports (ibid.). Away from the coast, fresh sea fish was inevitably more expensive than salt fish due to its perishability (Wilson 1991, 38) so it is likely that much of the fish purchased by the occupants of the Magdalen tenements had been preserved in some way.

PLANT REMAINS *by John Giorgi*

Following assessment of a total of 392 processed samples, 98 samples containing large amounts of charred plant remains from Phases 1 to 6 were selected for analysis. Waterlogged and mineralised plant remains from 12 samples were also recorded from a detailed scan. The methodologies used are detailed in Appendix 8, as are more detailed results and discussion. Nomenclature for the botanical identifications follows Stace (2005), which was also used for habitat and ecological information along with Hanf (1983) and Wilson and King (2003).

Over 22,000 charred items have been quantified from the 98 analysed samples. The bulk of the material consisted of cereal grains, in addition to

which were small amounts of chaff fragments and other plant remains, largely wild plant/weed seeds but also other cultivars, particularly legumes, and wild food resources, notably hazel (*Corylus avellana*) nutshell fragments. Almost two-thirds of the quantified charred remains were from Phases 4 to 6 (13th to mid-16th century) with smaller amounts from Phases 1, 2 and 3 respectively. Anaerobically preserved (waterlogged) and mineralised plant remains were recorded from 12 samples from Phases 3 to 6 and 8. They show a limited species range, largely from wild plants but including evidence for a few cultivated species. Most of the other samples from the site also contained occasional and small numbers of uncharred seeds but from only one or two species, mainly elder (*Sambucus*), which may be intrusive. Tabulated results are presented in Appendix 8.

Phase 1: 10th to mid-11th century

Nineteen out of the 20 assessed samples produced identifiable charred plant remains, including exceptionally rich assemblages in two samples, Ditch 1 fill 9367 and 'pit' 9196 (fill 9194) which may have also formed part of the same ditch, with estimated densities of 417 and 1346 items per litre of processed soil in the ditch and pit fill samples respectively (Table 4.11). A modest-sized assemblage was also recovered from pit 4181 (fill 4182), Pit Group 1. The quantified remains in these three samples were made up largely of cereal grains (75% of the counted material) along with some cereal chaff and other plant remains (Table 4.11; Fig. 4.8).

The cereal grains consist mainly of rye (*Secale cereale*), recorded in seven samples and also represented by good amounts of chaff, followed by fewer but still large amounts of wheat (*Triticum*) grains, present in 15 samples, the identifiable ones consisting virtually entirely of free-threshing wheat (*Triticum aestivum/turgidum*). Good amounts of free-threshing wheat rachis fragments were mainly from hexaploid bread wheat (*Triticum aestivum*) but there was also a single rachis fragment of tetraploid, probably rivet wheat (*Triticum turgidum*). Glume

Table 4.11: Phases 1 to 3: proportion of grain to chaff to other plants in samples with 100+ quantified items

Phase	*Tenement*	*Context (feature)*	*No. items*	*Item density (per litre of processed soil)*	*Grain (%)*	*Chaff (%)*	*Other plants (%)*	*Main cereal grains*
1	-	9367 (Ditch 1)	781	417e	79	14	7	Rye and then free-threshing wheat
1	-	9194 (pit 9196, Ditch 1)	1346	1346e	72	24	4	Rye and then free-threshing wheat
2	B	6272 (pit 6203, Pit Grp 5)	521	209e	83	9	8	Free-threshing wheat
2	B	6491 (pit 6492, Pit Grp 7)	105	2.8	90	-	10	Rye and then oats
2	C	6861 (pit 6860, Pit Grp 8)	127	3.2	80	1	19	Free-threshing wheat then oats
2	C	6401 (pit 6375, Pit Grp 8)	100	10.8	96	2	2	Free-threshing wheat
2	C	7191 (burnt layer, hearth 7195, Structure 4)	131	12.1	82	1	17	Free-threshing wheat
3	A	5018 (pit 5017, Pit Grp 3)	163	4.1	45	-	55	Mix of all 4 cereal grains
3	B	6189 (pit 6203 (Ph 2 pit, Ph 3 fill), Pit Grp 5)	130	3.3	72	1	27	Mix of all 4 cereal grains
3	B	6502 (pit 6503, Pit Grp 6)	106	2.7	59	4	37	Mix of 3 cereal grains
3	B	8946 (pit 8945, Pit Grp 6)	282	7.8	89	1	11	Free-threshing wheat
3	B	9193 (pit 9185, Pit Grp 6)	1181	1907e	80	13	7	Rye and then free-threshing wheat
3	B	9191 (pit 9192)	131	4.4	53	1	46	Mix of 3 cereal grains
3	C	6355 (pit 6370)	250	6.3	59	-	41	Mix of all 4 cereal grains
3	C	6808 (deposit, hearth 6809, Structure 5)	456	22.8	92	2	6	Free-threshing wheat and smaller nos of rye grains
3	C	7173 (occupation layer, Structure 4)	115	11.5	5	-	95	Few mixed cereal grains
3	C	7162 (occupation layer, Structure 4)	316	17.6	88	3	9	Mix of cereal grains
3	C	7174 (occupation layer, Structure 4)	156	31.2	82	6	12	Barley and oats

HNS = hazelnut shell; e = projected density based on sub-sample

fragments of free-threshing wheat were also noted in two rich samples while some of the cereal awn fragments were tentatively identified as wheat. These two samples also contained traces of hulled wheat (*Triticum dicoccum/spelta*) represented by a few grains and a spikelet base, perhaps relics of previous harvests growing as cereal weeds and/or residual material although emmer has occasionally been identified from Saxon contexts in Oxfordshire (Pelling and Robinson 2001).

There was relatively very little evidence for other cereals in this phase with only small numbers of barley (*Hordeum vulgare*) grains in 13 samples including hulled and twisted ones indicative of six-row hulled barley; this cereal was also identified by a few rachis fragments in one sample. Small numbers of oat (*Avena*) grains were found in eight samples; a few floret bases showing the presence of cultivated oat (*Avena sativa*) with oat awn fragments were also present in pit 9196 (fill 9194).

The two main cereals in these samples, free-threshing (bread) wheat and rye, along with hulled barley and oats, represented by fewer remains, are the main grains found in the late Saxon period in southern England (Greig 1991, 315). Hexaploid bread wheat is augmented by evidence of tetraploid rivet wheat from the late Saxon period onwards (Carruthers and Hunter Dowse 2019, 106). Remains of both hexaploid and tetraploid wheat were found in late Saxon deposits from excavations at Oxford Castle (Pelling 2019).

The charred plant remains in the two rich assemblages (from Ditch 1 and pit 9196) largely represent the remains of almost fully processed rye and free-threshing (bread) wheat grains, which may have been accidentally burnt during drying before storage or milling, such activities perhaps taking place close by before the charred debris was dumped into the pit and large roadside/field ditch. The burnt chaff in the two samples, however, also suggests that threshing activities from the earlier stages of crop processing may have also been taking place in the vicinity, the chaff subsequently being used as fuel perhaps for drying the grain. Corncockle (*Agrostemma githago*) was the dominant wild plant seed in these two rich assemblages,

Other plants	*Assemblage interpretation*
Weed seeds mainly *Agrostemma githago*	Virtually fully processed grain but also some evidence for threshing
Weed seeds mainly *Agrostemma githago*	Virtually fully processed grain but also some evidence for threshing
Mainly HNS and weed seeds	Virtually fully processed grain
Mainly HNS and weed seeds	Virtually fully processed grain
Mainly HNS and weed seeds	Virtually fully processed grain
Traces of HNS and weed seeds	Virtually fully processed grain
Mainly HNS and weed seeds	Virtually fully processed grain
Mainly HNS and weed seeds; some pulses	Mix of cleaned grain and hearth debris (HNS and by-products of crop processing)
Mainly HNS; also few weed seeds and pulses	Mainly food debris (grains, pulses, HNS)
Mainly HNS and weed seeds	Mix of cleaned grain and hearth debris (HNS and by-products of crop processing)
Mainly weed seeds and HNS	Virtually fully processed grain
Mainly weed seeds especially *Agrostemma githago*	Virtually fully processed grain but some evidence for threshing
Mainly HNS; few weed seeds	Mainly food debris (grains and HNS)
Mainly HNS and weed seeds	Mix of cleaned grain and hearth debris (HNS and by-products of crop processing)
Mainly weed seeds and legumes; little HNS	Virtually fully processed grain
Mainly HNS (91%) and a few weed seeds	Mainly HNS food debris
Mainly HNS and legumes; very few weed seeds	Virtually fully processed grain
Few HNS fragments, legumes and weed seeds	Mostly processed grain (*c* 25% germinated) ?brewing activities

including clumps fused together (probably partly representing seed heads) in pit fill 9194 which may be associated with the earlier stages of crop processing. The large number of grain-sized individual weed seeds, which include corncockle and brome (*Bromus*), however, are also indicative of almost fully processed crops. Such weed seeds can be common in stored grain because of the difficulty of separation other than by hand-sorting.

It is possible that the rye and free-threshing wheat grains in the two samples may have been grown together as a maslin crop, although mixing of the two cereals may have simply occurred at some stage after harvesting through to deposition. Indeed, the separate cultivation of each may be tentatively suggested by the weed seeds; those indicative of sandy loams in which rye is often grown included corncockle and cornflower (*Centaurea cyanus*), both weeds which were once frequent contaminants of rye (Wilson and King 2003); bread wheat, on the other hand, grows best in heavy and rich soils which may be indicated by the presence of stinking chamomile (*Anthemis cotula*).

Other late Saxon sites in Oxford have produced evidence for all four cereals, free-threshing (including bread) wheat often being the dominant grain, for example along with hulled barley in deposits from excavations at 11–12 Queen Street (Robinson 1983) and at 114–119 St Aldate's/4–5 Queen Street (Giorgi 2020a) and large assemblages of free-threshing wheat grain from excavations at All Saints Church (Robinson 2003, 389) and Lincoln College Kitchen (Kamash *et al*. 2002). Rye, on the other hand, is generally found in smaller quantities in late Saxon samples from across Oxford and therefore its dominance in these two samples during this period is of note.

During the Saxon period cereals would have been used for food, drink and fodder. Bread was a staple food at the time and all the grains could have been ground to produce flour either on their own (except oats) or as mixes for bread, with a preference for white leavened wheat bread (Hagen 1994, 125), probably the main use of the free-threshing wheat grains from the site. Bread wheat, which the rachis evidence suggests was the main free-threshing wheat grain on the site, produces relatively strong flour suitable for bread making; rivet wheat on the other hand, the presence of which was based on just one rachis fragment, produces weaker flour more suitable for biscuits. The cereals may have also been used for gruel or porridge which probably formed a significant part of the Saxon diet (Hagen 1994, 60) while oat, barley and rye meal was used in cereal pottage (Wilson 1991, 197). Grains were also used for brewing although none had sprouted to suggest that they were being used for such activities during this period. Barley and oats were also used as animal fodder.

A good number of charred legumes were also recovered from this phase, the few identifiable remains showing the presence of broad bean (*Vicia faba*) in Ditch 1 fill 9367 and possibly common vetch (cf *Vicia sativa*) in the two rich assemblages. A good majority of the charred legumes, however, were too poorly preserved or fragmented to be identified to species although the larger seeds may belong to cultivated pulses including *Vicia/Lathyrus* (vetch/tare/vetchling) and *Vicia/Pisum* (bean/pea) seeds.

Legumes are usually only found in small amounts as charred remains although broad bean (and pea) have been identified in Saxon deposits and common vetch from the late Saxon period onwards from sites in southern England (Carruthers and Hunter Dowse 2019, 106; Greig 1991, 317). In Oxford a large quantity of broad beans, along with peas, was found in an 11th-century deposit from Folly Bridge (Robinson 1984, 78–9) and a broad bean identified in a late Saxon pit at the Nun's Garden, Queen's College (Giorgi 2015, 179).

Pulses would have been an important source of protein (Carruthers and Hunter Dowse 2019, 106), beans (and peas) used for human consumption including bread, particularly in times of famine following poor harvests (Hagen 1994, 108) and in soups/broths and pottage (Wilson 1991, 201–2) and also as fodder, beans being fed to horses. Cultivated vetch was probably mainly grown as a fodder crop but may occasionally have been used for bread and pottage (Carruthers and Hunter Dowse 2019, 106). Pulses could also have been dried after harvest and stored for long-term use and were a useful break crop between cereals for restoring nitrogen levels to the soil (Campbell *et al*. 1993, 134). Evidence of wild plant foods is restricted to occasional charred hazelnut shell and a charred elder seed.

Charred wild plant seeds made up only a small proportion of the quantified remains and probably largely represent arable weeds incidentally imported onto the site with the harvested cereals. Corncockle, together with a few records for cornflower, knotweed (*Polygonum aviculare*), black bindweed (*Fallopia convolvulus*) and sheep's sorrel (*Rumex acetosella*) may indicate the cultivation of sandy loam soils while small numbers of seeds of stinking chamomile may suggest the use of calcareous soils for growing crops. The soils in the Thames Valley around Oxford are neutral to calcareous with acid sandy soils in the hills around the city.

Several weeds, cornflower and brome (*Bromus*) may point to the winter sowing of crops while black bindweed may indicate spring-sowing of cereals. Bread wheat and rye, the two main cereals in this phase, are usually winter-sown while barley and oats are sown in both periods. A few weeds of low to medium height in the samples including stinking chamomile and sheep's sorrel may tentatively suggest that the cereals were harvested fairly low on the straw; cereal straw would have served a number of useful purposes for thatching, flooring, fodder or simply fuel, rye straw being particularly valued for thatching. While it is not possible to differentiate between the stems of cereals and wild grasses, it is probable that the fairly good amounts

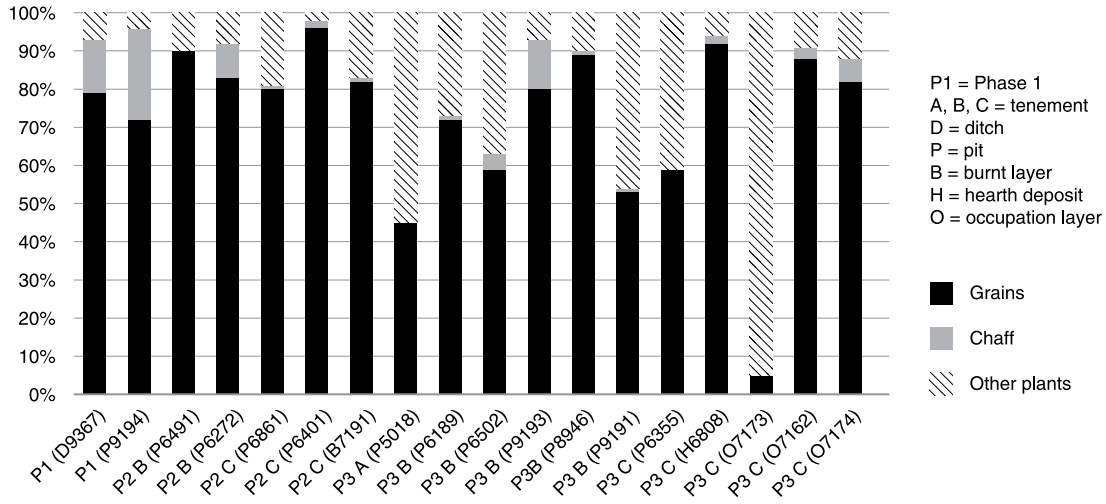


Fig. 4.8 Phases 1 to 3: proportion of grain to chaff to other plants in a selection of samples with 100+ quantified items

of Poaceae culm node fragments in the two rich assemblages represent burnt straw given their association with large amounts of other charred cereal debris.

Phase 2: late 11th to mid-12th century

The quantified remains in the seven analysed samples consisted largely of cereal grains (82% of the counted material) along with traces of cereal chaff and other plant remains (Fig. 4.8). The results are broadly similar to the late Saxon phase in terms of cereal representation although free-threshing wheat rather than rye was the main grain (Table 4.11) and traces of rachis fragments in several samples demonstrate the presence of hexaploid bread wheat. Rye and oats were the next two best represented cereals, identified in 15 and 19 assessed samples respectively, while there were fewer grains of (six-row) hulled barley in 13 samples.

Archaeobotanical and historical evidence shows that these crops, free-threshing wheat, hulled barley, rye and oats, continued to be the main cereals cultivated from the Saxon into and throughout the medieval period in England (Carruthers and Hunter Dowse 2019, 124; Greig 1991, 321; Moffett 2006). Charred plant remains from other early medieval sites in Oxford show similar results with free-threshing (including bread) wheat often the main cereal, as for example at Corpus Christi College (Smith 2014, 206), the Nun's Garden, Queen's College (Giorgi 2015) and Merton College (Giorgi 2020b) and along with hulled barley in excavations at 114–119 St Aldate's/4–5 Queen Street (Giorgi 2020a), and along with hulled barley and oats in excavations at Queen Street (Giorgi 1999).

Wheat made the best and therefore most expensive bread in the medieval period (Hammond 1995, 2), bread wheat having superior bread-making qualities to rivet wheat (Moffett 2006, 47–8). Wheat flour may have also been used for pies and pastries. Rye was the other main bread-making grain, consumed mostly by peasants and the less well-off (Campbell *et al*. 1993, 26, 38; Hammond 1995, 2). It is generally considered to have only been a minor crop in medieval Oxford, only occasionally found as the dominant cereal in charred grain assemblages, as in an early to mid-14th-century bread oven in excavations at Lincoln College Garden Building (Boardman 2020a), with large amounts also recovered in several late 12th-century to mid-13th-century pits in excavations at the Greyfriars (Westgate: Meen and Cook forthcoming). Barley and oats may have been occasionally used for bread in mixes of grains or on their own (except oats) and in pottage (Wilson 1991, 199). Cereals were also used for brewing, although there were no germinated grains and/or loose coleoptiles to suggest that such activities were taking place on site during this phase. Barley and oats were also used as fodder.

Evidence for other arable crops in this phase included traces of broad beans in three samples while some of the larger indeterminate legume seeds in a few samples may also be from cultivated pulses. A small number of mineralised legume seeds including possibly broad bean were also found in pit 5058, Tenement A (Pit Group 3).

Other potential wild food debris included occasional and small amounts of charred hazelnut shell in 23 samples and an elder seed in one while a few mineralised fruit seeds in pit 5058 included elder as well as apple/pear (*Malus*/*Pyrus*).

There was not a particularly wide range of weed seeds in this phase, individual species being represented by few seeds, but it did include a number of species also identified in the late Saxon phase. There was poorer representation of weeds often associated with the cultivation of sandy soils with only traces of corncockle and sheep's sorrel in single samples but a better representation and range of species often found in calcareous soils; in addition to stinking chamomile identified in the late Saxon phase, there

were occasional records for thorow-wax (*Bupleurum rotundifolium*), field madder (*Sherardia arvensis*) and narrow-fruited cornsalad (*Valerianella dentata*), the last two mainly found in light calcareous loams. As noted above, bread wheat would have grown well in such soils found in the Thames Valley bottom, the better representation of these weeds perhaps reflecting the greater amount of evidence for free-threshing (bread) wheat in this phase.

Several weeds including brome, field madder and cleavers (*Galium aparine*), may suggest the winter sowing of cereals, and narrow fruited-cornsalad the spring sowing of crops, while a few weeds of low to medium height in the samples, once more including stinking chamomile and sheep's sorrel but also thorow-wax, may perhaps indicate that the cereals were harvested fairly low on the straw.

Other wild plants in these samples included a few records for grassland species including self-heal (*Prunella vulgaris*) and yellow rattle (*Rhinanthus minor*) which together with occasional seeds of sedge (*Carex*), spike-rush (*Eleocharis*), branched bur-reed (*Sparganium erectum*) and wild grasses (Poaceae), may represent burnt residues of grassland vegetation, possibly collected for fodder or fuel and the sedges and rushes as flooring/thatching materials, from grassland and wetland areas close by.

Composition and distribution of the Phase 2 charred plant remains

There was one rich sample from Pit Group 5 in Tenement B, from an upper fill of pit 6203, dominated by free-threshing (bread) wheat. Otherwise the distribution of charred plant remains in samples from across the three tenements in this phase of the site only shows modest concentrations of mainly burnt cereal grains in a few Pit Group 2 and Structure 1 samples in the south half of Tenement A, in one sample from Pit Group 7 behind the High Street frontage in Tenement B, and in several samples from Pit Group 8 and one from Structure 4 in the north and southern areas respectively of Tenement C.

Comparisons of the charred cereal remains between the tenements are limited because of the generally small amounts of material, although there do not appear to be any significant differences between the charred plant assemblages. Grains are the main feature of the charred assemblages, free-threshing wheat being the dominant cereal in a few samples from Tenements A, B and C and rye and oats the main cereals in a sample from Tenement B. The charred remains represent virtually fully processed grain, perhaps accidentally burnt while being dried before storage or milling or in cooking accidents, together with a little other food debris (legumes, hazelnut shell). There was very little evidence for other crop-processing activities particularly from the earlier stages of cleaning including the threshing of the crops. The modest-sized grain assemblages suggest low-level, perhaps domestic activities, associated with the final stages of crop processing and food preparation.

Phase 3: late 12th to early 13th century

Forty-seven samples collected from this phase contained charred plant remains, eight from Tenement A, 25 from Tenement B and 14 from Tenement C. There was one exceptionally rich assemblage from 9185 (Tenement B). Another 14 samples produced fairly good to good-sized assemblages (between 50 and 500 charred items) which were also sorted, identified and quantified. The quantified remains in this phase consisted mainly of cereal grains (70% of the counted material) with a small amount of cereal chaff and other plant remains (Table 4.11; Fig. 4.8). Waterlogged and mineralised plant remains were also present in a pit fill sample (Appendix 8, Table 5).

The representation of the different cereals is broadly similar to the previous phases: free-threshing wheat and rye are the main cereals, equally represented by grains but with free-threshing wheat identified in 42 samples and rye in only 20. Free-threshing wheat rachis fragments include hexaploid rachis fragments (occasionally in large amounts), suggesting that bread wheat was again the main wheat grain. The definite presence of rivet wheat is represented by traces of tetraploid rachis fragments in one sample. Rye rachis fragments were present in nine samples. There were also traces of hulled wheat (grains and chaff) in several samples, these remains representing either residual debris and/or relics of previous harvests growing as cereal weeds. The other cereals, oats followed by (six-row) hulled barley, were represented by much smaller numbers of grains.

Other arable crops in this phase included evidence for pulses showing the continued presence of broad bean (represented by a small number of seeds in one sample) and traces of common vetch in three samples. Some of the small to modest amounts of larger legume seeds in the samples may also be from cultivated pulses, including several identified as possibly beans or peas.

Other potential wild food debris included several hundred charred hazelnut shell fragments in 39 samples, mainly as only occasional finds or in small amounts but with good amounts weighing 1.1g in occupation deposit 7173 (Tenement C) and 0.3g in pit 9192 (Tenement B). There was also a large amount of uncharred fruit stones and fruit seeds in pit 3955 (Tenement A) with good numbers of mineralised and waterlogged *Rubus* seeds, including blackberry (*Rubus* Sect *Glandulosus*) and raspberry (*R. idaeus*), and elderberry seeds. This pit also contained occasional mineralised apple/pear seeds and mineralised *Prunus* fruit stones, including plum/damson/bullace/greengage (*Prunus domestica* type), the latter also found charred in one sample. A charred sloe/blackthorn (*Prunus spinosa*)

fruit stone was also identified in another sample.

As well as for food, these fruits may have had a number of uses: plums and damsons for dyes and sloes for verjuice and dyes. Apples, one of the most widely cultivated fruits in the medieval period, were used for cider and verjuice. Fruits may have been grown in kitchen gardens and in orchards within and outside the town although the wild fruits including blackberry and elderberry and hazel nuts may have been gathered from further afield, from hedgerows and woodlands.

The range of weeds represented in this phase was not dissimilar to the earlier phases of the site, with evidence again for the cultivation of both sandy and calcareous soils; potential indications for the use of sandy loams for growing crops included corncockle and occasional records for cornflower, knotweed, black bindweed and sheep's sorrel. As noted above, corncockle and cornflower were once frequent contaminants of rye. A range of weeds often found in (light) calcareous loams included stinking chamomile, along with occasional records for field madder, narrow-fruited cornsalad and the first record for *Lithospermum arvense* (corn gromwell).

Again, there is potential evidence from the weed seeds for both spring sowing of crops, with the presence of black bindweed and narrow-fruited cornsalad, and winter sowing, indicated by the presence of cleavers, cornflower and brome. A few weeds again of low to medium height in the samples including stinking chamomile and sheep's sorrel may suggest that the cereals were harvested fairly low on the straw. Grass culm node fragments in six samples, including a good amount in pit 9185, may indicate burnt straw.

Potential grassland plants, represented by small numbers of charred and uncharred seeds in the samples, including knapweed (*Centaurea nigra*), rush (*Juncus*), sedge and wild grasses (Poaceae), may represent the residues of vegetation collected from damp grassland/meadows near the river for uses on site, possibly for hay, flooring/thatching materials or fuel and tinder. Wetland plants, such as water plantain (*Alisma*) and branched bur-reed may have been incidentally collected at the same time. A few mineralised bracken (*Pteridium*) frond fragments in one sample may be from the collection of this plant from acidic habitats, perhaps from the hills around Oxford, for possible uses on site including as animal bedding, fuel and tinder.

Composition and distribution of the Phase 3 charred plant remains

The distribution of charred plant remains in samples from across the three tenements in this phase shows a concentration of material in Tenement B, notably in samples from Pit Group 6 to the rear of the High Street frontage, with a particularly high densities of virtually fully processed grain dominated by rye and then free-threshing wheat in fill 6189 of pit 9185 in Trench 127. These remains may indicate potential areas of activity associated with the final stages of large-scale crop-cleaning/food preparation (including the drying of grain before milling/storage) and perhaps areas of grain storage close by; there was also some evidence to suggest threshing activities from the earlier stages of crop-cleaning in the vicinity of pit 9185.

Several other Pit Group 6 samples produced lower amounts of charred material mainly representing food debris (consisting largely of grains and hazelnut shell) mixed with a little debris from crop-processing activities (weed seeds and a little chaff) probably used as fuel for hearths associated with smaller-scale domestic food preparation activities.

There were only modest to fairly good amounts and fairly low densities of charred plant material in the samples from the other two tenements. One such assemblage in Tenement A in pit 5017 (fill 5018), part of Pit Group 3 to the rear of the High Street frontage, contained a similar assemblage to the smaller charred plant assemblages from Pit Group 6, mainly a mix of food debris (largely grains and some hazelnut shell and a few legumes) and hearth debris (weed seeds) from the final stages of small-scale grain cleaning/food preparation activities. Pit 3955, also in Pit Group 3, contained food debris (fruits, legumes) including possible faecal waste.

Several samples from across Tenement C consisted largely of food debris (mainly grains with variable amounts of hazelnut shell) with few weed seeds in most of the samples, these remains mainly from small-scale (domestic) activities associated with food preparation and cooking including a little hearth debris. The assemblage from occupation deposit 7174 (Structure 4) was mainly composed of barley and oats. A number of the oat and barley grains had sprouted and this may indicate that brewing activities were taking place close by although since only just over a quarter had germinated it may instead suggest accidental sprouting of grains as a consequence of damp storage conditions. It is possible that the oats and barley in this sample may derive from mixed cultivation of these two cereals as dredge although mixing of the cereals may have also occurred after harvesting.

The sample from deposit 6808 of hearth 6809, in the north-west corner of Tenement C, produced a rich assemblage with a high item density again consisting mostly of grain (92% of the quantified remains) with identifiable ones of mainly free-threshing wheat and smaller numbers of rye, almost fully cleaned cereals burnt during the latter stages of food processing/cooking. The few other remains in the sample, mainly wild plant/weed seeds and traces of chaff and hazelnut shell, probably represent spent fuel from the hearth.

Phase 4: 13th century

Twenty-six of the 71 flots from this phase produced sufficient amounts of charred plant remains to merit sorting and quantification. This included three rich

assemblages in pit 4944, hearth 4059 and floor deposit 5026, all in Tenement A. There were also very large amounts of charred plant remains in pit 4069 (fill 4100) and charcoal layer 9172. The other samples produced between 50 and 400 charred items (Table 4.12, Fig. 4.9 and Appendix 8).

Free-threshing wheat was the main cereal grain followed by smaller numbers of rye (also represented by several hundred rachis fragments in 13 samples) and then hulled barley and oats, both recorded in over 30 samples and also identified by traces of barley rachis and oat floret base fragments in single samples; over 50% of the quantified grains, however, were not identifiable. Several hundred free-threshing wheat rachis fragments in over 20 samples included hexaploid rachis fragments in the majority suggesting that bread wheat was once again the main cereal, only a few tetraploid rachis fragments in two samples showing the definite presence of rivet wheat. There were also a few hulled (including spelt) wheat spikelet bases in three samples which probably represent either residual debris and/or relics of previous harvests growing as cereal weeds. There were also good numbers of cereal awn fragments in two samples.

Other arable crops in this phase included evidence for pulses showing the continued presence of broad bean. There was also the first definite evidence for pea (*Pisum sativum*), represented by a few seeds in one sample.

Legumes including beans are frequently found in medieval deposits (Carruthers and Hunter Dowse 2019, 125) although often in only small amounts (Moffett 2006, 53). Cultivated pulses have been found in other early medieval sites in Oxford, for example beans and possibly common vetch in late

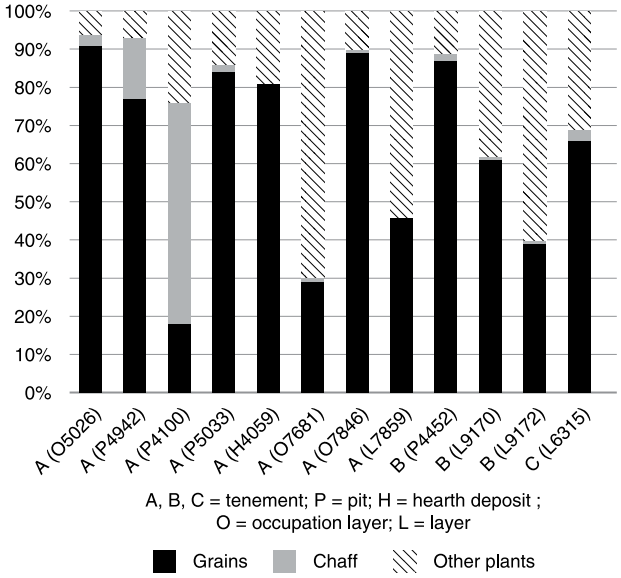


Fig. 4.9 Phase 4: proportion of grain to chaff to other plants in samples with 100+ quantified items

11th- to mid-13th-century deposits at the Nun's Garden, Queen's College (Giorgi 2015), and beans and peas in an 11th-century deposit from Folly Bridge (Robinson 1984) and in early medieval deposits at Queen Street (Giorgi 1999). Beans, peas and vetches were mainly used for fodder but were also eaten by the very poor, in bread (mixed with cereals), soup and in pottage (Hammond 1995, 32) particularly following poor cereal harvests (Wilson 1991, 201–2). As noted above, legumes may have also been sown as part of crop rotations to restore nitrogen and soil fertility.

Table 4.12: Phase 4: proportion of grain to chaff to other plants in samples with 100+ quantified items

Tenement	*Context (feature)*	*No. items*	*Item density (per litre of processed soil)*	*Grain (%)*	*Chaff (%)*	*Other plants (%)*	*Main cereal grains*
A	5026 (floor)	313	31.3e	91	3	6	Free-threshing wheat
A	4942 (pit 4944, Pit Grp 10)	229	45.8e	77	16	7	Free-threshing wheat
A	4100 (pit 4069, Pit Grp 10)	1150	29	18	58	24	Free-threshing wheat and rye
A	5033 (pit 5034, Pit Grp 10)	124	2.1	84	2	14	Free-threshing wheat
A	4059 (hearth fill, Structure 7)	222	22.2e	81	-	19	Free-threshing wheat
A	7681 (occupation layer, Building 1, Room 1)	399	11.1	29	1	70	Free-threshing wheat
A	7846 (occupation layer, Building 1, Room 1)	179	29.8	89	1	10	Mix of 3 cereal grains
A	7859 (charcoal layer, Building 1, Room 1)	216	5.4	46	-	54	Free-threshing wheat
B	4452 (pit 4453, Structure 9)	359	18	87	2	11	Free-threshing wheat
B	9170 (charcoal layer, Building 2, Room 2)	390	19.5	61	1	38	Free-threshing wheat
B	9172 (charcoal layer, Building 2, Room 2)	747	37.4	39	1	60	Free-threshing wheat
C	6315 (levelling layer, Building 3, Room 1)	133	3.3	66	3	31	Mix of all 4 cereal grains

HNS = hazelnut shell; QPR = quantified plant remains; e = projected density on basis of sub-sample

Historical evidence from around 1300 suggests that in the London region, including Oxford, legumes (including vetches, peas and beans) were widely grown but usually as a minority crop, although in the Cherwell Valley to the north of Oxford they were cultivated on a slightly larger scale (Campbell *et al.* 1993, 134). Archaeobotanical and historical evidence also suggests the increased growing of vetches during this period (Greig 1991, 323). Documentary evidence shows that legumes were grown not only as a field crop but also in gardens in towns (Green 1984, 107).

Other potential arable crops and food plants were also found as waterlogged remains from this phase including a few hemp (*Cannabis sativa*) seeds in dump 6109 (Tenement B, Structure 8); this plant was mainly grown for its fibres although the oil from the seeds may have been used for cooking and lighting and as animal feed (Greig 1988, 122) as well as having medicinal uses. Cannabis was also identified in a 13th-century pit fill from 4a Merton Street (Pelling 2006, 335) and from a number of other sites including a 13th- to 14th century-deposit from excavations at 114–119 St Aldate's/4–5 Queen Street (Giorgi 2020a). Occasional remains, however, may be from the plant growing wild as an escape from cultivation.

A few uncharred hop (*Humulus lupulus*) seeds were also found in the same dump deposit and have previously been recorded in medieval deposits in Oxford including the same 13th-century pit fill from 4a Merton Street (Pelling 2006, 335). Hops were cultivated and extensively used as a flavouring for beer from the late medieval period onwards, although it is possible that the plant may have been used as such from an earlier date.

There were also a number of fruit seeds in pits 6539 (fill 6555) and 6562 (fill 6563) (both Pit Group 13) and dump deposit 6109 (Structure 8) in Tenement B, including a few fig (*Ficus carica*) seeds, also found in floor deposit 5026 (Tenement A). Figs may have been imported as dried fruit or grown in warmer sheltered areas, particularly in the early medieval warm period (950 to 1250), although it is difficult to obtain good crops from home-grown fruit. Charred and uncharred fig seeds have been found on other medieval sites in Oxford including from various deposits in excavations at 114–119 St Aldate's/4–5 Queen Street (Giorgi 2020a) and in 11th- to 13th-century deposits from 4a Merton Street (Pelling 2006, 335).

Evidence of other fruits included blackberry and raspberry and good numbers of elderberry seeds in four samples. A small amount of uncharred hazelnut shell was identified in dump deposit 6109 and very large amounts of charred shell in 51 samples totalling almost a thousand fragments. There were also a few charred fragments of walnut (*Juglans regia*) shell, walnuts being used as food, for oil (cooking and lighting fuel) and medicinal purposes. A charred wild/sweet cherry (*Prunus avium*) fruit stone was also found; as well as for food, cherries may have been used for liqueurs and verjuice.

There was a fairly good range of wild plant/weed seeds in these samples, mainly from arable weeds with a similar range to the earlier phases, again suggesting the cultivation of both sandy and calcareous soils; the use of sandy (loam) soils for growing crops suggested once more by the presence of corncockle, cornflower, and sheep's sorrel along with traces of two other weeds not previously recorded, annual knawel (*Scleranthus annuus*) and

Other plants	*Assemblage interpretation*
Mix of HNS, legumes and weeds	Virtually fully processed grain
Mainly legumes and weed seeds	Virtually fully processed grain but some evidence for threshing
Mainly ?straw but also good nos weed seeds	Mainly crop-processing debris especially from threshing
HNS and weed seeds	Virtually fully processed grain
Mainly legumes and weed seeds	Virtually fully processed grain
Mainly HNS; few weed seeds	Virtually fully processed grain but mostly HNS (food) debris (66% of QPR)
Legumes and little HNS and few weed seeds	Virtually fully processed grain
Mainly HNS; small nos of legumes and weed seeds	Mix of virtually fully processed grain and HNS (food) debris
Weed seeds and legumes	Virtually fully processed grain
Mainly HNS (28% QPR); small nos weed seeds and a few legumes	Mainly almost fully processed grain but also good amount of HNS (food) debris
Mainly HNS (40% QPR); fewer legumes (mainly small-seeded) and weed seeds	Mostly mix of virtually fully processed grain and HNS (food) debris
Mostly mix of HNS and weed seeds	Mostly virtually fully processed grain and smaller amounts of HNS (food) debris

wild radish (*Raphanus raphanistrum*), both indicators of acidic soils. There was an increased representation of several wetland plants, notably sedge and spike-rush which could indicate the use of damper areas of ground for growing crops although both plants may have also been gathered from grasslands/meadows for a range of uses on site (see below).

There is an increase in the representation of small-seeded leguminous weeds including *Medicago/Trifolium* (medick/trefoil) in this phase and also the next two phases of the site which may suggest a reduction in soil fertility at this time or perhaps the sowing of legumes as part of a rotation to restore nitrogen levels (Carruthers and Hunter Dowse 2019, 134).

Evidence for the sowing times of crops may be indicated by wild radish and narrow-fruited cornsalad for spring sowing, and cleavers, cornflower and brome for winter sowing. A few weeds, again of low to medium height in the samples, including chickweed (*Stellaria media*), stinking chamomile and sheep's sorrel, may tentatively point to the cutting of cereals fairly low on the straw. Grass culm node fragments, including a large amount in pit 4069 (fill 4100), perhaps represent burnt straw.

Some of the plant remains in the samples, represented by both charred and uncharred seeds, including buttercup (*Ranunculus acris/repens/bulbosus*), ribwort plantain (*Plantago lanceolata*), hawkbit (*Leontodon*), rush, sedge and wild grasses may represent the residues of hay collected for fodder from areas close to the river; some of these plants, including the sedges and rushes, may have also been gathered as flooring/thatching materials,

Table 4.13: Phase 5: proportion of grain to chaff to other plants in samples with 100+ quantified items

Tenement	*Context (feature)*	*No. items*	*Item density (per litre of processed soil)*	*Grain (%)*	*Chaff (%)*	*Other plants (%)*	*Main cereal grains*
A	4861 (oven fill, Building 4)	213	85.2e	83	6	11	Free-threshing wheat
A	3575 (oven 3582, Building 4)	378	37.8e	85	5	10	Free-threshing wheat but also fairly good nos of barley grains
A	3576 (oven 3582, Building 4)	100	2.8	98	-	2	Free-threshing wheat
A	3858 (pit 3860)	223	22.9e	96	1	3	Free-threshing wheat
A	3609 (floor deposit, Building 4)	230	16.6	14	-	86	Mix of cereal grains
A	3783 (floor deposit, Building 4)	104	5.5	38	1	61	Mix of cereal grains
A	3608 (floor deposit, Building 4)	142	7.1	37	1	62	Mix of cereal grains
A	3585 (ash layer, Building 4)	112	16	82	5	12	Wheat (but 80% grains indet.)
A	3697 (charcoal layer, Building 4)	515	51.5e	89	5	6	Free-threshing wheat
A	4883 (construction cut 4934, Building 4)	195	6.5	96	-	5	Free-threshing wheat
A	7228 (hearth 7227, Building 1, Room 1)	179	35.8	64	1	35	Free-threshing wheat
A	7221 (rake-out, Building 1, Room 1)	426	21.3	77	1	22	Free-threshing wheat
A	7673 (hearth deposit, Building 1, Room 1)	188	18.8	19	-	81	Mix of cereal grains
B	8993 (floor deposit, Building 2, Room 2)	263	6.6	90	1	9	Free-threshing wheat
B	9157 (floor deposit, Building 6, Room 1)	115	2.9	92	4	4	Free-threshing wheat
B	Floor deposit 9627, Building 6, Room 1	506	14.1	85	1	14	Free-threshing wheat
B	9634 (pit 9630)	870	32.2	91	2	7	Free-threshing wheat but also good nos of barley grains
B	10201 (pit 10202)	386	9.7	92	3	5	Free-threshing wheat
B	10208 (pit 10202)	331	8.3	86	3	11	Free-threshing wheat
B	4608 (pit 4610, Building 7, Room 2)	322	129e	64	21	15	Equal amounts of free-threshing wheat and rye grains
B	4599 (pit 4609, Building 7, Room 2)	427	189.9e	76	13	10	Free-threshing wheat and then rye grains
B	4477 (hearth 4781, Building 7, Room 2)	291	29.1	70	6	24	Mainly free-threshing wheat
B	6449 (hearth deposit, Building 7, Room 1)	261	52.2	1	-	99	Traces indet. grain

HNS = hazelnut shell; QPR = quantified plant remains; e = projected density on basis of sub-sample

other wetland plants such as celery-leaved buttercup, water plantain and branched bur-reed being collected incidentally at the same time. A few charred potential bracken frond fragments, found in an earlier phase, may again represent the collection of this plant from acidic habitats for use as animal bedding, fuel and tinder.

Composition and distribution of the Phase 4 charred plant remains

The distribution of the charred plant remains across the three tenements in this phase shows two particularly rich and high concentrations of material in samples from Pit Group 10 to the rear of the High Street frontage in Tenement A, one containing almost fully processed grain and another containing a significant amount of crop-processing debris (chaff and straw and some weed seeds), suggesting that crop-processing activities (mainly threshing but some sieving) were taking place in the area with perhaps the storage of grain close by. Two other samples from hearth 4059 and floor deposit 5026 in the area behind the High Street frontage also produced large assemblages and high densities of almost fully processed grain to suggest, perhaps, that large-scale activities associated with the final stages of crop processing were taking place in the vicinity of these sampled features.

On the High Street frontage in samples from Building 1 there were several good-sized assemblages (with a high concentration in occupation deposit 7846) and a few smaller ones, in each case containing mainly grains but also good amounts of

Other plants	*Assemblage interpretation*
Mix of legumes and weed seeds	Virtually fully processed grain
Mainly weed seeds; fewer legumes and HNS	Virtually fully processed grain
Traces of weed seeds	Virtually fully processed grain
Mainly legumes; few weed seeds	Virtually fully processed grain
Mainly HNS (78% QPR); few weed seeds	Mainly HNS (food) debris
Mainly HNS (50% QPR); small nos weed seeds	Mostly mix of virtually fully processed grain and HNS (food) debris
Mainly HNS (49% QPR); small nos weed seeds	Mostly mix of virtually fully processed grain and HNS (food) debris
Mix of legumes and weed seeds	Virtually fully processed grain
Mix of legumes and less HNS and weed seeds	Virtually fully processed grain
Traces of weed seeds, legumes and HNS	Virtually fully processed grain
Mainly legumes (32% QPR); trace of HNS and weed seeds	Mostly virtually fully processed grain but also good nos of legumes (food debris)
Mainly legumes and fewer weed seeds and trace HNS	Virtually fully processed grain; some legumes (food debris)
Mainly HNS (70% QPR); small nos weed seeds	Mainly HNS (food) debris
Mix of weed seeds, HNS and a few legumes	Virtually fully processed grain
Few weed seeds; trace HNS	Virtually fully processed grain
Mainly HNS; smaller nos legumes and weed seeds	Virtually fully processed grain
Mainly legumes (also mineralised) smaller nos weed seeds and HNS	Virtually fully processed grain
Few weed seeds; traces HNS and legumes	Virtually fully processed grain
Weed seeds and fewer legumes and HNS	Virtually fully processed grain
Mix of weed seeds and legumes	Virtually fully processed grain but also evidence for threshing
Legumes and weed seeds	Virtually fully processed grain but also some evidence for threshing
Mainly weed seeds; few legumes	Virtually fully processed grain; some processing by-products
Virtually all sedge seeds; trace of heather	?Flooring/ roofing materials

hazelnut shell in several samples, with little evidence for crop-processing activities.

In Tenement B samples both to the rear of the High Street frontage and in Building 2 on the High Street frontage produced broadly similar but not particularly large assemblages with mainly grains but also good amounts of hazelnut shell in some of the samples. The larger assemblages came from the samples from Building 2, including a rich and dense concentration of material in a charcoal layer (9172). Most of these assemblages represent food debris from small-scale activities associated with the final stages of crop-cleaning and food preparation.

At the southern end of the tenement on the High Street frontage and immediately east of Building 2, a sample from charcoal layer 9172 produced several hundred charred items consisting mainly of free-threshing wheat. Other remains consisted largely of hazelnut shell, with a few possibly cultivated pulses, a small number of weed seeds and a trace of chaff. These remains mainly represent burnt food debris.

The charred plant remains in Tenement C came from Building 3 on the High Street frontage with only moderately good-sized assemblages in Room 1 consisting mainly of grains but also good amounts of hazelnut shell and some weed seeds, representing debris from the final stages of crop-cleaning/food preparation being carried out on a small (domestic) scale.

Phase 5: 14th to early 15th century

A total of 30 of the 80 flots were sorted and quantified including five rich assemblages from ovens 4582 and 3577 and pit 3860 (all Tenement A) and pits 4610 and 4609 (Tenement B).

The quantified remains from the 30 analysed samples amounted to over 7300 items, made up mainly of cereal grains (73% of the counted material) with only a small amount of cereal chaff and other plant remains (Table 4.13; Fig. 4.10). A small range of waterlogged plant remains in two pit fill samples are shown in Appendix 8, Table 5.

Free-threshing wheat was again the main cereal, followed by smaller numbers of rye and (six-row) hulled barley, and fewer oat grains. These cereals were also represented by chaff fragments with *c* 170 free-threshing wheat rachis fragments in 24 samples including hexaploid rachis fragments, suggesting that bread wheat was again the main cereal with only several tetraploid rachis fragments in two samples showing the definite presence of rivet wheat. Rye was also represented by a fairly good number of chaff fragments, barley by a small number of rachis fragments and oat by a few awn fragments. A few grains and glume bases of hulled wheat in two samples may again represent either residual debris and/or relics of previous harvests growing as cereal weeds.

Legumes included a significant number of larger seeds (greater than 4mm) probably from cultivated pulses with good evidence once more for broad bean and peas. There was a large amount of charred hazelnut shell which made up almost 40% of the quantified remains of other plants in this phase. There were also a small number of walnut shell fragments in three samples. Uncharred fruit seeds in two pit fills included a few fig seeds in pit 4301 (sample 3183) along with good numbers of *Rubus* seeds (including both blackberry and raspberry) and moderate numbers of elderberry seeds.

The range of weed seeds in these samples is similar to those found in earlier phases of the site although most individual species were only represented by occasional or small numbers of seeds. The remains again suggest the cultivation of both sandy soils and calcareous soils. Sedge seeds in one sample along with a few records for spike-rush may represent residues of these plants gathered from grassland/wetland areas for use as flooring/thatching materials or may be part of the residues of hay fodder also potentially represented by occasional records for buttercup self-heal (*Prunella*

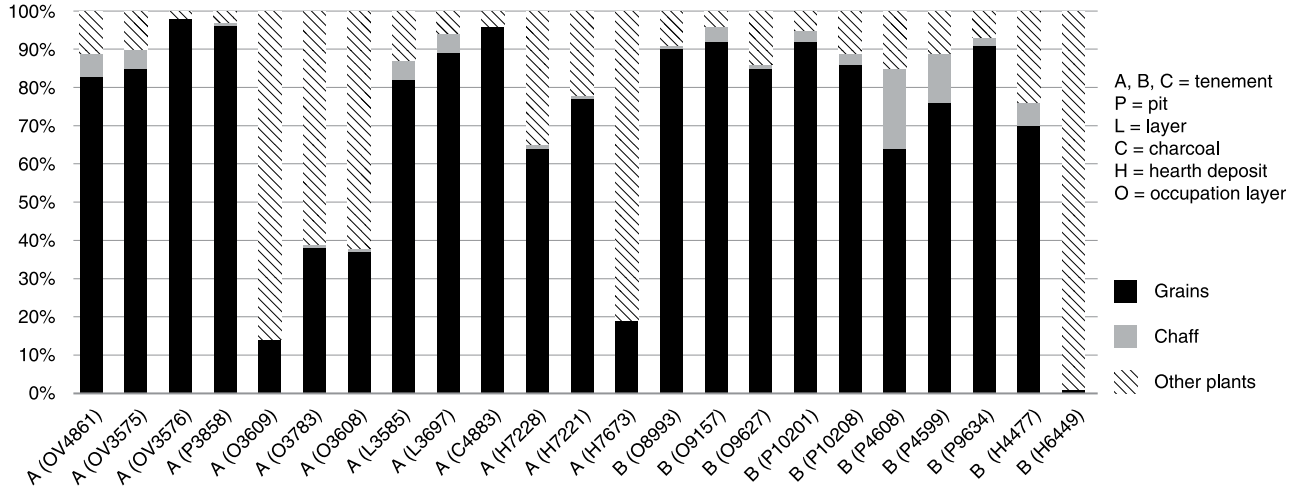


Fig. 4.10 Phase 5: proportion of grain to chaff to other plants in samples with 100+ quantified items

vulgaris) and small and large-seeded wild grasses.

The spring sowing of crops may be indicated by narrow-fruited cornsalad while several other species may suggest the winter sowing of crops. A few weeds again of low to medium height in the samples including chickweed, thorow-wax, stinking chamomile and sheep's sorrel may point to the harvesting of cereals fairly low on the straw. A little evidence for ling/heather (*Calluna vulgaris*) in one sample may represent the collection of this plant from heathland for potential uses as fuel, fodder, bedding and building materials.

Composition and distribution of the Phase 5 charred plant remains

The bulk of the charred remains came from Tenements A and B. In Tenement A, samples from Building 1 on the High Street frontage included several good-sized and high concentrations of charred plant remains of mainly fully processed grain with some legumes and hazelnut shell but little crop-processing debris. To the rear of the High Street, several samples including from two oven fills and a charcoal layer produced very rich and dense concentrations of mainly fully processed grain suggesting intensive activities associated with the drying of crops were taking place here with perhaps storage of grain close by. Pit 3860, to the south of this building, also contained a rich assemblage of almost fully processed grain.

Samples from Buildings 2 and 6 on the High Street frontage in Tenement B also contained mainly fully processed grain with one or two high concentrations of charred plant remains although most of the assemblages suggest fairly small-scale activities were taking place here. To the rear of the High Street frontage, however, two very rich and very dense concentrations of charred plant remains were found in Building 7 which contained mainly grains but also crop-processing debris mainly from threshing activities (chaff, awn fragments) but also from the sieving (weed seeds) of the grains, activities which may have been taking place within the building or close by.

The samples from Tenement C only consisted of small or modest amounts of charred plant remains, mostly grains, the remains representing debris from the final stages of crop-cleaning and food preparation from small-scale activities.

Waterlogged plant remains

Uncharred seeds in two samples are shown in Table 4.14, from pits 4423 (fill 4424) and 4301 (fill 4308), both associated with Pit Group 14 in the north-western corner of Tenement A. Evidence for potential food debris includes a small range of fruit seeds of blackberry, raspberry and elderberry seeds in both fills and two fig seeds in fill 4308. Fill 4424 also contained vestiges of nettle (*Urtica dioica*) and sun spurge (*Euphorbia helioscopia*), both weeds of nutrient-rich disturbed and waste ground, which may reflect the presence of rubbish and faecal waste within the pit or close by. Fill 4308 also contained a few mineralised sedge seeds, possibly from the dumping of sedges in the pit to dampen down smells. Large amounts of mineralised concretions and very fragmented wood were also present in this pit fill sample.

Phase 6: mid-15th to mid-16th century

One hundred and twenty-seven samples were collected from this phase, although only 16 produced sufficient amounts of charred plant remains to merit sorting and quantification. This included a rich assemblage from deposit 6640 overlying hearth 6728 (Tenement C) which was sub-sampled. The other samples produced variable amounts of charred plant remains ranging from *c* 60 to *c* 900 quantified items.

The charred remains from the 16 quantified samples totalled almost 2400 items, consisting mainly of cereal grains (67% of the counted material) and only a small amount of cereal chaff (4%) while other plant remains (29%) included good amounts of hazelnut shell and large legumes including cultivated pulses (Tables 4.14 and 4.15; Fig. 4.11). Waterlogged plant remains from four samples are shown in Appendix 8, Table 5.

The charred grains in this phase once more showed that free-threshing wheat was the best represented cereal, accounting for 57% of the identifiable and quantified grains, followed by smaller numbers of (six-row) hulled barley and rye, and a few oat grains. A spelt wheat grain and a hulled wheat spikelet base in separate samples probably represent residual debris and/or relics of previous harvests growing as cereal weeds.

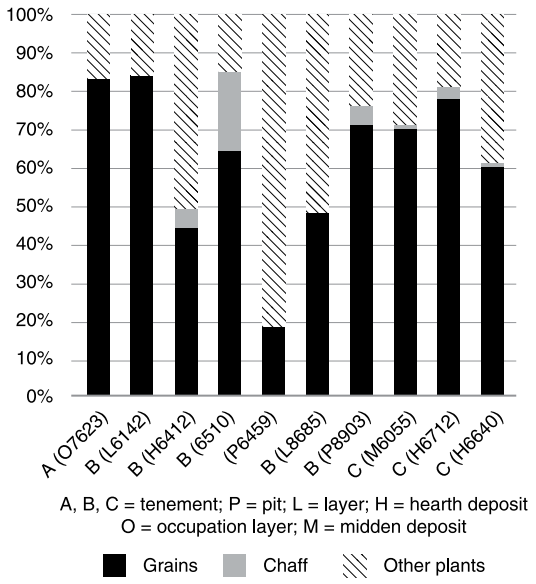


Fig. 4.11 Phase 6: proportion of grain to chaff to other plants in samples with 100+ quantified items

Table 4.14: Waterlogged plant remains

	Phase	*3*	*4*	*4*
	Sample no.	*3335*	*4006*	*4062*
	Context	*5052*	*6109*	*6555*
	Feature	*3955*		*6539*
	Feature type	*Well/pit*	*Dump*	*Pit*
	Building/structure	*Grp 3*	*8*	*Grp 13*
	Tenement	*A*	*B*	*B*
	Vol sample (l)	*30*	*30*	*35*
	Vol flot (ml)	*c 150*	*300*	*59*
Bracken fronds	*Pteridium aquilinium* (L.) Kuhn	+*		
Buttercups	*Ranunculus acris/repens/bulbosus*		++	+
Celery-leaved crowfoot	*R. sceleratus* L.		+	+
Poppy	*Papaver* spp.	+		
Common fumitory	*Fumaria officinalis* L.			+
Hemp	*Cannabis sativa* L.		+	
Hop	*Humulus lupulus* L.		+	
Fig	*Ficus carica* L.		+	
Common nettle	*Urtica dioica* L.	+++	+	+
Hazelnut shell fragments	*Corylus avellana* L.		++	
Nettle-leaved goosefoot	*Chenopodium murale* L.			
Goosefoots etc	*Chenopodium* spp.			+
Oraches	*Atriplex* spp.	+	++	+
Campions/catchflies	*Silene* spp.		+	
Pink family	Caryophyllaceae indet.			+
Pale persicaria	*Persicaria lapathifolia* (L.) Gray		+	
Knotweed	*Persicaria* spp.		+	
Knotgrass	*Polygonum aviculare* L.		+	
Docks	*Rumex* spp.		+	
Mallow	*Malva* spp.			
Violet	*Viola* spp.			
Weld	*Reseda luteola* L.			
Weld/mignonette	*Reseda* spp.			+
Raspberry	*Rubus idaeus*	++	+	
Blackberry	*R.* sect. *Glandulosus*	+++	+	
Raspberry/blackberry	*R. idaeus*/sect. *Glandulosus*	++++**	++	+
Brambles etc	*Rubus* spp. fragments	++		+
Cinquefoil/tormentil	*Potentilla* spp.		+	+
Plum/damson/bullace	*Prunus domestica* type	+*		
Indet. fruit stones (whole/fragments)	*Prunus* spp.	++*		
Pear/apple	*Pyrus/Malus* spp.	+*		
Rose family	Rosaceae indet.	++*		
Vetch/tare/vetchling (>4mm)	*Vicia/Lathyrus* spp.	+*		
Sun spurge	*Euphorbia helioscopia* L.			
Petty spurge	*E. peplus* L.		+	
Fool's parsley	*Aethusa cynapium* L.			+
Hemlock	*Conium maculatum* L.	+		
Carrot	*Daucus carota* L.		+	
Carrot family	Apiaceae indet.	+*		
Henbane	*Hyoscyamus niger* L.		+	
Black nightshade	*Solanum nigrum* L.		+	
Dead-nettles	*Lamium* spp.	+		+
Dead-nettle family	Lamaiceae indet.			+++
Eyebrights/bartsias	*Euphrasia/Odontites* spp.			+
Elder	*Sambucus nigra*	+++**	+++	+++++
Thistles	*Carduus/Cirsium* spp.			
Hawkbits	*Leontodon* spp.			+
Milk-/sow-thistle	*Sonchus* spp.		+	
Water-plantains	*Alisma* spp.	++		+
Rushes	*Juncus* spp.	++		+

4	4	5	5	6	6	6	6	8
4063	5241	3263	3183	4053	3296	3158	5027	4001
6563	10426	4424	4308	6443	4783	4256	9099	6039
6562	10429	4423	4301	6475	5	5		6053
Pit	Pit	Pit	Pit	Pit	Ditch	Ditch	Occupation	Construction cut
Grp 13		Grp 14	Grp 14				6	
B	B	A	A	B			B	C
40	40	40	38	40	29	20	33	40
49	55	115	c 50	4	22	c 120	100	52
						+		
					+			
+			+	+				
+		+			+++++	++		+
						+		
+								
+				+	+	++		
+					+	++		
+								
								+
							+	
		+	+		+			
		+	++					
		++	++		++			
			+					
		+				+		
					+			
						+		
	+						+	+
+								
				+	+		+	
+++++	++	++	+	++	+	+	+	++
					+			
	++				+		+	
				+		+	+	

Table 4.14 continued

	Phase	*3*	*4*	*4*
	Sample no.	*3335*	*4006*	*4062*
	Context	*5052*	*6109*	*6555*
	Feature	*3955*		*6539*
	Feature type	*Well/pit*	*Dump*	*Pit*
	Building/structure	*Grp 3*	*8*	*Grp 13*
	Tenement	*A*	*B*	*B*
	Vol sample (l)	*30*	*30*	*35*
	Vol flot (ml)	*c 150*	*300*	*59*
Spike-rush	*Eleocharis palustris/uniglumis*			
Sedges	*Carex* spp.	+*	++	+
Ribbed stem fragments (?Cypercaeae, Poaceae)	Indeterminate	+++*		
Seeds etc	Indeterminate	++*		
Wood fragments, >/<2mm	Indeterminate	+++/+++++	+++/+++	++
Mineralised concretions	Indeterminate	+++++		
	Roots			
	Beetle fragments <1mm	+++		
	Puparia	+++*		
	Ephippia			

Very approximate frequencies: + = 1–10; ++ = 11–50; +++ = 51–100; ++++ = 101–250; +++++ = >250 items. ** = waterlogged and mineralised;
* = mineralised only

Table 4.15: Phase 6: proportion of grain to chaff to other plants in samples with 100+ quantified items

Tenement	*Context (feature)*	*No. items*	*Item density (per litre of processed soil)*	*Grain (%)*	*Chaff (%)*	*Other plants (%)*	*Main cereal grains*
A	7623 (occupation layer, Building 1, Room 2)	242	16.1	83	0	17	Free-threshing wheat; some rye
B	6142 (layer)	111	2.8	84	0	16	Free-threshing wheat
B	6412 (hearth deposit)	124	3.1	44	5	51	Mix of cereal grains
B	6510 (latrine Structure 11)	299	7.5	64	21	15	Rye and some free-threshing wheat grains
B	6459 (latrine Structure 11)	123	11.9	18	0	82	Mix of cereal grains
B	8685 (burnt deposit, Building 2, Room 3)	169	4.2	48	0	52	Mainly barley and some oat grains
B	8903 (pit 8893, Building 2, Room 3)	108	2.7	71	5	24	Free-threshing wheat
C	6055 (midden deposit, Building 3, Room 1)	161	4	70	1	29	Mix of cereal grains
C	6712 (hearth deposit, Building 8)	393	19.7	78	3	19	Free-threshing wheat and barley grains
C	6640 (hearth 6728, Building 8)	182	18.2e	60	1	39	Barley and smaller amounts of free-threshing wheat grains

HNS = hazelnut shell; QPR = quantified plant remains

4	*4*	*5*	*5*	*6*	*6*	*6*	*6*	*8*
4063	*5241*	*3263*	*3183*	*4053*	*3296*	*3158*	*5027*	*4001*
6563	*10426*	*4424*	*4308*	*6443*	*4783*	*4256*	*9099*	*6039*
6562	*10429*	*4423*	*4301*	*6475*	*5*	*5*		*6053*
Pit	*Pit*	*Pit*	*Pit*	*Pit*	*Ditch*	*Ditch*	*Occupation*	*Construction cut*
Grp 13		*Grp 14*	*Grp 14*				*6*	
B	*B*	*A*	*A*	*B*			*B*	*C*
40	*40*	*40*	*38*	*40*	*29*	*20*	*33*	*40*
49	*55*	*115*	*c 50*	*4*	*22*	*c 120*	*100*	*52*
+						+		
+					+	+++	+	
			+*					
			+++++/+++++			++++/+++++		
			+++++			+++++		
						+++		
						+++		
						+		

Other plants	*Assemblage interpretation*
Mainly legumes; few weed seeds; trace HNS	Processed grain; some legumes (food debris)
Weed seeds and HNS	Virtually fully processed grain
Mix of rhizome/bud/stem fragments, HNS, legumes and weed seeds	Processed grain and some legumes and hearth fuel
Mainly rhizome/bud/stem fragments and legumes and few weed seeds and HNS	Mainly processed grain but also hearth fuel (including threshing debris)
Mainly weed seeds (80% QPR) (mostly small-seeded); few flax seeds and trace HNS	Mainly crop-processing by-product (sieving)
Mix of weed seeds (mainly large ones mostly *Agrostemma githago*) and legumes; trace HNS	Virtually fully processed grain (and legumes and weed seeds) ?fodder crop
Weed seeds, HNS and legumes	Virtually fully processed grain
Mainly legumes, *Brassica*/*Sinapis* and weed seeds; trace HNS	Mainly almost fully processed grain and other food debris (legumes, *Brassica* seeds)
Mainly weed seeds (mostly *Galium aparine*) and some legumes	Mainly almost fully processed grain
Mainly legumes and smaller nos weed seeds; trace HNS	Mainly almost fully processed grain and other food debris (legumes)

The cereals were also represented by small numbers of chaff fragments mainly from free-threshing wheat and rye rachis fragments. Hexaploid wheat rachis fragments suggests that bread wheat continued to be the main cereal with only a single tetraploid rachis fragment showing the definite presence of rivet wheat. There were also a few barley rachis fragments.

Evidence for other cultivars included a few seeds of flax (*Linum usitatissimum*) in one sample; the main use of this plant was for the fibres for the production of cloth but the seeds may have been added to cereal-based pottage (Hagen 1994, 59) and used in bread and stews (Greig 1988, 122) with oil extracted from the seeds for cooking and lighting.

Legumes made up over 30% of the quantified remains of other plants in this phase, over a third of which were large seeds (greater than 4mm) probably from cultivated species with good evidence once more for broad bean and a smaller number of peas while a good number of the large legumes were identified as bean/pea. One legume seed was also tentatively identified as common vetch.

There was also a range of fruits and nuts represented by charred, waterlogged and mineralised remains; the charred remains included a large amount of hazelnut shell and there were also occasional fragments of walnut shell. A few charred sloe/blackthorn fruit stones were found in two samples while small-seeded fruits included mineralised and uncharred fig seeds as well as mineralised and uncharred blackberry and raspberry seeds and a charred elder seed in another.

Other potential food plants may be represented by a small number of *Brassica/Sinapis* (cabbages, turnips, mustards) seeds in six samples which may represent food remains (mustards or cultivated and/or wild leaf vegetables) or weeds, one of the seeds being identified as white mustard (*Sinapis alba*).

There was a fairly wide range of wild plant species represented by other charred seeds, most of which are probably from arable weeds given their presence in assemblages consisting mainly of grains. The range of weeds represented in the samples was broadly similar to the earlier phases of the site although most of the individual species were again mostly only represented by occasional or small numbers of seeds. The weed seeds, which include corn marigold (*Chrysanthemum segetum*) once more suggest the cultivation of both sandy soils and the use of calcareous soils. The fairly good representation of small-seeded legumes including *Medicago/Trifolium* in samples from this phase may again indicate poor soil fertility and/or the use of legumes, perhaps as part of crop rotations, to restore nitrogen levels.

The winter sowing of crops may be suggested by the presence of cleavers, cornflower and brome grass, and spring sowing by black bindweed and corn marigold, while weeds of low to medium height in the samples including stinking chamomile and sheep's sorrel may perhaps point to the harvesting of cereals fairly low on the straw, small amounts of potential burnt cereal straw fragments being present in six samples.

Composition and distribution of the Phase 6 charred plant remains

The distribution of charred plant remains from across the three tenements in this phase showed few charred plant remains in samples from across Tenement A with the exception of one good-sized assemblage in an occupation deposit associated with Building 1 consisting mainly of fully processed grain and other food debris mainly legumes. The small amounts of charred remains from other samples point to only low-level activities associated with the final stages of crop-cleaning and food preparation.

Samples from Tenement B contained the bulk of the charred plant remain from this phase particularly from buildings along the High Street frontage with fairly good charred plant assemblages including from Buildings 2 and 6, consisting mostly of food debris (mostly fully processed grains and occasionally good amounts of hazelnut shell) but also the remains of a possible fodder crop in one sample from Building 2 Room 3. Generally, the low densities of remains suggest fairly modest scale activities associated with the final stages of crop-cleaning and food preparation.

Behind the High Street frontage in Tenement B there was evidence for the by-products of crop-processing activities in two pit fill samples from latrine Structure 11 including chaff from the threshing of grains in one and a large number of small weed seeds from the sieving of grains in another, probably used as fuel for hearths along with other vegetation (rhizome, bud, stem fragments) in one of the pit fills (similar evidence also being found in hearth deposit 6412 to the west). These remains suggest that crop-processing activities, albeit on a fairly low scale, may have been taking place in this area.

Charred plant remains from Tenement C included a fairly good-sized assemblage from a midden deposit associated with Building 3 on the High Street frontage, consisting mainly of food debris, mostly grains but including some legumes and *Brassica/Sinapis* seeds. Other samples from this building, however, only produced evidence for low-level activities associated with the final stages of food preparation and cooking. Two fairly rich assemblages from two hearths in Building 8 just behind the High Street frontage contained mainly food debris (mostly grains and some legumes) with the little crop-processing debris probably representing spent fuel from the hearths.

Waterlogged plant remains

Four samples from this phase produced modest or good numbers of uncharred seeds (Appendix 8, Table 5).

Two fills (4256 and 4783) of Ditch 5 on the northern boundary of Tenement A contained species indicative of damp/wetland conditions including hemlock (*Conium maculatum*), water plantain and sedge in 4783 and rush, spike-rush and sedge in 4256; Cladoceran ephippia in 4256 may also point to wet conditions within the ditch. Many of the wild plants in the two samples, including nettle, sun spurge, fool's parsley (*Aethusa cynapium*), hemlock and elder are also indicative of nitrogen/nutrient-rich soils which may be a reflection of the dumping of waste into the ditch, perhaps including faecal waste (large amounts of mineralised concretions also found in fill 4256), and/or the presence of waste/refuse tips nearby. Elder and bramble seeds and hazel nut shell may indicate the presence of scrub/hedgerow vegetation close by.

The other two samples from pit 6475 fill 6443 and Building 6 occupation deposit 9099 (both in Tenement B) contained smaller amounts of waterlogged plant remains with a few fruit seeds of elder in both, fig in 6443 and wetland plants in 9099, perhaps representing residues of flooring materials. This sample also contained a few seeds of dyer's rocket (*Reseda luteola*), a potential dye plant but also a common weed.

Conclusion

The charred plant remains from the site show a fairly consistent pattern in terms of cereal representation from the late Saxon period (Phase 1) through to the late medieval/early post-medieval period (Phase 6); free-threshing wheat was the main grain in most phases of the site except in the late Saxon (Phase 1) where rye was better represented and in Phase 3 (late 12th to early 13th century) where rye and free-threshing wheat were equally well represented as the main grains. Rachis fragments suggest that the free-threshing wheat in Phases 1 to 6 was mainly bread wheat with only traces of evidence for tetraploid, probably rivet wheat, present in most phases. Rye was the other principal grain (in Phase 1 and 3) and the second-best represented grain in 13th-century samples (Phase 4). There were fewer hulled barley and oat grains in all phases of the site.

There was a fairly consistent pattern and similar weed seed assemblages in the samples from Phases 1 to 6 suggesting the cultivation of both calcareous and sandy soils around the town, historical records from around 1300 suggesting that the catchment area for cereal production and supply to Oxford extended to a radius of no more than *c* 20km (Campbell *et al*. 1993, 173). Similar weed seed assemblages have been found in late Saxon and medieval deposits in excavations at 114–119 St Aldate's/4–5 Queen Street (Giorgi 2020a) and on other medieval sites in Oxford including the Nun's Garden, Queen's College (Giorgi 2015) and Queen Street (Giorgi 1999). The increase in the number of small-seeded leguminous weeds in Phases 4 to 6 may indicate poor soil fertility or perhaps the sowing of legumes to restore nitrogen levels; this coincided with the better representation of wetland species, notably sedges and spike-rush, in Phase 4 which could suggest the use of damper areas of ground perhaps nearer the river for growing crops; both these plants, however, may have been gathered from such areas for various uses on site (see below). There is evidence from the weed seeds from all phases of the site for both the spring and autumn-sowing of cereals while the presence of several short weeds in the different phases of the site suggests that the cereals were reaped fairly low on the straw.

Other crops in the samples include variable amounts of cultivated legumes from the late Saxon period (Phase 1) through to the early post-medieval period (Phase 6); broad beans were found in all these phases while smaller amounts of peas were present from the 13th century (Phase 4) onwards. Common vetch was tentatively identified in the late Saxon period (Phase 1) with traces of this legume from the late 12th century (Phase 3) through to the mid-16th century (Phase 6). Other potential cultivars included flax, represented by a few seeds in a mid-15th- to mid-16th-century deposit (Phase 6), with a few records for hemp in a 13th-century sample (Phase 4).

Fruits and nuts included occasional evidence for fig and walnut in samples from the 13th century (Phase 4) through to the mid-16th century (Phase 6) while there was a solitary grape pip in a mid-17th- to early 18th-century pit fill (Phase 8). Other fruits included a few seeds of apple/pear in a late 11th- to mid-12th-century deposit (Phase 2), and *Rubus* (blackberry and raspberry) seeds in samples from the late 12th early 13th century (Phase 3) through to the mid-16th century (Phase 6) along with occasional fruit stones of plum/bullace, sloe/blackthorn and cherry. Elderberry seeds were present in samples from Phases 1 to 6 but often only as occasional remains which may be intrusive. Hazelnut shell made up a significant component of the charred plant remains, present from the late Saxon through to the early post-medieval period, but with particularly large amounts in samples from Phases 3 to 6 (late 12th to mid-16th century). Other potential food remains included a few *Brassica*/*Sinapis* (cabbages, turnips, mustards) seeds in late medieval/early post-medieval samples, one of the seeds being identified as white mustard.

Evidence from the larger charred plant assemblages (containing at least 100 quantified items) suggests that the cereals (and legumes) were being bought onto site as almost fully processed crops with the grains accidentally burnt while being dried before milling or storage or during food preparation or cooking. Most of the grains in these samples consisted of free-threshing wheat and therefore were probably intended for human consumption, although there was a possible fodder crop (mainly barley and oats) in one sample from Tenement B (Phase 6) while barley and oat grains in

a sample from Tenement C (Phase 4) may have been used for brewing.

There was no significant difference in the range of foodstuffs between the tenements in each phase and between phases and no significant evidence from the plant remains to indicate the level of status of the inhabitants of the tenements; bread made from wheat was the most highly valued in the medieval period but free-threshing wheat grains are frequently found, often as the main cereal, on sites throughout Oxford while fig, a possible status indicator, was only represented by a few seeds and is again found on other sites in the city.

Evidence for other crop-processing activities, by-products from the earlier (chaff and straw from threshing) and later stages (weed seeds from the sieving of the grain) were limited. Weed seeds from crop-processing activities were also a minor component of the charred plant remains, only making up the majority (80%) of the quantified remains in one sample from Tenement B (Phase 6). Weed seeds did, however, account for almost 100% of the quantified remains in a hearth deposit from Tenement B in Phase 5 although these were virtually all sedge seeds and probably represent the remains of flooring/thatching materials. The by-products (chaff and weed seeds) of crop processing would have been used as fuel for the hearths/ovens on site.

The majority of the samples from the different phases of the site and across the three tenements contained charred plant assemblages indicative of fairly low or modest levels of activity, probably domestic, mainly associated with the final stages of crop-cleaning and food preparation/cooking. There were also, however, a number of richer assemblages from Phases 1 and 3–6, with high concentrations of material, suggesting activities were being carried out on a larger scale close by, largely associated with the drying of grains (mostly free-threshing wheat and sometimes rye) before milling or storage, and also possibly indicative of areas of grain storage nearby; some of these assemblages also contained evidence for other crop-processing activities including threshing. These include: in Phase 1, two rich grain assemblages including evidence for threshing at the southern end of the site; in Phases 2 and 3, two Pit Group 5 and 6 samples behind the High Street frontage of Tenement B (also with some evidence for threshing); in Phase 4, in Tenement A, five rich grain samples, four to the rear of the tenement from Pit Group 10 (also including threshing debris), Structure 7 and a floor deposit, and one from Building 1 on the High Street frontage, and in Tenement C, a rich grain assemblage (possibly for brewing) in Building 3, also on the High Street frontage; in Phase 5, from Tenement A four samples from Building 4 (including two oven fills) to the rear of the tenement, and two hearth samples from Building 1 Room 1 on the High Street frontage, and in Tenement B, three samples from Building 7 Room 2, one of which contained some crop-processing debris (a fairly good number of weed seeds); and in Phase 6, in Tenement B, rich assemblages in one pit fill sample on the High Street frontage, and in Tenement C two hearth deposits from Building 8 to the rear of the tenement.

The presence of mineralised fruit seeds and concretions in several samples suggest that some pits and culverts may have included faecal waste. Sedges, represented by seeds from two samples from Pit Group 14 in Tenement A (Phase 5) and either sedges, cereals or wild grasses represented by mineralised stems in pit 3955 in Tenement A (Phase 3) may represent the use of these plants to dampen down the smells in these features after perhaps being initially used as flooring/thatching materials.

Other wild plants that may have been gathered and used on site included a little charred evidence in a Phase 5 hearth deposit (Tenement B) for heather/ling which may represent residues of bedding materials or fodder. There were a few mineralised and charred fronds of bracken, possibly used for animal bedding, in two pit fills from Tenement A dating to Phases 3 and 4. Both plants may have been gathered from heathland and the hills around Oxford. Potential grassland plants in Phases 2 to 6 were represented in a number of samples but only as occasional remains and rarely in association with one another to suggest that they represent the deliberate collection of grassland vegetation for uses on site such as hay fodder.

CHARCOAL *by Julia Meen*

Introduction

Twenty-five samples were selected for analysis, mostly from hearths, ovens and layers associated with metalworking activity from contexts spanning Phases 3–6; these were often characterised by quantities of coal and clinker as well as charcoal. One charcoal-rich sample from Phase 1 (10th to mid-11th century) and one from Phase 2 (late 11th to mid-12th century) were also recorded; both samples came from pit fills.

Identification of wood taxa was made based on the criteria of Schweingruber (1990) and Hather (2016). In most samples 100 charcoal fragments were identified, but six samples had lower numbers of identified fragments either because fewer were identifiable or the samples were deemed to be lower priority. Full methodology and results are provided in Appendix 9.

Utilisation of wood resources from the Anglo-Saxon period to the mid-16th century

Phase 1: 10th to mid-11th century

Sample 5157 from pit or ditch terminus 9196 contained a large amount of charred grain as well as

fired clay. The latter has impressions of interwoven wattle on its reverse face. Most of the charcoal is roundwood and the associated wattle impressions are strong evidence that the roundwood pieces are the remains of burnt wattles. Hazel is the dominant taxon; other roundwood is much less common but includes ash, willow/poplar and hawthorn type (Maloideae). Oak is present both as heartwood and as mature roundwood.

For the pieces of roundwood, measurements were made of radius and the number of annual rings was counted. In the hazel roundwood, there is generally a strong curvature of the annual rings, giving the impression that the branches are relatively small. Although cross-sections are rarely complete, and so most measurements are minima, the hazel pieces rarely have more than 10 rings preserved, with a range of 3–12 rings. In those pieces where the cross-section is complete and both pith and bark survive, there are 4–6 rings and diameters of up to 17mm. This implies that, while there is variation in size and age of branches being selected, overall smaller branches were favoured. In contrast, the ash roundwood generally has a wider curvature compared to the other roundwood, indicating that larger branches were used.

As the charcoal is dominated by oak heartwood and hazel roundwood, it could perhaps derive from a building constructed from oak timber framing and hazel wattle. The strong representation of hazel fits the pattern from elsewhere in Saxon Oxford (see discussion, below).

Phase 2: late 11th to mid-12th century

Sample 5195 is from the fill of posthole 7896, associated with Structure 1 in Tenement A. The charcoal is mostly oak heartwood although there is also a little roundwood. The assemblage also contains a secondary, but much less abundant, component of hawthorn-type charcoal.

Phase 3: late 12th to early 13th century

Sample 5224 is from pit 9330, located in Structure 2 in Tenement B which was probably used for the disposal of waste from smithing. The charcoal assemblage is overwhelmingly dominated by oak, and most of the pieces are clearly heartwood. A small amount of hawthorn-type charcoal is also present.

Sample 4017 is from hearth rake-out layer 6212, located in Tenement C. While most of the charcoal is oak (often heartwood), there is a significant secondary component consisting of hazel, blackthorn/cherry, beech and hawthorn type. As this assemblage is securely associated with a hearth it is likely to represent the wood fuels that were being burnt, although it is possible that material from different burning events is present. Even so, it indicates that oak was the primary fuel with smaller branches of shrubby species perhaps used as kindling.

Phase 4: 13th century

Two samples selected from this phase both came from Tenement A. Sample 3142, from hearth 4059 (Structure 7) is charcoal rich with a high diversity of wood species. Oak, mostly heartwood, makes up approximately half of the assemblage, while beech forms the second most abundant component. Alongside these two main taxa, there are smaller quantities of hawthorn type, elm, hazel, ash, field maple, blackthorn/cherry and willow/poplar. The sample is otherwise rich in cereal grain but coal and clinker are also present, hinting at both industrial activity and food storage or preparation in this tenement.

Further evidence of metalworking activity in Tenement A comes from Room 1 of Building 1. A sample (5103) from flue 7254 (fill 7296) was found to contain coal, clinker and hammerscale. There is a high diversity of wood taxa: hawthorn-type wood is dominant, followed by oak heartwood, with small quantities of beech, ash, hazel, field maple, elm and willow/poplar. Many of the non-oak pieces are roundwood, while all the oak is heartwood.

In Tenement B, four samples have been analysed from Room 2 of Building 2: two samples from probable smithing hearths, and two samples from pits. Both samples 5221 and 5222, from pits 9332 and 9323, are charcoal-rich and are very similar in composition being dominated by oak, usually heartwood. Some of the oak is vitrified, and many have closely spaced rings. Other wood taxa are rare, but there is a little hawthorn type in both assemblages, and a little hazel from pit 9332. These pit fills also contained abundant hammerscale, slag and clinker.

While much charcoal was recovered from hearth 9282, only a small amount of identifiable charcoal survived from hearth layer 9702, external to Room 2, and this is generally of very small size. Both assemblages are mixed, with oak the most common taxon. Hearth 9282 also contains charcoal of hawthorn type and hazel, with a little beech also present, while a little hazel, willow/poplar, beech, hawthorn type and blackthorn/cherry charcoal is present in hearth layer 9702.

A charcoal-rich layer was also preserved within hearth or oven 6325, located in Room 1, Building 3 in Tenement C. This charcoal is predominantly composed of oak, mostly heartwood with occasional small roundwood twigs, with a smaller component of hazel, holly and hawthorn type.

Phase 5: 14th to early 15th century

Seven samples have been analysed from Tenement A. Four of these are from Room 1 of Building 1: three associated with hearths, and one from a layer (7831) rich in metalworking debris. This last sample was dark and appeared to be charcoal rich, but further inspection showed that much of the flot is composed of clinker rather than charcoal. Almost all the charcoal is beech, some of which is round-

wood. The number of annual rings is very variable and some pieces have a large number of closely spaced rings. Overall, the beech is either large roundwood or else has no clear curvature, indicating it is either large roundwood or trunkwood.

Two of the hearth deposits are also dominated by beech charcoal, while oak is the main component of a third. The beech-rich rake-out from the last firing of hearth 7227 (sample 5063) has a secondary oak component, with amounts of hazel and holly also identified. The beech is sometimes clearly roundwood, with most fragments having 10–20 surviving annual rings but some had up to 26 rings visible on the preserved section. The layer is also rich in charred food remains, indicating that the hearth may have been associated with food preparation.

Sample 5078, from hearth 7227, also contains much beech roundwood, with minimum ring counts ranging from 6–16. Oak, field maple and hawthorn-type charcoal make up the secondary component. The charcoal from sample 5131 from scorched floor or hearth layer 7673 is, by contrast, dominated by oak, almost all of which is heartwood, with a secondary component of hawthorn-type charcoal and a small quantity of beech and hazel.

Two layers associated with hearths in Building 4 proved to be composed almost entirely of coal and clinker. A small number of identifiable charcoal fragments from layer 3580 (sample 3116) comprise a mixture of taxa including oak, beech, field maple and hazel, while in sample 3117 (layer 3581) the charcoal is predominantly oak heartwood, with a small amount of beech and hawthorn type.

One of the richest charcoal deposits recovered from the site came from layer 4861, overlying hearth 4582 in Tenement A. The charcoal is highly mixed, comprising, in descending order of abundance: beech, hawthorn type, oak, ash, hazel, blackthorn/cherry, field maple, holly, elm and willow/poplar. This sample is also highly rich in cereal grains and legumes, suggesting that it is composed of the remains of food that became burnt *in situ*, and suggesting therefore that the wood charcoal represents fuel used for cooking.

A single sample from hearth 4609 in Room 2 of Building 7 (Tenement B) included only charcoal of small size dominated by oak, including heartwood and roundwood, with lesser amounts of beech and hawthorn type and a little hazel. As with layer 4861, this feature is exceptionally rich in burnt cereals and pulses.

Phase 6: mid-15th to mid-16th century

Sample 5163 came from slag-rich layer 7813 in Room 1 of Building 1 in Tenement A. Much of the flot is composed of clinker and there is comparatively little charcoal. The assemblage is almost entirely beech, with some roundwood of varied sizes and ring counts, with a little oak, elm and ash.

A layer from hearth 8649, located in Room 3 of Building 2 in Tenement B, included abundant well-preserved charcoal. Species diversity is high, although oak is the dominant taxon. Other species present include elm, blackthorn, hazel, beech, holly and hawthorn type.

A charcoal assemblage with high species diversity was also recovered from layer 8245 under hearth 8232 in Room 4. Just over half of the identified fragments was identified as oak, much of which was heartwood. Of the remainder, beech was the most common species, often roundwood, with elm, hazel, blackthorn/cherry, ash, hawthorn type and willow/poplar all identified. Coal and clinker were also present in the sample.

Sample 5199 is from charcoal layer 8876 associated with a possible hearth deposit 8888, located in Room 1 of Building 7. Charcoal is abundant and fairly well mixed, with frequent roundwood. Beech is most abundant, followed by oak, and then elm, ash and hawthorn type, followed by blackthorn/cherry and hazel. The number of rings of the beech roundwood is quite variable, with minimum counts as high as 23 rings. Also in Room 1 is hearth 9070,

Table 4.16: Presence/absence of wood taxa by phase

	Phase	*1*	*2*	*3*	*4*	*5*	*6*
	No. analysed samples	*1*	*1*	*2*	*7*	*8*	*6*
	No. fragments	*100*	*100*	*200*	*593*	*595*	*550*
Blackthorn/cherry	*Prunus* sp.			x	x	x	x
Blackthorn/cherry/hawthorn	*Prunus*/Maloideae			x	x	x	x
Hawthorn/whitebeam/apple	Maloideae	x	x	x	x	x	x
Beech	*Fagus sylvatica* L.		x		x	x	x
Oak	*Quercus* sp.	x	x	x	x	x	x
Elm	*Ulmus* sp.				x	x	x
Hazel	*Corylus avellana* L.	x		x	x	x	x
Willow/poplar	*Salix*/*Populus*	x			x	x	x
Field maple	*Acer campestre* L.				x	x	x
Ash	*Fraxinus excelsior* L.	x			x	x	x
Holly	*Ilex aquifolium* L.				x	x	x

with the charcoal it contained comprising a mixture of beech and elm, with smaller amounts of oak and ash, and rarer blackthorn/cherry, field maple, hawthorn type and willow/poplar.

Also dating to Phase 6, deposit 6640 overlying hearth 6728 (sample 4078) was located in Building 8, in Tenement C. The mixed charcoal assemblage includes much beech and oak, but with elm, ash, holly and hawthorn type also present. This deposit is rich in charred cereals and pulses, indicating an association with food preparation.

Trends in wood species preference

Table 4.16 shows the presence/absence of wood taxa by phase, while Figure 4.12 shows the relative proportions of wood taxa identified from each phase (calculated from the total number of fragments of each taxon from each phase as a percentage of the total number of identified fragments from each phase). Both illustrate a trend of increasing species diversity over time. In the single late Saxon sample, five taxa are present (hazel, oak, ash, willow/poplar and hawthorn type), but in Phases 4, 5, and 6 at least ten taxa have been identified, with holly, field maple, blackthorn/cherry, beech and elm added to those seen in the earliest phase. However, in most of these later samples one or two taxa tend to dominate the assemblages with the remaining species present in small amounts. In Phases 2, 3 and 4 oak is strongly dominant. Beech, which is formerly present in only small quantities and only in a small number of samples, becomes much more important in Phase 5 and 6 samples. It occurs in all samples in these two phases and is the dominant taxon in half of these samples (four from Phase 5 and three from Phase 6).

Use of wood as an industrial fuel

It was not until the 18th century that coal was widely used as a fuel for industrial activities (Gale 2003, 30). Prior to this, wood was used, either as seasoned branch or trunkwood, or as charcoal which was manufactured in specialist clamps. As the populations of medieval towns like Oxford grew, so did the demand for wood fuels for heating and cooking and for the numerous industries that became established around the town. Smithing was an important industry which would have required a reliable supply of fuel and assemblages of charcoal associated with metalworking activity are present in samples from Phases 3–6. To investigate variation in fuel use, a distinction was made between 'industrial' samples, identified by the presence of industrial residues (clinker, coal, hammerscale or slag) versus those considered 'domestic' (those not containing industrial residues, and associated with large quantities of material associated with food preparation – abundant cereal grain, oyster shell, animal bone). This distinction is

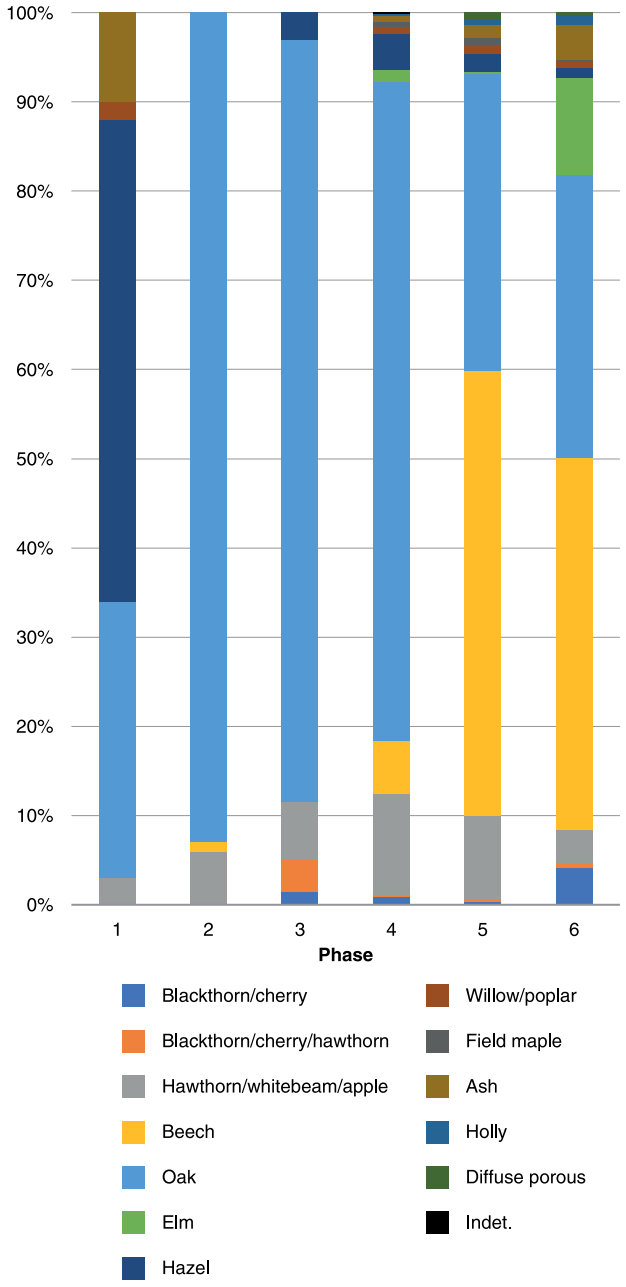


Fig. 4.12 Proportions of wood taxa by phase

not definite as there is overlap in the contents of many of the deposits. Therefore 14 samples were defined as 'industrial', dating to Phases 3–6, while 9 samples were classed as 'domestic.'

Figures 4.13 and 4.14 show the proportions of wood taxa in the domestic and industrial samples. It seems clear that there is no significant difference in the proportions of wood taxa between those samples classed as 'domestic' and those classed as 'industrial'. Instead, it is the date of the assemblage which accounts for most variability between samples. In Phase 3, which dates from the late 12th to early 13th century, oak heartwood is dominant, especially from the context most clearly associated with metalworking debris (pit 9330). This prefer-

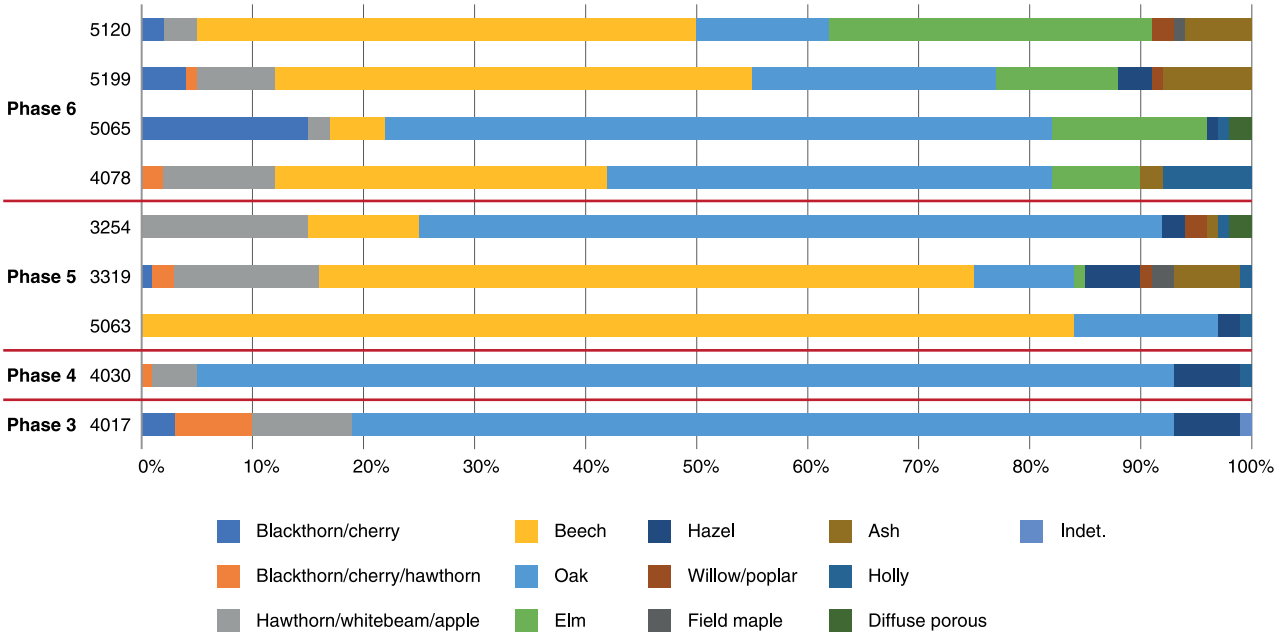


Fig. 4.13 Proportions of wood taxa in 'domestic' samples

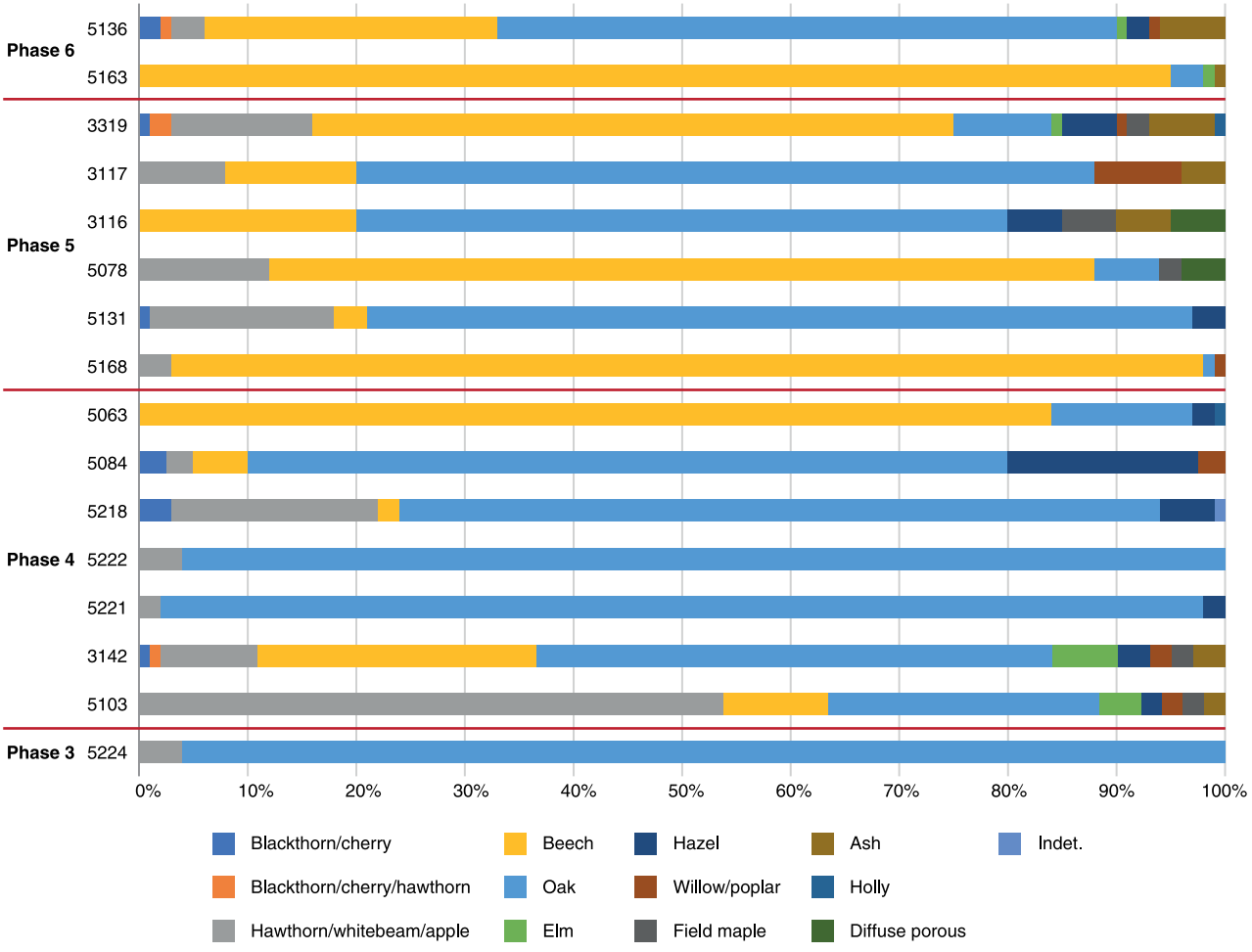


Fig. 4.14 Proportions of wood taxa in 'industrial' samples

ence for oak heartwood appears to continue throughout the 13th century, with hearth 4059 the only Phase 4 sample to contain a significant amount of beech. However, in the 14th and 15th centuries both beech and oak seem to have been favoured fuels. Both beech and oak are present in all samples from Phases 5 and 6, with the more abundant of the two varying between samples.

The charcoal assemblage within the context of medieval Oxford

Charcoal assemblages from two excavations at Lincoln College covered a similar chronological period and included a comparable range of wood taxa. Unlike the site at Magdalen, which lies just outside the eastern gate of the medieval town, Lincoln College would have lain within the town walls, but there is a very similar pattern of fuel use at the two locations. Charcoal assemblages from 11th-century cooking hearths at the Lincoln College Kitchen site are dominated by oak, with secondary amounts of hazel and hawthorn type, but very little beech (Challinor 2002). In contrast, beech was the dominant component of assemblages dating to the 15th century and later, with oak much reduced in importance. Charcoal assemblages investigated after further excavations at Lincoln College Garden Building included samples from a mixture of context types, including some that were related to metalworking and others to food preparation (Boardman 2020b). Again, earlier assemblages (dating from the late 11th to early 13th century) were dominated by oak and hazel charcoal, with hawthorn type also significant in some assemblages (ibid.) while from the 14th century onwards, beech was increasingly important, although oak and hawthorn type continued to be significant fuels.

The dominance of oak, and to some extent hazel, charcoal in late Saxon and early Norman assemblages appears to be a typical pattern for Oxford. Late Saxon charcoal assemblages from the Provost's Garden, Queen's College were mostly composed of oak (Challinor 2010), while further work at the site identified Saxo-Norman deposits composed of oak with some hazel (Boardman 2020c). At the Mitre Inn on the High Street, charcoal from mid-11th- to early 13th-century pits and occupation layers was heavily dominated by oak, with some hazel, blackthorn/cherry and hawthorn type (Druce 2022). The early importance of oak and hazel is also evident at sites including Oxford Castle (Challinor 2019), the Greyfriars (Meen forthcoming) and Paradise Street (Meen 2021a).

The increasing importance of beech as the medieval period progressed is also a pattern observed from other sites in Oxford and, as Challinor (2010) notes, it is a trend also seen in other medieval cities such as Bristol and Southampton. As at Magdalen, assemblages are often a mixture of beech and oak, with the relative proportions of the two taxa varying between samples. Charcoal associated with late medieval kitchen hearths at the Nun's Garden, Queen's College, were a mixture of oak and beech (Challinor 2010) and a similar composition was seen in the mid-12th to early 14th century at the Provost's Garden, Queen's College (Boardman 2020c) and from mid-13th- to mid-14th-century refuse deposits at Jesus College (Meen 2021b). However, this shift is not seen everywhere in Oxford as oak is dominant throughout the medieval period at the Classics Centre (Challinor 2008) and Brewer Street (Boardman forthcoming) while at the Mitre Inn, hawthorn-type charcoal is strongly represented in samples from the 14th to 16th centuries (Druce 2022). Boardman (forthcoming) suggests that the dominance of oak at Brewer Street may be because it was the most desirable fuel for the various industries which were concentrated in the southern suburb. Likewise, beech does not appear to have been a favoured fuel in the kitchens of the Greyfriars (Meen forthcoming).

Evidence for woodland availability and management

Trade in fuel wood would have been an important part of the local economy, with wood and charcoal available to buy in Oxford's markets. A description of traders on the streets of Oxford from about 1370 records wood sellers on St Aldate's and sellers of timbers and faggots on the south side of the High Street (Crossley 1979, 306). Local woods that survive from the medieval period include Wytham and Bagley Woods, at that time owned by Abingdon Abbey. Wood could have been transported from the beech woods of the Chilterns, an important source for firewood for medieval London.

Oak from all phases of activity at Magdalen commonly contained tyloses within the vessels of the early wood, demonstrating that heartwood from mature trees was being used. The ring boundaries on many of the pieces of oak charcoal from Phase 3 pit 9330 and Phase 4 pits 9332 and 9323 were closely spaced, indicating that wood was growing slowly with minimal new wood laid down each year. This may be indicative of growth in dense woodland or could be a reflection of a period of adverse climate (Morgan 1988, 16; Salisbury and Jane 1940, 316–24).

Much of the beech from the later phases is roundwood. Both the numbers of annual rings and the spacing of rings is variable: some pieces have many closely spaced rings, while others of the same dimensions had just a few widely spaced rings. Often fragmentary pieces show shallow curvature, suggesting larger roundwood, and the proportion of roundwood may be underestimated as the curvature is not visible on smaller fragments. Most of the charcoal fragments from sample 5063 have 10–20 annual rings but some have up to 26 rings visible on

the preserved section and, in sample 5199, at least 23 rings. This is consistent with other sites from Oxford where beech was found to be a favoured fuel in the later medieval period and where larger roundwood appears to have been preferred. The variability of the roundwood both in terms of diameter and age at collection may suggest that the wood utilised at Magdalen was not taken from a consistently managed source but instead from underwood of non-standard sizes, as suggested for assemblages from the Provost's Garden, Queen's College (Boardman 2020c) and medieval samples from Lincoln College Garden Building (Boardman 2020b).

MARINE SHELL *by Rebecca Nicholson*

The excavations produced approximately 2340 marine shells from 390 deposits, ranging in date from late Saxon to early modern periods. Of these, 980 shells were recovered by hand collection (12,871g) with the remainder (6717g) extracted from the dried residues of sieved soil samples, from 130 deposits, representing a similar range of periods. Almost all the hand-collected shell is European flat oyster (*Ostrea edulis* L.), with the shells spread across the excavated area but usually in small numbers per context, deposits typically producing between one and ten valves of variable size and in variable condition. Oyster shells were abundant (4092g) in soil sample 4051 from mid-15th–mid-16th-century (Phase 6) dumped deposit 6457 (Tenement B, latrine Structure 11), and comprise 243 left valves and 212 right valves; 106 left valves were measured (Appendix 10). There were also 39 cockle valves from a minimum of 17 shellfish, 2 mussel valves, 5 saddle oysters and 20 very juvenile oysters (spat).

Mussels (*Mytilus edulis* L.) were common in some of the sieved samples, mainly from mid-15th–mid-16th-century contexts (Phase 6) but other taxa are extremely scarce. Sample 5190 from occupation layer 8864 in Room 3 of Building 2 (Tenement B, Phase 6) included 412 mussel valves in addition to a single tellin (Tellinidae). From across the site gastropods are absent and the only other identified bivalves are cockles, most or all *Cerastoderma edule* (L.) which occur in eight contexts, a possible horse mussel (*Modiolus modiolus* (L.)) in one context, as well as a small clam (*Tapes* cf *corrugata*) and a tellin (Tellinidae) and several examples of saddle oyster (Anomiidae). The tellin and saddle oysters in other contexts were probably collected accidentally during shellfish harvesting. Oyster spat was also recorded in several sieved samples. Worked scallop shells from two contexts are reported on separately in Chapter 3.

AVIAN EGGSHELL *by Rebecca Nicholson*

Avian eggshell weighing 112g was recovered from 71 bulk samples and hand-collected from one context. The majority of the eggshell came from samples taken from pits and occupation deposits associated with the tenements in Phase 6 (88g), with no more than 8g recovered from any other phase (Appendix 11). The collected eggshell constitutes a representative sample rather than the entirety of eggshell from the site, since many samples include highly fragmented shell in the finer residues which would have been extremely time-consuming to extract. The material was rapidly scanned by eye and several examples examined using a low-power stereo microscope. With little exception the eggshell appeared similar in colour and thickness and is likely to be from domestic chicken eggs, although other domestic birds cannot be ruled out.

SOIL MICROMORPHOLOGY AND GEOCHEMISTRY

by Richard I Macphail and Chris J Carey

Introduction

Soil micromorphological and geochemical analyses were carried out to investigate the character of late Saxon Ditch 1 as well as medieval floors and occupation deposits in Tenements A and B. Eight samples were analysed, employing 90mm and 139mm size thin sections, was complemented by twelve exactly correlated geochemical analyses. The thin sections were analysed using a petrological microscope under plane polarised light (PPL), crossed polarised light (XPL), and oblique incident light (OIL), at magnifications ranging from x1 to x200/400. Bulk samples were analysed at Brighton University making organic matter estimates (loss on ignition: LOI), carbonate (CO3), and ICP-MS elemental analyses. Standard methods were used, following Goldberg *et al*. (2022, Chapter 17). The complete report, supported by tables, scans and photomicrographs, as well as geochemical figures, is available in Appendix 12.

Tenement A

Five thin sections and nine bulk samples were taken from monolith sequence 5052, 5053, 5054 covering the fills of the Phase 1 late Saxon Ditch 1 (contexts 7717/7716) and a series of floor layers (7703/7650/7658/7681) associated with medieval smithy Building 1 (Fig. 2.2, section 5030).

Phase 1 inwash colluvial ditch fill layers 7717 and 7716 in Ditch 1 represented in monolith 5054 were very weakly humic (2.40–2.43% LOI), in part because of mineralisation (associated with iron staining – 3.08–3.19% Fe). The dominance of brickearth soils over mortar remains was consistent with a low CO_3 content (5.92–6.24% CO_3) and small amounts of calcium (4.61–5.11% Ca). These layers had the weakest occupation signal of any of those studied here in terms of pollutants/heavy metals, with the lowest magnetic susceptibility. Fill 7717, as identified in thin section M5054B, is a brickearth building debris-rich ditch fill, with many wood charcoal fragments (max 4mm), rare fine bone,

coprolitic bone, examples of woody root remains, rare iron-phosphate nodules, and many sand- to gravel-size lime mortar fragments, rare trace of biocalcite granules, and humic stained laminae. This suggests an earth-based building debris colluvium is present which is characterised by domestic waste/latrine waste deposition (Brönnimann *et al*. 2017; Macphail 2022). Overlying ditch fill 7716, identified in thin section M5054A, comprises colluvial washes of fine soil sediments, with episodes of gravelly and stony deposition. It is likely that liquid waste was an important component as illustrated by slaking sediments and coatings, and it seems that burnt materials – charcoal and iron-cemented nodules with high-temperature melted sands and fine iron fragments – became embedded in phosphate. Charcoal and ash was often added to cesspits to sweeten the fills and this may be a component of the deposit. The presence of semi-melted sands suggest moderately high temperatures (~800C?) developed at times, with fine iron flakes (hammerscale?) being indicative of ironworking (Angelini *et al*. 2017; Berna *et al*. 2007; Röpke and Dietl 2017; Goldberg *et al*. 2022, 315).

Overlying ditch fill 7716, in thin section M5053 from monolith 5053, was the moderately fragmented remains of a scorched and charcoal-coated lime mortar and calcareous brickearth constructed floor or occupation surface 7703 of Building 1, Phase 4, with post-conflagration burrow fills of anthropogenic inclusions. The thin section probably also records a repair to the brickearth surface, using a lime mortar. A fire razing destruction event seems to have led to occupation surface 7703 being coated with fine charcoal, and the presence of very abundant clasts of lime mortar and brickearth constructional clasts, abundant pelletised ash and very fine charcoal, very abundant fine and coarse wood charcoal and charred bark. Notably, there is a subhorizontally >15mm-long fragment of oriented semi-fused phytolith-rich ash and fine charcoal, attached to a coarse charcoal fragment (8mm); embedded examples of partially melted quartz sands testify to high-temperature episodes associated with this conflagration (Röpke and Dietl 2017). The Principal Components Analyses (PCA) indicate polluting of the floor deposits with non-ferrous metal elements.

Layer 7681, also Building 1, Phase 4, identified in monolith 5052 (thin section M5052B) appears to be a later charcoal and iron fragment-dominated beaten floor deposit linked to an ironworking space, possibly a smithy, with basal layers recording iron flakes (hammerscale). Upwards, vesicular iron fragments (max 8mm) and neo-formed iron nodules are more common. No iron silicate slags are present, so this is an area of ironworking, not iron production. An example of globular silica slag/glassy slags, with embedded silt (max 8mm), suggests temperatures attained ~1000C to produce a silica glass phase. Consistent with this is the ~6% LOI and much the highest magnetic susceptibility at the site. Artisan activities in general also led to concentrations of lead (Pb), tin (Sn) and copper (Cu). The ground-raising layer (7650, 7658) is notable in that it has some of the lowest amounts of anthropogenic indicators but is one of the most organic (LOI=~9%).

Layers 7634 and 7604, both from Phase 6 (M5052A), are alternating brickearth clay floors and dark charcoal-rich trample layers, over a weathered mortar floor, and include likely cereal-processing waste. These layers have some of the strongest geochemical signals for anthropogenic activity and concentration of pollutants (PCI); there is a strong concentration of heavy metals and the marked correlation between Cu and Sn (r=0.71) indicating the presence of bronze with an antimony (Sb) and molybdenum (Mo) impurity, possibly deriving from the use of bronze utensils or tools. Higher iron (Fe) concentrations also potentially raise the possibility of ironworking or the presence of iron metal.

Tenement B

Three thin sections and three bulk analyses were taken from monolith sequence 5159 and 5160, a sequence of layered deposits in Trench 123 from an area of industrial activity, occupation surfaces and floor layers in Tenement B, overlying pit 8296.

Layers 8220, 8235, 8243, 8251, 8257, 8258, 8262 (thin sections M5159A-B-C and Monolith 5160) cover a whole series of brickearth and mortar constructed floors and trampled occupation deposits formed on them. Of particular note are associated phosphate (P) and organic matter concentrations (up to ~700mg/kg P; up to ~6% LOI), consistent with coprolitic and bone debris, and the possibility that occasionally pigs may have been present. Phosphate nodules in Tenement B, Building 2, layer 8262, could be of nightsoil origin (Goldberg *et al*. 2022, 326–7), but they have also been associated with pig management, and pigs could have been wandering around (cf Macphail and Crowther 2009; 2011).

Some form of organic pollution, potential waste/midden material in these occupation deposits was also demonstrated through Principal Components Analysis (PCIII being strongly associated with phosphate, calcium and sodium). Renewed lime plastering may have been carried out to seal 'dirty' floor surfaces. Tin (Sn) and lead (Pb) are particularly notable in monolith 5160.

Overall, the mortar and brickearth floors and occupation deposits in Tenement B record domestic use and have low magnetic susceptibility enhancement. In contrast, layer 7681 from Building 1, Tenement A (Phase 4) has by far the highest magnetic susceptibility and this is associated with evidence of ironworking. Of interest generally, the poor correlation between calcium (Ca) and carbonate (CO_3) may be related to decarbonation of weathered mortar floors.

Table 4.17: Radiocarbon measurements from human burials and from pit 3698 that stratigraphically predated burials within the cemetery

Laboratory number	*Material*	*Context description and sample association*	*^{14}C age (BP) C:N*	*$\delta^{13}C$ $\delta^{15}N$*	*Marine dietary component estimate (%)*	*Calibrated radiocarbon age (if terrestrial reservoir; 95% confidence; cal AD)*
SUERC-80254	Human right femur	SK 3004, from the cemetery (see Fig. 4.15)	850±26	-20.2 11.1 3.3	-	1160–1270
SUERC-80255	Human right femur	SK 4205, from the cemetery (see Fig. 4.15)	857±26	-19.7 11.3 3.2	15±10	Marine component, see Table 4.18
SUERC-80259	Large mammal bone	Fill 3708, pit 3698, stratigraphically predating burials within the cemetery	913±26	-22 10.1 3.2	-	1030–1220
SUERC-99885	Human right fibula	SK 4745, from the cemetery (see Fig. 4.15)	926±26	-19.7 11.9 3.4	15±10	Marine component, see Table 4.18
SUERC-99886	Human left femur	SK 3244, from the cemetery (see Fig. 4.15)	886±26	-20.4 9.8 3.4	-	1040–1230
SUERC-99887	Human left fibula	SK 3556, from the cemetery (see Fig. 4.15)	880±26	-19.5 11.3 3.4	18±10	Marine component, see Table 4.18
SUERC-99888	Human right tibia	SK 4732, from the cemetery (see Fig. 4.15)	877±26	-20.5 13.5 3.4	-	1050–1230
SUERC-99889	Human left clavicle	SK 4276, from the cemetery (see Fig. 4.15)	928±26	-19.9 11.4 3.3	13±10	Marine component, see Table 4.18
SUERC-99890	Human left femur	SK 6950, not part of the cemetery; isolated neonate found in association with Tenement C some way to the SE of the cemetery	819±26	-18.6 14.8 3.3	28±10	Marine component, see Table 4.18

RADIOCARBON DATING OF THE CEMETERY *by Seren Griffiths*

Introduction

Human skeletal remains provided an opportunity to examine the chronological development of the site as a cemetery, as well as to provide some chronological evidence for associated archaeology. Seven samples from burials within the cemetery were submitted to the Scottish Universities Environment Research Centre (SUERC), along with a further sample from a pit (3698) that stratigraphically predates burials within the cemetery. From the radiocarbon dates that were produced (Table 4.17) it has proved possible to examine the timing of burial practices at this location and to compare these with a series of key events in the history of urban Oxford.

Methodology

Full details of the dating methods and analytical techniques undertaken are available in Appendix 13.

Because the stable isotope data from the human bone collagen suggested that some of the individuals may have had marine components in their diets a two-stage correction was undertaken. Firstly, in order to provide accurate age estimates for the age of tissue formation, it was necessary to estimate the marine contribution. This has been done using the δ^{13}C values and the method of Arneborg *et al.* (1999) which assumes δ^{13}C end members of -12.5‰ for a purely marine diet and -21‰ for a purely terrestrial diet. The percent marine dietary contributions are shown in Table 4.17 where applicable; an error term of ±10% has been applied to this dietary component. Secondly, the local marine reservoir effect needed to be identified, but recognising the source of marine protein for this population poses something of a challenge since the geographical position of landlocked Oxford means that potentially a wide range of different locations could have provided the food resources responsible for the offset. Because the marine reservoir effect varies both geographically and temporally, identi-

Table 4.18: Impacts on the radiocarbon measurements of the different reservoir effects on the outputs (95% confidence or probability)

Calibrated results	*Terrestrial (Reimer* et al. *2020)*	*UK-averaging (SUERC- approach) -150±52*	*Nearest 10 datapoints -166±113*	*Nearest 100 datapoints -141±65*
SUERC-99885 (SK 4745)	1030–1210	1050–1270	1050–1260	1050–1270
SUERC-99887 (SK 3556)	1050–1220	1160-1290	1130–1290	1160–1290
SUERC-99889 (SK 4276)	1030–1210	1050–1260	1040–1260	1050–1260
SUERC-99890 (SK 6950)	1170–1280	1240–1420	1240–1420	1240–1420
SUERC-80255 (SK 4205)	1050–1270	1170–1290	1160–1290	1170–1300
Posterior density estimates				
start_Longwall_Quad_cemetery	*n/a*	*1120–1220*	*1120–1220*	*1120–1220*
end_Longwall_Quad_cemetery	*n/a*	*1170–1270*	*1160–1270*	*1170–1280*

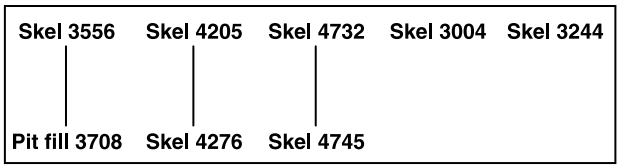
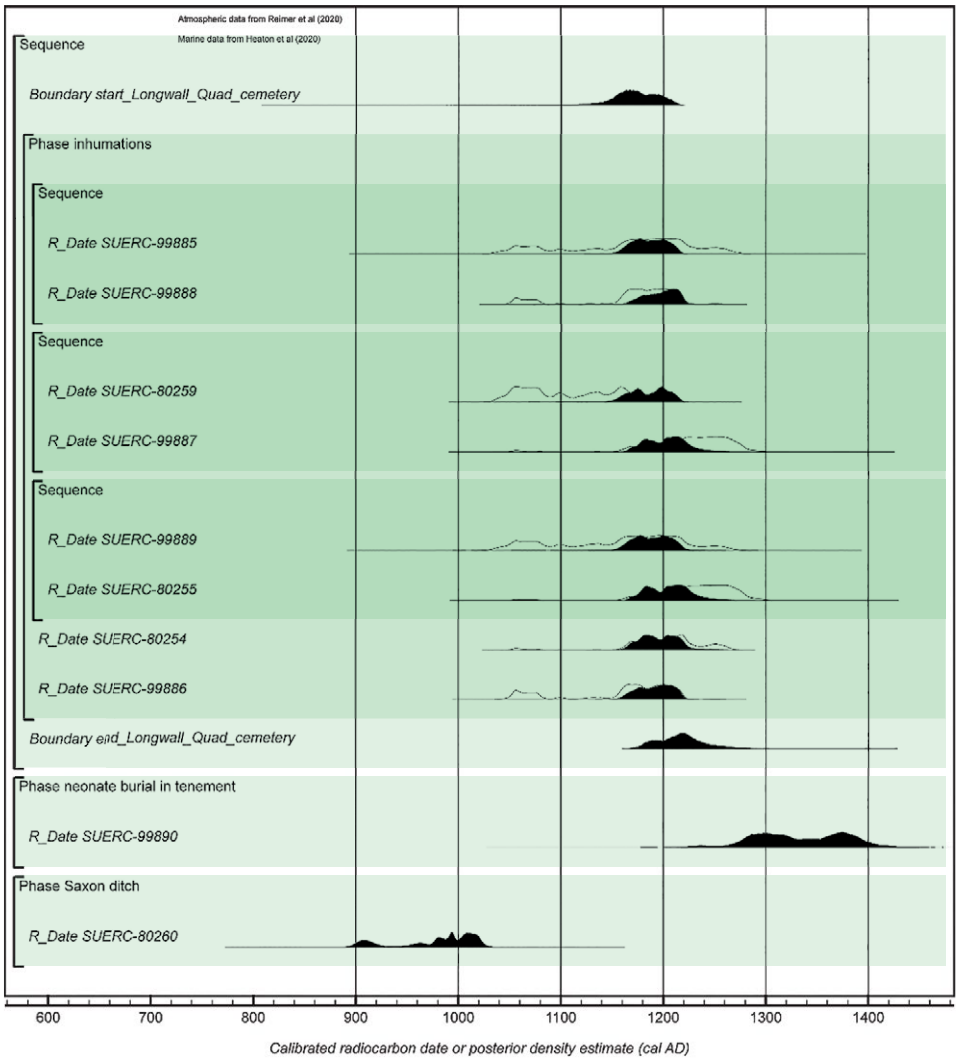


Fig. 4.15 (left) The stratigraphic relationships applied in the model presented in Fig. 4.16



The upper part of this illustration shows the Bayesian model for the cemetery, where the OxCal keywords and brackets define the model. In this part of the figure, the outline distributions are the calibrated radiocarbon results, where the distributions in black are the posterior density estimates (the model output). In the lower part of the figure two distributions are given for results (SUERC-99890 and SUERC-80260) that are not associated with the cemetery and have not therefore been included in the model.

Fig. 4.16 Bayesian model for the cemetery

fying the most appropriate local reservoir is challenging.

In the analysis three potential marine reservoir offsets were compared (Table 4.18). The first is a UK-averaging approach employed by the SUERC radiocarbon laboratory based on the local marine reservoir established for 13 sites from around the UK. For each site, a local reservoir from the nearest 10 datapoints in the Marine20 has been determined, and a mean (-150 ± 52) calculated from all these resultant reservoir estimates. This value is compared with two other estimates for the marine reservoir for Oxford. In the first alternative approach, the Marine20 dataset (Heaton *et al.* 2020) is used to calculate the average reservoir offset for the closest 10 reference points to Oxford. In the second alternative approach, the Marine20 dataset (ibid.) is used to calculate the average reservoir offset for the closest 100 reference points to Oxford. The results from using these different reservoirs is presented in Appendix 13, but in summary there are very limited differences in the ranges at 95% confidence. For the purposes of the analysis presented below the -141 ± 65 offset derived from the 100 nearest marine reservoir datapoints to Oxford has been applied.

Bayesian model

Using the stratigraphic relationships (Fig. 4.15) between the skeletal remains the results are presented within a Bayesian statistical model (Buck *et al.* 1996) using the program OxCal v4.4 (Bronk Ramsey 2009). The model is defined in the figures by the OxCal CQL2 keywords and brackets, whilst the calibrated radiocarbon dates are shown in outline and the posterior density estimates produced by the chronological modelling are shown in solid black. In the text and tables, the Highest Posterior Density intervals of the posterior density estimates are given in italics, followed by a reference to the relevant parameter name and the figure in which the estimate is defined. The Highest Posterior Density intervals which describe the posterior distributions are given in italics.

Figure 4.16 shows the preferred model (using the -141±65) local reservoir, the radiocarbon data and the prior information afforded by the site stratigraphy. From this model it is estimated that the cemetery began to be used in *cal AD 1120–1220* (*95% probable*; *start_Longwall_Quad_cemetery*), most probably in the second half of the cal AD 12th century (*74% probable* between cal AD 1150 and AD 1200; figure not shown). We estimate the cemetery was last used in *cal AD 1170–1280* (*95% probable*; *end_Longwall_Quad_cemetery*). This represents a relatively short duration of activity of between *1–95 years* (*95% probable; duration burial Longwall Quad*; Fig. 4.17), or between *1–45 years 68% probability*; *duration burial Longwall Quad*; Fig. 4.17). Also using the preferred model, it is most probable (*60% probable*) that the cemetery was first used before Jewish people had the right to bury their dead outside London in AD 1177 (*start_Longwall_Quad_cemetery_DR_141_65;* Fig. 4.18). It is also most probable (*99% probable*) that the cemetery ceased to be used before Jewish people were expelled from England in AD 1290 (*end_Longwall_Quad_cemetery_DR_141_65;* Fig. 4.18). On the basis of this chronology it seems that the cemetery is unlikely to represent the burials of the Jewish cemetery.

Beyond the cemetery, SUERC-99890 provided an age estimate for the death of SK 6950, a neonate found in association with a tenement some way to the south of the cemetery. This individual appears to have had a significant marine component in their diet, though this warrants further exploration in terms of the metabolic processes (of both the mother

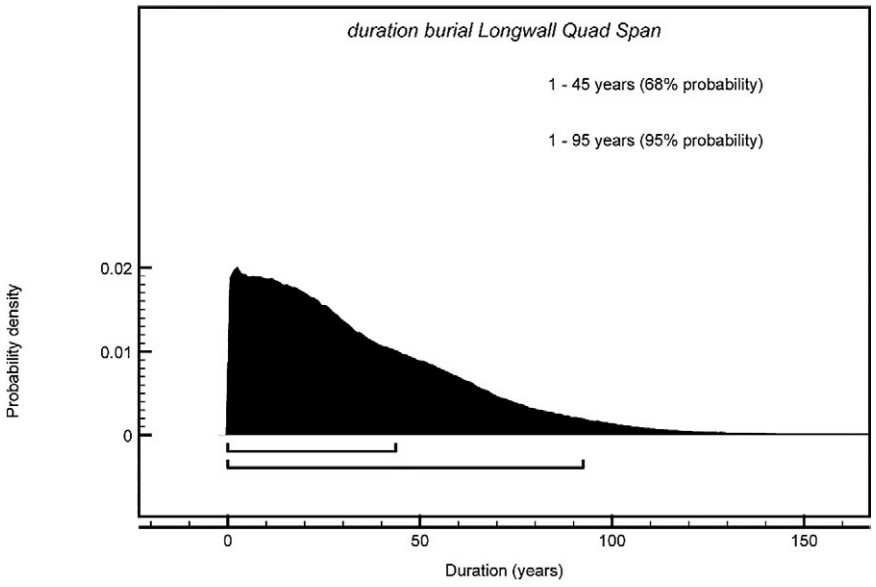


Fig. 4.17 The duration over which people buried in the cemetery are estimated to have died, based on the model shown in Fig. 4.16

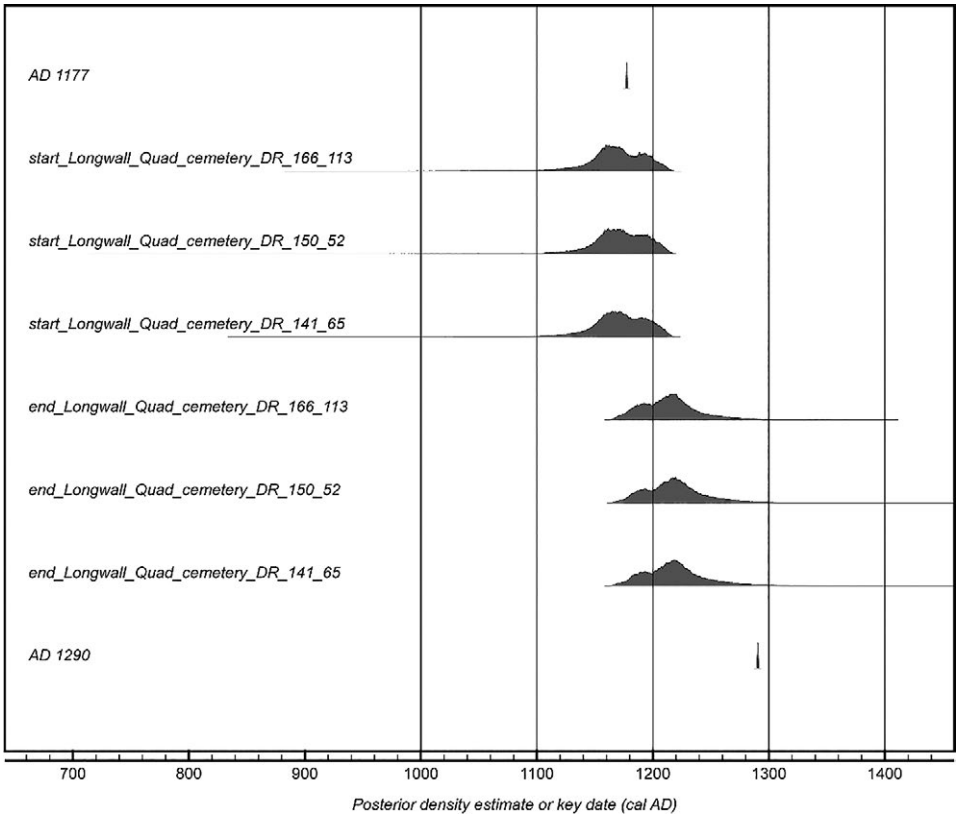


Fig. 4.18 Output from the preferred model with parameters generated from the same model shown in Fig. 4.16 with different reservoir estimates (see text) and compared with key events in 1177 and 1290

and neonate) that might be producing the stable carbon values. Currently it is estimated that this individual died in cal AD 1240–1420 (95% confidence; SUERC-99890; Table 4.18). Radiocarbon dates from other non-cemetery contexts are listed in Table 2.1.

Conclusions

The comparison shown in Table 4.18 emphasises the importance of applying a marine correction. The corrected results seem to represent a group of people who died over a relatively short period of time – perhaps under 50 years – around 1200. Further work on the stable isotopes of medieval Oxford may allow us to further explore the accuracy of the local reservoir offsets applied here and might enable the production of even more precise results. Given that radiocarbon measurements were produced from articulated skeletal remains from both the upper and lower preserved burials in this sequence, we would appear to have good age estimates for the preserved remains; the potential that some of the upper layers of the cemetery were truncated cannot be accounted for in the chronological evidence we have presented here.

Chapter 5

Human Skeletal Remains

by Helen Webb and Louise Loe

INTRODUCTION

The human skeletal assemblage from the cemetery at Magdalen College is an important group because it presents a rare opportunity to explore mid-12th–early 13th-century Oxford from the remains of the people themselves. Although contemporary human skeletal assemblages have been excavated from Oxford and elsewhere in the country (Table 5.1), osteological data is limited for many of these sites, either because detailed analysis was precluded by immediate reburial (eg Jewbury, York), skeletons were examined *in situ* (eg Bartlemas Chapel, Oxford) or skeletons were examined many years ago using outdated methods (eg Blackfriars, Oxford). For this reason, there is a lacuna in knowledge of the physical remains of the people from medieval Oxford sites, especially when compared with elsewhere in the country.

Totalling 115 skeletons, the assemblage includes 112 individuals from the formal cemetery and three neonates from tenement plots. Both groups are contemporary, so are generally considered together here, although reference is made to them individually, as required. Each skeleton was osteologically analysed following nationally accepted practice (Brickley and McKinley 2004; Mitchell and Brickley 2017), and the results described in a full technical report in Appendix 14. In addition, 40 of the skeletons were sampled for aDNA analysis by the Crick Institute, as part of their Wellcome Trust-funded *aGB: a thousand ancient genomes from Great Britain* project. This work is ongoing (so is not the focus of the present discussion), but so far has identified Klinefelter, a chromosomal defect, in one individual (mature adult skeleton 4205 from grave 4207; Anastasiadou *et al*. 2024). Other preliminary findings, on the genetic inheritance of the individuals, their genetic sex and genetic relationships, are reported in Appendix 14. A grave catalogue, including a concordance of skeleton number and grave number, is presented in Appendix 15.

Comprising 59 adults and 56 juveniles, the assemblage was generally well preserved making possible the collection of a wealth of osteological data on mortality, physical attributes and health. The juvenile skeletons – predominantly young children or adolescents – were characterised by frequent bone inflammation, cribra orbitalia and dental enamel defects, suggestive of a high burden of generalised health stress and, in some cases, scurvy and longstanding infectious disease. Two of the juveniles were especially notable, because they had developmental defects which had resulted in skeletal abnormalities, rarely observed archaeologically, and which would have been outwardly visible in life. They include a cleft palate and generalised dysplasia, a disorder in bone growth from birth, probably achondroplastic dwarfism. More generally, congenital and developmental defects were common among the juveniles, although most were relatively minor conditions, such as those involving teeth. Dental anomalies were also frequent among the adult skeletons, but it is perhaps the dental modifications in this group which are most interesting, because they suggest repeated use of teeth as a 'third hand' over a prolonged period. The adults included 29 females, 19 males and 11 unsexed individuals, most of whom were 26–35 years or 36–45 years of age when they died. A good number had bones which could be examined or measured to estimate stature and explore biological variation, the results generally consistent with a relatively heterogeneous group. Concerning health and disease in the adult sample, the most striking observation was the high frequency of bone inflammation (over 80% of the sample), especially in comparison with the prevalence of other diseases (joint disease, cribra orbitalia and neoplastic disease) in the group. The inflammation suggests several different conditions, sinusitis, tuberculosis, non-specific bone infection and septic arthritis among them.

This section considers these findings in the context of a range of medieval assemblages from Oxford and elsewhere in the country (Table 5.1) under two broad headings: assemblage composition and health. Physical attributes, including adult stature, cranial and post-cranial indices, and non-metric traits, were recorded during the osteological analysis but are not a focus here. They are, however, discussed where

Table 5.1: Comparative assemblages

Site name	*Type*	*Date range*
St Peter-le-Bailey, Bonn Square, Oxford	Parish church cemetery	11th–18th century
Bartlemas Chapel (St Bartholomew's Hospital), Oxford	Leprosarium, followed by alms house	12th century
Dominican Priory (Blackfriars), Oxford	Priory	1236–1538
St Bartholomew's Hospital, Bristol	Augustinian hospital	Founded *c* 1400, dissolved *c* 1532
St James and St Mary Magdalene, Chichester, W Sussex	Leprosarium and alms house	Founded ?before 1118, ceased use by late 17th century
St Mary Magdalen, Partney, Lincolnshire	Hospital	Founded by 1115, ceased use by 1318
St Mary Spital, London	Priory and hospital	1120–1200 (period 14) 1200–1250 (period 15)
The Litten medieval cemetery (Hospital of St Bartholomew), Newbury, West Berkshire	Hospital	Early 13th–early 16th century
St Nicholas, Lewes, Sussex	Hospital	Founded before 1088? Not dissolved – alms houses until 1810
St Leonard, Newark, Nottinghamshire	Secular hospital (originally leper hospital)	Founded c 1133. Not dissolved – moved to new site *c* 1642
St John the Baptist, Mill Farm, Lutterworth, Leicestershire	Hospital	Founded 1219 – late 14th or 15th century
Jewbury, York	Jewish cemetery	Late 12th–13th century
Mews Lane, Winchester, Hampshire	Jewish cemetery	1177–1290
East Smithfield, London	Black Death cemetery	1348–50
Hospital of St John the Evangelist, Cambridge	Hospital	13th–16th century
St Augustine's, Stoke Quay, Suffolk	Parish cemetery	850–1500

NB Data in this table primarily compiled from Gilchrist and Sloane 2005. The references given above are for the main site reports.

relevant under the main themes below. Reference is also made to the data presented by Roberts and Cox (2003, 221–86) for the late medieval period (1050–1550). It should be highlighted that the different ways in which the data are presented within the comparison reports, and the different methods used to analyse the skeletons, preclude direct comparison of some data, but more general observations have been made in such instances.

ASSEMBLAGE COMPOSITION

The composition of the assemblage contrasts starkly with most contemporary assemblages in terms of the relatively even number of adults and juveniles (ratio 1:0.9, or 51.3% versus 48.7%, respectively) and the high ratio of females to males, which is 1.5 females to every male (Table 5.2). Except for Mews Lane Jewish cemetery, Winchester, where a

No. of excavated skeletons/burials	*Demography*	*Reference*
111 earlier period (11th–18th century)	1.1F:1M 82.0% adults 18.0% juveniles burials	Webb and Norton 2010
13 inhumations, 3 charnel pits	Minimum 13 individuals. No detailed demography but adults and juveniles, males and females	Griffiths and Harrison 2020; Boylston 2012; Levick 2012
Harman 1985: 83 intra- and extra-mural burials reported on	*Harman 1985*: 9 juveniles (up to 15 yrs) 74 adults (>15 yrs) 5.9M:1F 53 adult males 9 adult females 12 adult?	Lambrick and Woods 1976; Harman 1985
30 articulated intramural chapel burials	1.1M:1F 32% >45 years	Price with Ponsford 1998
384 burials	2.3M:1F 26% subadults 22% elderly Magilton *et al.* 2008	Lee and Magilton 1989;
33 articulated skeletons examined (14 lay burials, 19 monk/priest burials)	17M:1F 15.2% juveniles 84.8% adults	Atkins and Popescu 2010
Period 14: 512 burials Period 15: 1390 burials	Period 14: 1.3M:1F 18.4% juveniles 81.6% adults Period 15: 1.1M:1F 21.7% juveniles 78.3% adults	Connell *et al.* 2012a
56 articulated burials	37 adults 19 children 1.6M:1F	OA 2006b
103 from ?northern cemetery of the hospital	4.25M:1F 8% subadults 3% elderly 34% young adults	Barber and Sibun 2010
87 individuals (minimum) from the south roadside cemetery of the hospital	3.7M:1F No subadults 23% died before 26 years 14% elderly	Bishop 1983
22 simple plain interments	1 unsexed adolescent 18 adult males 1 adult female 2 unsexed adults Predominantly elderly males	Score 2010
c 475 burials (470 skeletons aged as adult/juvenile)	1.08M:1F 154 juveniles 316 adults 32.8% juveniles 67.2% adults	Lilley *et al*. 1994
88 burials, 73 osteologically assessed	Large numbers of juveniles, especially infants (55%)	Ottaway and Qualmann 2018
558 burials from the western cemetery 192 individuals from the eastern cemetery	Of 636 recorded: 1.82M:1F 27.8% subadults 72.2% adults	Grainger *et al*. 2008
404 complete or partial skeletons	M=87 F=74 1.2M:1F male to female ratio Unsexed unaged adults=161 Unsexed adults=19 Total juveniles=63 Total adults=341	Cessford 2015
1142 skeletons	1:1M:1F 41.6% juveniles, 58.4% adults	Loe *et al.* 2020

The osteological reports are, where relevant, specifically referenced below.

high number of infants was observed, all the comparative sites had lower numbers of juveniles than adults, unlike Magdalen. The medieval parish cemetery of St Augustine, Stoke Quay, Suffolk, the vast majority of which was identified and excavated, had the most similar proportion of adults to juveniles, at 1:0.7, or 1:0.8 in the two earliest of the three phases at this site (phase 4.2, AD 850–1066 and phase 5, 1066–1200; Loe *et al*. 2020, 291–6), but this was still a lower proportion of juveniles than at Magdalen. Further, all comparative sites had a lower ratio of females to males than Magdalen (where this could be calculated), all of them, except St Peter-le-Bailey, Oxford, having more males than females. St Peter-le-Bailey is the only assemblage where more females than males were observed, but the ratio was not as high as Magdalen (1.1 females to 1 male, compared with 1.5 females to

1 male at Magdalen). It is perhaps interesting that, of all the assemblages considered here, those with more females than males are both from Oxford.

More generally, the Magdalen mortality profile is not consistent with the profiles that are typically reported for contemporary archaeological populations. These approximate the same U-shaped curve seen among developing countries today where deaths peak in infancy, decline in later childhood and adolescence and increase again over adulthood (Waldron 1994). Profiles which reflect catastrophic events, such as a high number of males dying in prime adulthood as the result of battle (eg Fiorato *et al*. 2000; Loe *et al*. 2014), or high numbers of very young and very old individuals resulting from famine (Margerison and Knüsel 2002; Dyson and O Grada 2002), have also been reported, although are less common. Unlike these patterns, the Magdalen mortality profile is more erratic, with deaths being proportionally highest among neonates, young children, adolescents, and prime and middle adults, most notably female adults (Fig. 5.1). The erratic nature of the profile, and high proportion of juveniles in relation to adults, are in stark contrast with broadly contemporary sites, which have smoother profiles and fairly equal proportions of juveniles to adults (Fig. 5.2). The high proportion of deaths in adolescence and low proportion of deaths in young adulthood at Magdalen compared with other sites are also striking.

These patterns are likely to be the result of a combination of several factors, first and foremost bias caused by the extent of excavation, but also the methods employed to estimate the ages of the skeletons; cultural, social and religious practices; and the nature of the buried population itself.

Table 5.2: Age and sex distribution of the total assemblage

Age category	*Age range*	*Male*	*Female*	*Total inc. unknown sex (%)*
Preterm	<37 weeks gestation	-	-	0 (-)
Neonate	birth–1 month	-	-	9 (7.8)
Infant	1–12 months	-	-	4 (3.5)
Young child	1–5 years	-	-	22 (19.1)
Older child	6–12 years	-	-	5 (4.3)
Adolescent	13–17 years	2	-	16 (13.9)
Young adult	18–25 years	3	2	5 (4.3)
Prime adult	26–35 years	5	10	16 (13.9)
Middle adult	36–45 years	6	16	22 (19.1)
Mature adult	>45 years	4	0	4 (3.5)
Mature adult +	>60 years	0	0	0 (-)
Adult (unspec.)	>18 years	1	1	12 (10.4)
Total		21	29	115 (100)

Male and female categories include probable and possible instances

Methodological bias

It is widely acknowledged that inaccuracies in the methods employed to estimate age in archaeological skeletons may bias mortality profiles. This is especially the case for methods used for adult skeletons, which are well known for their tendency to under-age the old and over-age the young (Falys and Lewis 2011, 706; O'Connell 2004, 18; Cox 2000, 64; Boulter *et al*. 1998, 39). However, these inaccuracies are not thought to be that significant here. This is because, broadly speaking, the same methods have been employed to age all the assemblages considered here, including Magdalen, so the margins of error are theoretically the same. Further, this does not explain the unusual mortality patterns among the Magdalen juveniles, for which age estimation methods carry much smaller error margins than for adults (Mays 2021, 64; Brickley 2004, 21) meaning the age distribution is likely a reasonably accurate representation of the ages at death of these individuals.

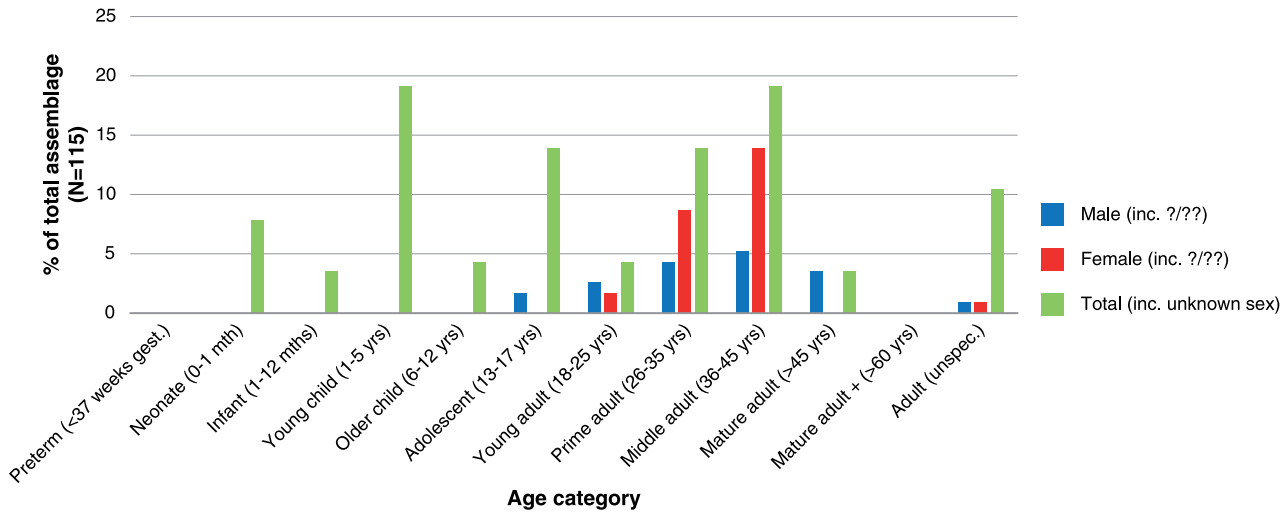


Fig. 5.1 Age-at-death distribution of the total assemblage (N=115)

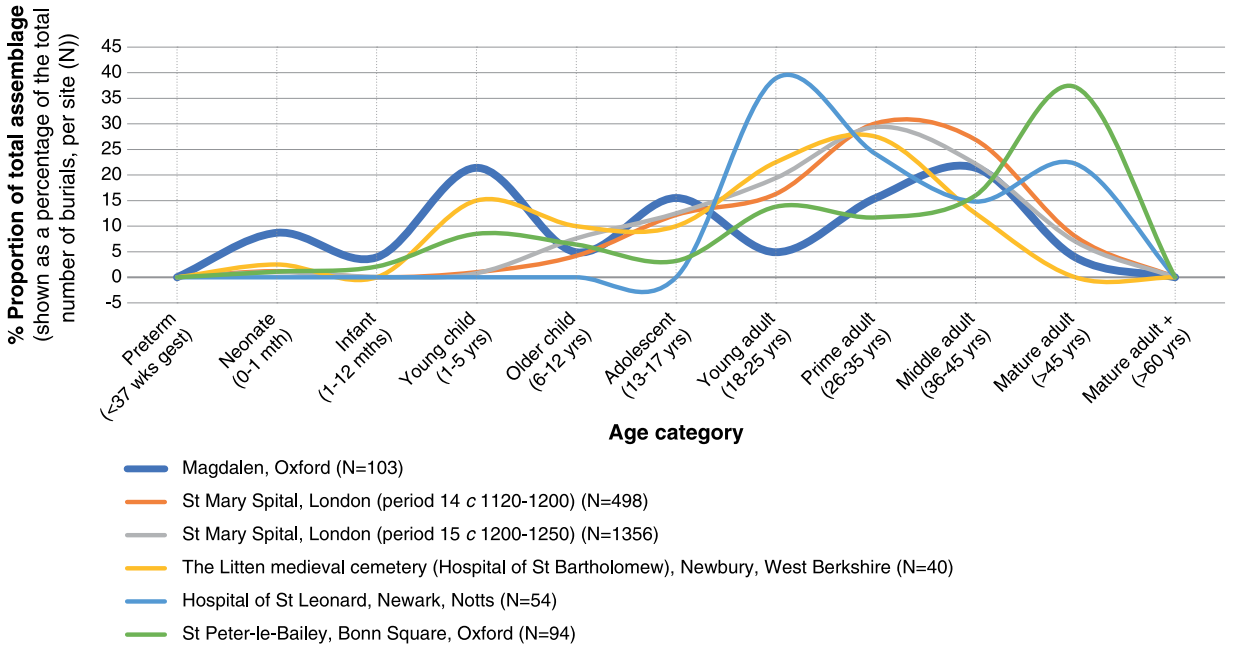


Fig. 5.2 Comparative proportional mortality curves

It seems unlikely that methodological bias has resulted in a significant overrepresentation of females within the assemblage. Although osteological analysis estimated that a notable proportion of the adult skeletons was probably (13 skeletons) or possibly (four skeletons) female, rather than definitely female (12 skeletons), most of these non-definite cases (11/17 skeletons) were largely complete skeletons (76–100%), thus the estimations of sex will have been derived from multiple sexually dimorphic features of both the pelvis and skull. Estimation of sex using a combination of cranial and pelvic traits is deemed reliable. For example, Inskip *et al*. (2018) evaluated macroscopic sex estimation methods using genetically sexed medieval skeletons from Cambridge and found an accuracy of 97.7% when estimating sex using a combined method of cranial and pelvic traits (ibid., 344).

Methodological bias is also not supported by the preliminary results of the aDNA analysis. This work identified the genetic sex of 29 skeletons, 17 of which were adults that had undergone osteological sex estimation. All ten of the osteologically estimated female skeletons were proven to be female. Of the seven skeletons estimated to be male, six were confirmed as male, and one was identified as having an intersex condition (Klinefelter syndrome), in which two copies of chromosome X and one copy of chromosome Y are present (Anastasiadou *et al*. 2024). These findings indicate a high level of accuracy in osteological sex estimation for the Magdalen College assemblage.

Lastly, it is interesting to note that, of the 12 juvenile skeletons in the sample that had genetic sex determined, nine were found to be female and three were male. Thus, the overrepresentation of females was apparently not restricted to the adult sample.

Excavation bias and burial zonation

The full extent of the burial ground was not identified during the excavation, so it is unclear how representative the excavated burials are of the once buried population. Only the southern limit of the cemetery was revealed during excavation, and the western extent is likely to have been delimited by the boundary of Adam Faber's corner tenement (Tenement A; see Chapters 2 and 6). How far to the north and east the cemetery extended was not ascertained.

The effect of the incomplete excavation of the burial ground may be further compounded by the fact that individuals might have been buried in zones. The high number of juveniles in the assemblage might reflect that the excavated south-west area of the cemetery had been used primarily for child burials. According to Gilchrist (2012, 205) the zoning or clustering of infants and juveniles is known at a range of medieval cemeteries including parish churchyards (eg Barton-upon-Humber in North Lincolnshire, Wharram Percy in North Yorkshire and St Helen-on-the-Walls, York), hospital cemeteries (eg St James and St Mary Magdalene, Chichester) and the East Smithfield Black Death cemetery, London. Child clustering has also been observed at Jewish burial grounds, for example, Jewbury, York and Mews Lane, Winchester. At the non-Jewish cemeteries the clustering would seem to be particular to children, that is, age does not seem to have been a factor in the burial locations of adults (ibid.), but at Mews Lane Jewish cemetery, most of the few adults were found to the west of an early boundary ditch (Ottaway and Qualmann 2018, 226).

In addition, it is possible that babies (neonates and infants) were deliberately excluded from the

cemetery, with the resulting underrepresentation of these young age categories causing an artificially high 'young child' age category. An underrepresentation of babies is often reported for archaeological samples, such as at St Helen-on-the-Walls, York (Grauer 1991, 70–1), where it has been suggested that the exclusion of unbaptised infants may have been a factor (Connell 2012, 242). This is certainly relevant to the Magdalen assemblage, given that three of the nine neonates included were from outside the confines of the cemetery, having been buried in tenement plots.

The clustering of burials relative to age may have also extended to sex, which might also explain the high number of females in the assemblage (ie they were intentionally clustered in the south-western area of the cemetery). Clustering of burials by sex is a consistent trend in English monastic churches and cemeteries (Gilchrist 2012, 205; Gilchrist and Sloane 2005, 64–70) and it is also seen in a wide range of other medieval cemetery types. For example, at the parish cemetery of St Helen-on-the-Walls, York, areas B and C, forming the south corner of the graveyard and the area south-east of the church, respectively, had significantly higher proportions of juveniles and females compared with area A (north-west of the church), clearly indicating spatial segregation (Gilchrist and Sloane 2005, 70). In two leper hospitals, St James and St Mary Magdalene, Chichester, and St Margaret, Huntingdon, there was also evidence of spatial zoning of women and children (ibid., 69–70). At Jewbury, some clustering of males was observed in which 20 males were recovered from the ends of burial rows and half of one row consisted entirely of males (Lilley *et al*. 1994, 333). This may refer to the practice of affording rabbis separate burial, so that they could rise to face their congregation at the resurrection, or so that they were close to the edge of the cemetery because the graveyard was regarded as '... a place of dangerous spirits which the rabbi should not frequent' (*Jewish Encyclopedia* 1902, 638, cited in Lilley *et al*. 1994, 308). There were no large clusters of females here, although two of the burial rows contained fairly distinct groups of females (ibid., 333).

Cultural and social practices

Besides zonation, there are numerous cultural factors which should be considered in relation to the composition of the population. For example, mortality is likely to have increased when children were weaned, which, according to an isotope study on child skeletons from Fishergate House, York, happened at an average age of two years during the medieval period (Burt 2013, 407). Whilst a growing infant is sufficiently supported in utero, and then by their mother's milk during the first months of life, a weanling's diet during the medieval period was likely insufficient for normal growth and development, rendering the child at risk of malnutrition, weakened immune response and a much higher chance of early death (Dittman and Grupe 2000, 345). Even in the modern world, inadequate complementary feeding and early cessation of breastfeeding are considered to be key factors contributing to infant malnutrition (Stewart *et al*. 2013; WHO 2009, 3–4; Craig-Atkins *et al*. 2018, 652).

In addition to weaning, high numbers of child deaths in the assemblage may also be linked to the fact that at around age one, children tend to become more mobile, and will have been 'released' from their swaddle bands, allowing them to interact more fully with the world – and its hazards – around them (Penny-Mason 2015, 24). Contemporary documents indicate that young children were regarded as playful and active, yet they lacked both discretion and judgement (ibid.). Documentary accounts also allude to the sorts of play, or household risks – such as choking, falls, drowning, attacks by household animals – that might have led to trauma, and potentially death (ibid.). Children and infants certainly feature as victims within coroners' rolls, and many accidental deaths were no doubt associated with play and/or lack of proper supervision (Goldberg 1995, 4), though very few are likely to have been visible skeletally.

In this respect, then, the mortality profile is also influenced by the social experiences of the children during the life course (Agarwal 2016). With this in mind, the lower number of older child (6–12 years) deaths perhaps reflects the fact that for those children who survived the risks associated with weaning and an immature level of sense and judgement, life was less hazardous. By around age six children began interacting with the world more fully although the transition into adulthood and the activities associated with it was probably gradual, and during these years (to around 11 years) the perceived state of 'childhood' was retained (Penny-Mason 2015, 24). It was from around age 12 that children were expected to undertake more adult, occupational roles, with many boys going out to work and girls tending the household (ibid., 25–6), and it may be that the peak in adolescent deaths observed at Magdalen is a reflection of the increased exposure to the dangers of the adult world. This being said, none of the adolescents in the assemblage exhibited lesions of trauma, although the dangers of the adult world were not, of course, only of the physically hazardous type. Inflammation/infection and metabolic disease, potentially indicative of dietary deficiency, were the most common categories of disease amongst the Magdalen juveniles.

The peak in adolescent deaths may also reflect that a higher proportion of individuals in this age group were residing within Oxford at this time. Children, both boys and girls, from poorer families travelled to urban areas to seek employment as menial workers and domestic servants (Lewis 2016a, 140; Shapland *et al*. 2015, 273). Very little is documented on these young individuals, with most contemporary records relating to formal apprentices, who were generally of wealthier stock. Before the Black Death reduced the working population of England, boys began apprenticeships between the ages of 14 and 16 years and

girls entered domestic service as young as 10 years of age (Lewis 2016a, 142). It is likely that children travelling to the towns under less formal circumstances were of similar ages to their wealthier counterparts, or perhaps even younger (ibid., 161).

Nature of the buried population – a hospital population

A final consideration in the composition of the assemblage is the fact that it comprises individuals who were associated with the Hospital of St John. However, it is difficult to understand the extent to which the demography of the assemblage has been influenced by this, because the nature of the hospital is unclear. Like other hospitals of the time, St John's was primarily associated with entertaining strangers and pilgrims, being referred to as a '*herebergeria hospitalis extra portam orientalem*' – the lodging of the hospital outside the east gate (ibid.; Steane 2004, 196). A bull of privileges by Pope Innocent IV, dated to 6 October 1245, speculated that its original purpose was to benefit 'poor scholars and other wretched persons' (Bridge 1999, 140; James 2013, 11). According to charters which predate 1234, the hospital comprised brethren and sisters and is referred to as a place where hospitality and harbour were received (Salter 1917, xii–xiii). However, it is not stated whether the hospitality and harbour were provided on a permanent or temporary basis, or whether this included the 'hale or the sick' (ibid., xiii). Salter (ibid., xiii–xiv) suggests that the hospital's function was twofold: 'to receive the infirm like a modern hospital, and to provide lodging for wanderers and tramps'. It was managed by brethren who were permanent residents and who, along with sisters, waited on the infirm (ibid., xiii, xxiv). References to the hospital after it was refounded in 1231 associate it solely with the sick and infirm, suggesting that its function had changed by this time (Page 1907, 158).

It seems unlikely that the high numbers of women and children in the assemblage reflect an institution which was functioning as a hostel, catering solely to the needs of travellers, but women and children may well have formed a significant proportion of the 'patients' if the early hospital also functioned to care for the sick. As suggested above, it is of course possible that the nature of the population buried within the hospital cemetery was not fixed but changed over time from one which predominantly comprised brethren, pilgrims and travellers, to one which came to focus on the sick.

Perhaps another relevant consideration here is the crusades, specifically the Third Crusade (1189–1192), instigated by Henry II, led by Richard the Lionheart of England, which were funded through higher taxes (the 'Saladin tithe') and recruited an army of men. The increased burden resulting from raised taxes at the same time as an absence of menfolk, who would have answered the call to go on crusade, would certainly have put great strain on the communities and families, not least the women and children, left behind (ibid.), undoubtedly pushing many into poverty. It is reasonable to suggest that those affected would have turned to a hospitable institution, such as St John's, for aid.

As highlighted by James (2013, 10), children would certainly have made up a significant component of medieval hospital populations, particularly given that children in particular were beneficiaries of the support of the Church, prior to the

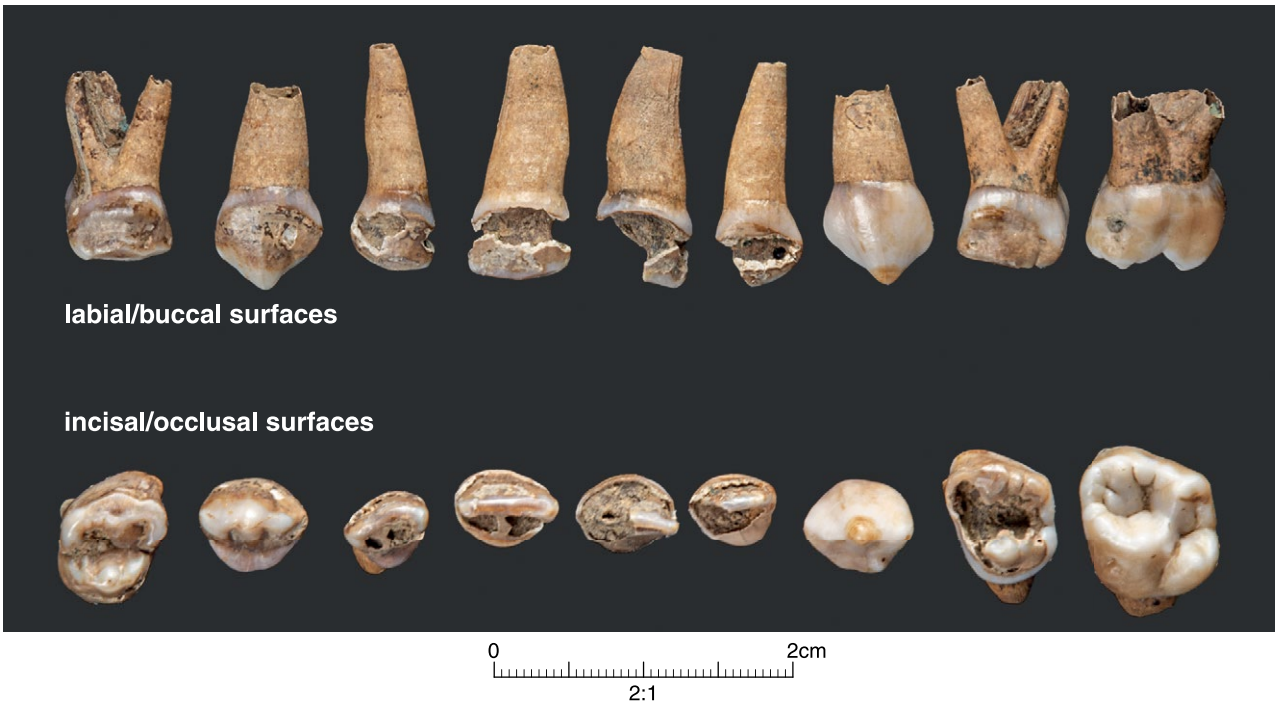


Fig. 5.3 Dental decay consistent with bottle-feeding caries in the upper dentition of young child skeleton 4643

Reformation (Penny-Mason 2015, 21). High rates of abandonment and mortality in urban centres meant that orphans were likely common in medieval hospitals (James 2013, 10; Hookway and Squires 2020, 53). Perhaps also relevant to mention here is skeleton 4643, a young child skeleton with severe dental decay in a pattern consistent with bottle-feeding caries (Fig. 5.3; see Appendix 14, *Juvenile dentitions*). This might refer to a child who had been orphaned or abandoned, so needed to be bottle fed.

Another relevant point here relates to Henry III, who in 1240 gave £16 13s 4d for a chamber to be built for women undergoing childbirth at St John's Oxford (Calendar of Liberate Rolls). Whilst 1240 may narrowly post-date the burial ground if it was solely associated with the first hospital, before it was refounded in 1231, the requirement for a specific maternity chamber must have been based on prior need – that is, perhaps the number of labouring women requiring care and support outweighed that which could practicably be provided by the hospital. Bridge (1999, 141) highlights the presence in Oxford of large numbers of often riotous young male students, which might well have drawn a large pool of single young women to the town. If this had indeed occurred, it might easily have resulted in a large pool of unmarried, expectant young mothers, lacking their family circle and needing a place to give birth (ibid.). The high number of females, and indeed the neonates within the assemblage, may well be explained by obstetric deaths, whilst the high number of children in general might reflect maternal deaths, but survival of children, subsequently left in the care of the Church (ibid.). This being said, there is apparently no evidence for the presence of children in the hospital records of St John's (ibid.), which is in stark contrast to the archaeological and osteological evidence. It is tempting to suggest that the sole double burial from Magdalen, that of a neonate (3041) and a prime adult female (3034) were casualties of an obstetric complication, although the genetic relationship between the two individuals could not be proved osteologically (these skeletons were not included in the aDNA sample programme). It was not unusual at this time, or in later periods and even in modern times, for recently deceased infants to be buried with a conveniently recently deceased female of childbearing age (Roberts and Cox 2003, 253).

Other women who may have made up a notable proportion of the sample include the lay sisters residing and working at the hospital, and widows who could not work or were homeless. Hospitals are known to have provided refuge and employment in such cases (Leyser 1995, 179).

HEALTH

The vast majority of skeletons in the assemblage had lesions of dental and/or skeletal pathology. To put this into perspective, all 44 observable adult dentitions and 26 of the 43 (59.1%) juvenile dentitions had some form of dental pathology, whilst 80.0% (92/115) of skeletons had one or more lesions of skeletal pathology, comprising 98.3% (58/59) of adults and 60.7% (34/56) of juveniles. For the purposes of analysis, pathological lesions were broadly classified according to their primary aetiology as congenital/developmental, inflammation/infection, metabolic, joint (spinal/extra-spinal), non-specific inflammatory, circulatory, neoplastic, miscellaneous disease (ie diseases with an unknown aetiology), or trauma, with undiagnosed lesions grouped separately. Table 5.3 presents the crude prevalence rates (number of skeletons with a pathology out of all skeletons; CPR) of each category of skeletal pathology. Full details of the lesions observed are present in the archive, and detailed analysis of both dental and skeletal pathology is presented in the technical report (Appendix 14).

The conditions considered in this chapter are those which may be used to explore the key areas of research interest relating to the overall health of the population, and include lesions of non-specific inflammation and specific infection, pathological conditions which might relate to diet, evidence for congenital deformity, lesions or modifications which may be linked with occupation and activity, and cases of trauma, with specific reference to interpersonal violence.

Table 5.3: Crude prevalence rates (CPR) of skeletal pathologies

Pathology category	*Adults CPR*	*Juveniles CPR*	*Total CPR*
Congenital/developmental	25.4% (15/59)	5.4% (3/56)	15.7% (18/115)
Inflammation/infection	81.4% (48/59)	37.5% (21/56)	60.0% (69/115)
Metabolic	27.1% (16/59)	37.5% (21/56)	32.2% (37/115)
Spinal joint disease	71.2% (42/59)	1.8% (1/56)	37.4% (43/115)
Extra-spinal joint disease	40.7% (24/59)	0% (0/56)	20.9% (24/115)
Circulatory	3.4% (2/59)	1.8% (1/56)	2.6% (3/115)
Neoplastic	5.1% (3/59)	0% (0/56)	2.6% (3/115)
Miscellaneous	11.9% (7/59)	25.0% (14/56)	18.3% (21/115)
Trauma	32.2% (19/59)	0% (0/56)	16.5% (19/115)
Undiagnosed	8.5% (5/59)	1.8% (1/56)	5.2% (6/115)

NB These figures do not account for skeletons having multiple cases of the same category of disease, ie multiple fractures and an ossified haematoma identified in a single skeleton are classified as one count of trauma.

Non-specific inflammation and specific infection

By far the most prevalent pathology observed in the assemblage was inflammation/infection, seen in 60% (69/115) of all skeletons, or 81.4% (48/59) of adult skeletons and 37.5% (21/56) of juvenile skeletons. Lesions in this category included maxillary sinusitis, endocranial lesions and periosteal new bone formation (PNBF) (Tables 5.4–5.6). When considered in relation to contemporary assemblages, these conditions may be considered to be a useful measure of non-specific health stress suffered by past populations (eg Steckel *et al*. 2009). For Magdalen, the rate of maxillary sinusitis is in keeping with the wide range of rates observed elsewhere (Table 5.4), but endocranial lesions and PNBF were far more common than elsewhere (Tables 5.5 and 5.6).

Comparing the pattern of skeletal involvement in this way does not help to clarify why the prevalence is higher in the Magdalen assemblage. Indeed, the overall pattern of skeletal involvement at Magdalen is in keeping with elsewhere (ie tibia most frequently affected bone; Brothwell and Browne 1994, 471; Bishop 1983, 32; Dodwell 2015, 94; Lee and Boylston 2008a, 226–7). Whilst PNBF is generally considered non-specific in its aetiology, the high level observed in the Magdalen assemblage may, at least in part, reflect a high level of systemic disease, including both specific and non-specific infection, the latter of which cannot be diagnosed because of a lack of diagnostic features on the skeletons. At least 11 skeletons had diffuse periostitis, indicative of systemic disease. Certainly, the Magdalen PNBF crude prevalence rate (CPR, see Appendix 14, *Methods*, for definition) (47.0%, 54/115), albeit higher, was most in keeping with the overall CPR observed at St James and St Mary Magdalene, Chichester (43.0%, 165/384), an assemblage incorporating a significant proportion of

Table 5.4: Comparative maxillary sinusitis rates

		Total assemblage	*Juvenile*	*Adult*
Magdalen College, Oxford	CPR (n/N)	17.4% (20/115)	5.4% (3/56)	28.8% (17/59)
	CCPR (n/N)	36.4% (20/55)	15.0% (3/20)	48.6% (17/35)
	TPR (n/N)	31.6% (31/98)	13.9% (5/36)	41.9% (26/62)
Jewbury, York	CPR (n/N)	6.0% (28/470)	5.2% (8/154)	5.4% (17/316)
	CCPR (n/N)	31.1% (28/90)	/	/
The Litten medieval cemetery (Hospital of St Bartholomew), Newbury, West Berkshire	CPR (n/N)	17.9% (10/56)	15.8% (3/19)	18.9% (7/37)
	CCPR (n/N)	40.0% (10/25)	/	/
St Mary Magdalen, Partney, Lincolnshire	CPR (n/N)	21.2% (7/33)	20.0% (1/5)	21.4% (6/28)
St James and St Mary Magdalene, Chichester, W Sussex	CPR (n/N)	32.8% (126/384)	/	/
	CCPR (n/N)	58% (126/?)	/	/
St Mary Spital, London**	CPR (n/N)	1.7% (89/5387)	/	/

CCPR (corrected crude prevalence rate) based on number of skeletons with at least one observable maxillary sinus.
CPR = crude prevalence rate. TPR (true prevalence rate) based on total number of observable maxillary sinuses (L + R combined). / = no data.
** Data includes period 17. Jewbury, York data from Brothwell and Browne (1994, 475). Litten cemetery data from Witkin (2006, 29). St James and St Mary Magdalene, Chichester data from Lee and Boylston (2008a, 225). St Mary Spital, London data from Connell *et al*. (2012b, 109–10).

Table 5.5: Comparative endocranial lesions rates

		Total assemblage	*Juvenile*	*Adult*
Magdalen College, Oxford	CPR (n/N)	7.0% (8/115)	14.3% (8/56)	(0/59)
	TPR (n/N)	10.4% (8/77)	21.6% (8/37)	(0/39)
Jewbury, York	CPR (n/N)	3.2% (15/470)	5.2% (8/154)	2.2% (7/316)
	TPR (n/N)	5.8% (15/257)	? (8/?)	? (7/?)
St James and St Mary Magdalene, Chichester, W Sussex	CPR (n/N)	/	8.6% (9/105)	/
	TPR (n/N)	/	9.9% (9/91)	/

CPR = crude prevalence rate, TPR = true prevalence rate. / = no data. Jewbury, York data from Brothwell and Browne (1994, 465). St James and St Mary Magdalene, Chichester data from Lewis (2008, 179).

individuals who were patients in the hospital during its time as a leprosarium. Lee and Boylston (2008a, 227) substantiate this link between higher rates of inflammation and specific infection by comparing the rates of PNBF between the areas of the cemetery used during the earlier period, when the hospital was a leprosarium, and the later period, when the hospital functioned as an alms house, with the former group exhibiting a far higher rate. It is not surprising that the rate of maxillary sinusitis at Chichester was far higher than observed in the Magdalen assemblage, given the common involvement of the rhinomaxillary region in the leprosy disease process. Inflammation of the nasal mucosa is a feature of lepromatous leprosy, and this may spread to the paranasal sinuses (Lee and Boylston 2008a, 225).

There was no convincing skeletal evidence for leprosy within the Magdalen assemblage (see Appendix 14, *Differential diagnoses of non-specific inflammation*) and this probably reflects the fact that, from the 12th century and in accordance with the Church Council who forbade lepers to live among the healthy, individuals with the disease were routinely removed to leper hospitals, which were founded in Britain from the late 7th century (Aufderheide and Rodríguez-Martín 1998, 148; Roberts and Cox 2003, 271–2; Connell *et al*. 2012a, 261–2). In Oxford, near Cowley Marsh, the Hospital of St Bartholomew (Bartlemas) was founded in 1129, specifically for a chaplain and 12 leprous brethren (Page 1907, 157). Tuberculosis, on the other hand, was apparently prevalent within the Magdalen assemblage.

Tuberculosis (TB) is a chronic infectious disease spread by droplet infection from human to human (*Mycobacterium tuberculosis*), from animals such as cattle to humans (*Mycobacterium bovid*) and vice versa, or from the ingestion of infected meat or milk (Ortner 2003, 227; Walker 2012a, 155). It is thought that only 5–7% of individuals affected with TB exhibit skeletal lesions (Aufderheide and Rodríguez-Martín 1998, 133), the most diagnostic lesions being destruction of the vertebral bodies and subsequent spinal collapse (Pott's disease; ibid.). In the Magdalen assemblage, spinal TB was confidently diagnosed in three skeletons (3238, 3549, 4493), one of which (skeleton 3549) also had destructive changes (probable TB focus) at the sacroiliac joint, in keeping with extra-spinal TB (Fig. 5.4). These three cases alone produce a CPR of 2.6% (3/115). Roberts *et al*. (1998, 55) suggest that a far closer approximation to the actual frequency of TB present within an historical population may be produced by including the cases of visceral rib lesions (specifically periosteal new bone formation). Such rib lesions, although not pathognomonic, are likely related to TB in the majority of cases (Appendix 14, *Rib lesions and TB*; Santos and Roberts 2006, 47; Matos and Santos 2006, 198; Kelley and Micozzi 1984, 385–6; see Fig. 5.5 for examples of rib lesions observed). If the eight skeletons with periostitis (and in many cases, erosive lesions) on the visceral surfaces of multiple ribs are included, the CPR for TB in the Magdalen assemblage increases markedly to 9.6% (11/115). Furthermore, three other skeletons in the assemblage had lesions possibly indicative of TB (see

Table 5.6: Comparative periosteal new bone formation rates

		Total assemblage	*Juvenile*	*Adult total*	*Adult F*	*Adult M*
Magdalen College, Oxford	CPR (n/N)	47.0% (54/115)	25.0% (14/56)	67.8% (40/59)	79.3% (23/29)	63.2% (12/19)
Jewbury, York	CPR (n/N)	14.5% (68/470)	/	/	/	/
Mews Lane, Winchester, Hampshire	CPR (n/N)	24.7% (18/73)*	/	/	/	/
The Litten medieval cemetery (Hospital of St Bartholomew), Newbury, West Berkshire	CPR (n/N)	30.4% (17/56)	10.5% (2/19)	40.5% (15/37)	41.7% (5/12)	42.1% (8/19)
Hospital of St John the Evangelist, Cambridge	CPR (n/N)	12.4% (50/404)	6.3% (4/63)	13.5% (46/341)	33.3% (10/30)	61.0% (25/41)
St James and St Mary Magdalene, Chichester, W Sussex	CPR (N/n)	43.0% (165/384)	20.0% (21/105)	51.6% (144/279)	/	/
St Mary Spital, London**	CPR (n/N)	22.4% (1204/5387)	/	/	/	/

CPR = crude prevalence rate. / = no data. * Data from Mews Lane includes cases of cranial (endo- and ectocranial) PNBF. ** NB Data includes period 17. Jewbury, York data from Brothwell and Browne (1994, 467–71). Litten cemetery data from Witkin (2006, 29). St John the Evangelist, Cambridge data from Dodwell (2015, 94). St James and St Mary Magdalene, Chichester data from Lee and Boylston (2008a, 227). St Mary Spital, London data from Connell *et al*. (2012b, 109).

Appendix 14, *Systemic conditions and specific infection*, for discussion of differential diagnoses): young child skeleton 3045, in which TB was a convincing diagnosis for the multiple lesions of infection observed (including osteitis of the right tibia, and osteomyelitis of the mandible and right ulna; Fig. 5.6), and two skeletons with small, solitary lytic lesions in single vertebrae (possibly early TB foci) (see Appendix 14, *Undiagnosed lesions*). If these cases are also included, the CPR inflates further, to 12.2% (14/115). Thus, the CPR for TB in the assemblage is somewhere between 2.6% and 12.2%. The lower end of this range is in keeping with the range observed at other sites (see Table 5.7, but note that many comparative sites had no recorded cases at all, eg Mews Lane, Winchester; St John the Baptist, Lutterworth; St Nicholas, Lewes). The two highest comparative rates in the table (St James and St Mary Magdalene, Chichester and the Litten medieval cemetery, Newbury) include individuals with rib lesions (including those in the absence of spinal TB lesions), but these rates are still lower than the equivalent calculation for the Magdalen assemblage (9.6% including the skeletons with rib lesions, or 12.2% if the three possible cases noted above are also included).

Table 5.7: Comparative crude prevalence rates of tuberculosis

	Tuberculosis CPR (n/N)
Magdalen College, Oxford	2.6% (3*/115) 9.6% (11**/115) 12.2% (14***/115)
St James and St Mary Magdalene, Chichester, W Sussex	7.8% (30**/384)
St Mary Magdalen, Partney, Lincolnshire	3.0% (1/33)
St Mary Spital, London	1.9% (100/5387)
The Litten medieval cemetery (Hospital of St Bartholomew), Newbury, West Berkshire	5.4% (3**/56)
St Leonard, Newark, Nottinghamshire	1.1% (1/87)
Jewbury, York	1.3% (6/470)
Hospital of St John the Evangelist, Cambridge	0.9% (3/339)

* Confident, spinal/extra-spinal cases only; ** includes skeletons with rib lesions only; *** includes tentative cases. St James and St Mary Magdalene data from Lee and Boylston (2008a, 222. St Mary Magdalen data from Anderson (2010, 248). St Mary Spital data from Connell *et al*. (2012b, 114). Litten cemetery data from Witkin (2006, 20). St Leonard data from Bishop (1983, 32). Jewbury data from Brothwell and Browne (1994, 472). Hospital of St John the Evangelist data from Dodwell (2015, 95).

It is worth noting here that recent research using clinical and autopsy data, as well as identified skeletal collections, has found a positive correlation between rates of porous skeletal lesions, namely cribra orbitalia (porous lesions in the orbits), and causes of death recorded as respiratory infection, particularly pulmonary tuberculosis, pneumonia and bronchitis (Gomes *et al*. 2022; O'Donnell *et al*. 2020; Anderson 2022). Whilst the link between cribra orbitalia and respiratory disease is not yet fully understood, these finding are particularly relevant here given that, as well as frequent osteological evidence for respiratory disease noted above, the rate of cribra orbitalia within the assemblage was notably high, compared with contemporary sites (see Table 5.12). Further research is required to broaden our understanding of the co-occurrence of cribra orbitalia and respiratory infection, but the recent work (eg Anderson 2022; O'Donnell *et al*. 2020) suggests that the processes which cause cribra orbitalia lesions in early life can result in heightened lifetime susceptibility to some infections (Anderson 2022, 159).

Given the close living conditions, high population densities and poor sanitation, typical of English medieval towns, high rates of infection in an urban assemblage are perhaps unsurprising (Walter and DeWitte 2017, 338; Loe *et al*. 2020, 318). Furthermore, high numbers of individuals migrating into and out of urban centres will have introduced new diseases, with migrants being particularly susceptible to infection as they were exposed to new diseases (Roberts and Cox 2003, 167). However, the reason for the comparatively high rate of TB in the Magdalen assemblage is unclear. James (2013, 6–12) discusses the composition of the St John's Hospital burial population. According to the admittance rules of the hospital, and in keeping with elsewhere, lepers, the insane, epileptics, the wounded, ulcerate, people suffering from fistulas or diseases which were considered incurable, pregnant women and those with paralysis and dropsy were excluded (Salter 1917, 1–6; Rawcliffe 1999, 204; Page 1907, 158–9; Orme and Webster 1995). The presence of multiple individuals with infectious disease is then perhaps surprising, given the range of excluded conditions. We of course do not know how the excavated burial assemblage relates to the total cemetery population. These individuals may represent a later subset of the total population, buried at a time when the hospital was focussing on care of the sick, rather than the travellers and the elderly. Indeed, the changing function of medieval hospitals is discussed above. For example, despite the original rule against admitting pregnant women, we know that in 1240 Henry III donated a significant sum for the construction of a chamber for women in childbirth (Calendar of Liberate Rolls; James 2013, 10). On the other hand, it is plausible that the admission rules were simply violated. Admittance to St John's was the responsibility of the sacristan, who heard the

confessions of the patients upon their arrival and admitted them, or otherwise, as he saw fit, although there was significant input from the hospital's benefactors (Salter 1917; James 2013, 8). Documentary sources for the 18th–19th-century Radcliffe Hospital, Oxford, record a number of occasions when the admissions rules were violated, and osteological evidence from the excavated burial ground confirmed this, with several excluded diseases (eg syphilis) identified (Loe *et al*. 2022). Another explanation is that some cases of infectious disease went unrecognised on admission or, it is of course possible that these diseases were actually considered curable.

Tuberculosis was treated by various means, reflecting the medieval approach to the treatment of disease (Roberts and Cox 2003, 230). Medicines, based on herbal remedies were used, including syrups made with lungwort and poppy, whilst other approaches included desiccated wolf's lung with liquorice and horse saliva (Roberts 1987, cited in Roberts and Cox 2003, 230). Scrofula – swelling of the cervical lymph nodes – was known in England and France as 'King's Evil' and it was widely believed that persons affected could be healed by a royal touch (Barberis *et al*. 2017, E10). In the 12th century, William of Malmesbury reported complementary treatments including visits at royal tombs, the king's touch or the use of a coin-talisman (ibid.). The practice of the king's touch established by English and French kings continued for several years, Queen Anne being the last English monarch to use the practice in 1712 (ibid.). The contagious nature of TB was not understood until the 16th

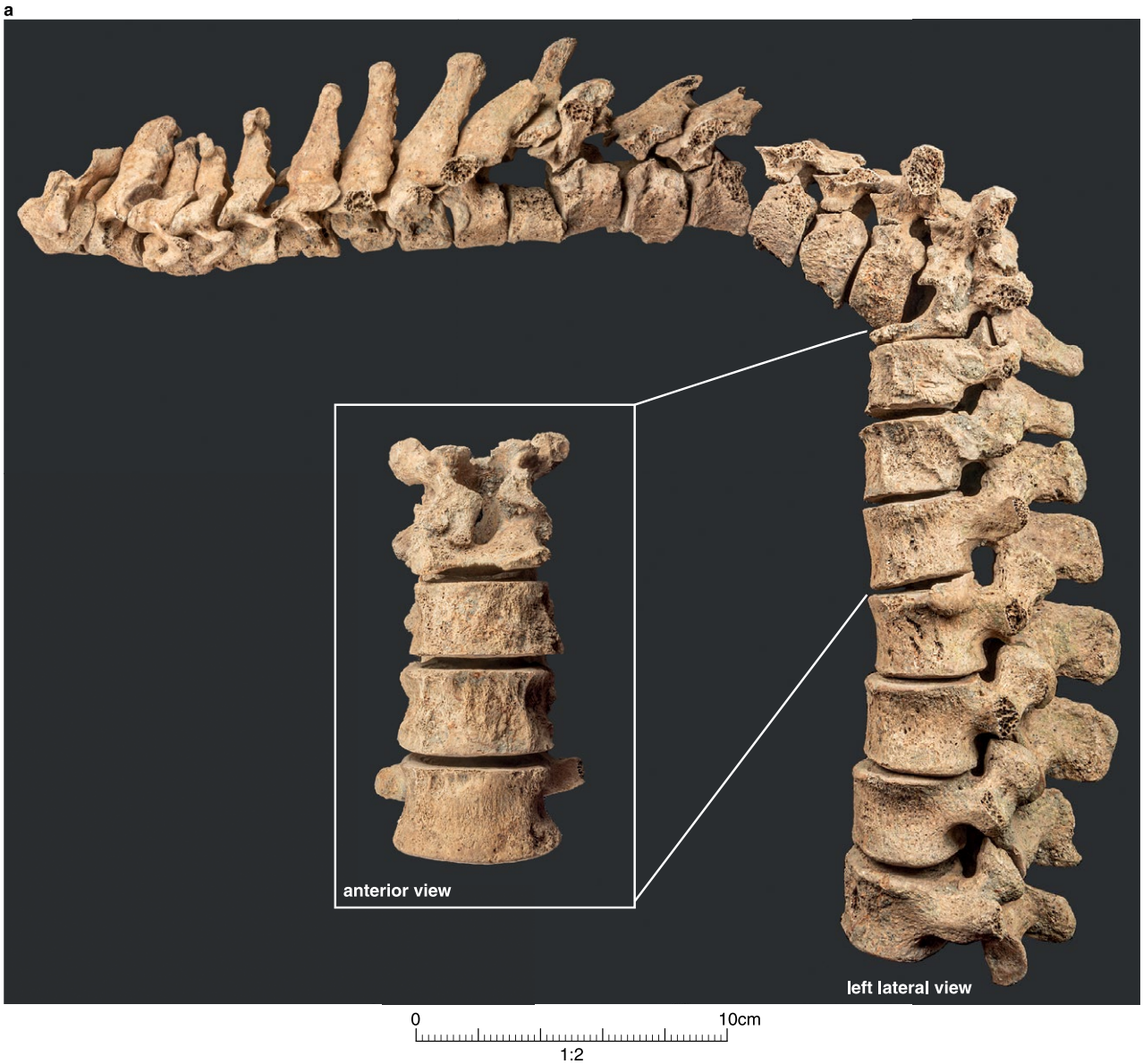


Fig. 5.4 (above and right) Examples of tuberculosis lesions: a) prime adult female skeleton 3238 (spinal TB, Pott's deformity); b) middle adult female skeleton 3549 (TB lesion in second lumbar vertebra, top, and probable TB lesion in right sacroiliac joint, bottom. Unaffected left side shown for comparison)



century, when the first clear definition was given by Girolamo Fracastoro, but it was not until 1720 that the infectious origin of TB was conjectured by English physician Benjamin Marten, in his publication *A New Theory of Consumptions* (ibid.).

Dietary status

Diets during the medieval period were primarily based on grain products, with bread and ale forming the basic staples for most people (Roberts and Cox 2003, 242). Most peasants grew rye, the hardiest of the grains, from which they could make bread, although the poorest peasants of all likely survived on water and vegetables (Hammond 1995, cited in Roberts and Cox 2003, 242). Diets were normally supplemented by seasonal produce such as nuts, berries, fungi, wild birds and rabbits, other meats and fish, although the range and quality of these additional sources of nutrition, particularly meat and fish, depended largely upon income and the ability to be self-sufficient (ibid.).

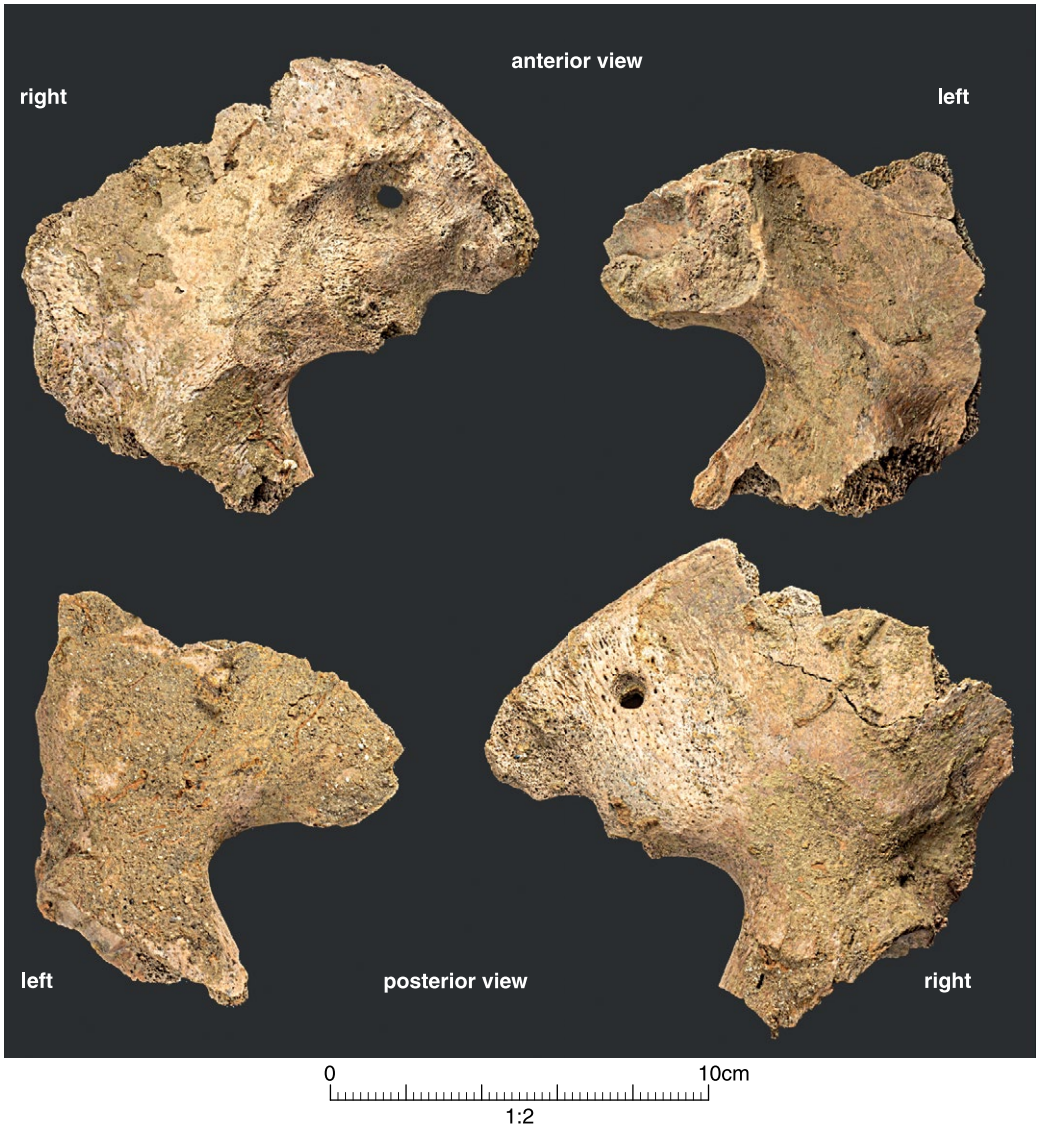




Fig. 5.5 Rib lesions (periosteal new bone formation and erosive lesions) possibly resulting from tuberculosis: a) older child skeleton 4798; b) mature adult male skeleton 4811 (note multiple layers of periosteal new bone visible in cross-section on the original bone surface, white arrow)

The diet of those residing in the Hospital of St John would undoubtedly have comprised the same basic provisions as elsewhere, but it is likely that the brethren, sisters, and those lucky enough to be admitted as patients, also reaped the benefits of the hospital's gardens, although how these foods may have been divvied out between the different members of the hospital is not documented. James (2013, 13) highlights one of the benefits of the marginalised location of the Hospital of St John relative to the town, being that it had greater space for gardens from which to supply the hospital with an additional source of food. Furthermore, there is convincing evidence that the hospital had its own fishponds (Steane 1998, 98–9; James 2013, 16–17). The hospital's link with the Church meant that dietary restrictions imposed by Christianity, including restrictions on the consumption of certain meats at certain times (eg Lent, and on Fridays and Saturdays and also Wednesdays until the 15th century) would likely have applied to the hospital inmates, thus the fishponds would have provided a valuable source of protein. James's (2013) isotopic ($\delta^{13}C$ and $\delta^{15}N$) study investigating the diet of juveniles from the Magdalen assemblage concluded that the children's hospital diet had been high in animal protein, with likely contributions from marine fish

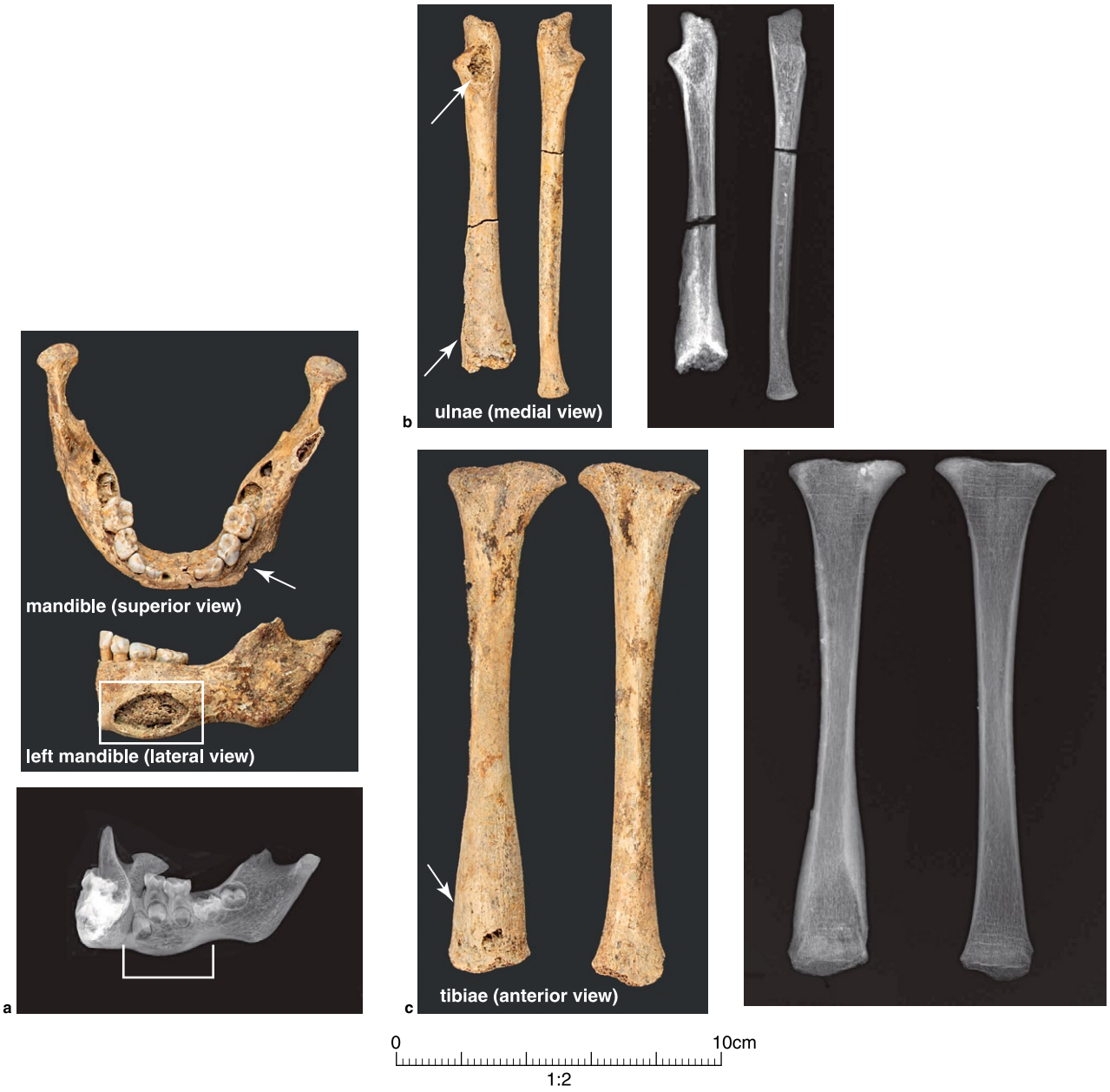


Fig. 5.6 Multifocal lesions of infection in young child skeleton 3045: a) large space-occupying lesion in left mandibular body; b) lesions of infection in proximal and distal portions of right ulna (left shown for comparison); c) infection in distal portion of right tibia (left shown for comparison)

sources (ibid., 89). Although it was not possible to more accurately calculate the proportions of animal versus marine fish protein levels from the isotopic study (ibid., 81), the apparent high animal protein levels might reflect the fact that children (the sole focus of James' study) were likely exempt from the monastic restrictions on the consumption of meat (White 1993, 15). Isotopic work on the adult sample would be required to explore this further.

Several osteological indicators were recorded in the Magdalen assemblage which may be considered in respect of diet. These include adult stature, dental enamel hypoplasia, scurvy and rickets, cribra orbitalia, and dental diseases (namely calculus and caries).

Adult stature

Potential adult stature is largely governed by genetics, although environmental factors experienced during growth, particularly nutritional status, have significant influence on the actual final height achieved (Larsen 1997, 13–19; Perkins *et al*. 2016, 149). As such, adult height may be used as a useful marker of variation in cumulative net nutrition, biological deprivation, and standard of living between, and within, populations (Perkins *et al*. 2016, 149).

Table 5.8: Comparison of stature data

	Mean (m)	Range (m)	Males Standard deviation (m)	Coefficient of variation (%)	No. of skels
Magdalen College, Oxford	1.72	1.59–1.78	0.055	3.2	16
Average late medieval period data (Roberts and Cox 2003, 248)	1.71	1.67–1.74	/	/	8494
St John the Baptist, Mill Farm, Lutterworth, Leicestershire	1.7	1.59–1.80	0.050	2.9	16
St Leonard, Newark, Nottinghamshire	1.74	1.67–1.83	/	/	27
Hospital of St John the Evangelist, Cambridge	1.69	1.59–1.78	0.044	2.6	56
St Bartholomew's Hospital, Bristol	1.70	1.58–1.76	0.061	3.6	8
St James and St Mary Magdalene, Chichester	1.70	1.55–1.90	0.063	3.7	167
St Mary Spital, London Period 14 (*c* 1120–1200, burial type ABC)	1.69	1.57–1.84	0.053	3.1	63
St Mary Spital, London Period 15 (*c* 1200–50, burial type ABC)	1.69	1.55–1.83	0.060	3.6	86

Magdalen data converted to metres for comparative purposes. / = no data. St John the Baptist, Lutterworth data from Score (2010, 181–2). St Leonard, Newark data from Bishop (1983, 31). St John the Evangelist, Cambridge data from Dodwell (2015, 91). St Bartholomew's, Bristol data from Stroud (1998, 176). St James and St Mary Magdalene, Chichester data from Lee and Magilton (2008, 155). St Mary Spital data from Redfern (2012c, 36).

The assemblage from Magdalen College spans the period when, at a population level, the average stature declined (Galofré-Vilá *et al*. 2017, 15; Roberts and Cox 2003, 248). It is thought that climate played an important role in increased heights during the 10th to 13th centuries, with England experiencing the warmest weather of the millennium at this time. This undoubtedly contributed to increased agricultural production and impacted positively on health (Galofré-Vilá *et al*. 2017, 15; Roberts and Cox 2003, 227). Average heights start to decline sometime after 1200 however, which is thought to reflect the negative effect on health and mortality brought about by rural depopulation, soil exhaustion and shortages of crop seeds. These were, at least in part, linked to a deterioration in climatic conditions (Galofré-Vilá *et al*. 2017, 16). The 13th century was generally colder than the previous one, followed by a rapid drop in temperatures and general climatic instability by the 14th century (ibid.). It is likely that increasing social inequality and poverty during the 12th and 13th centuries, not least the effect this had on access to nutritious foods, was also a relevant factor in the decline in heights during this period (ibid.; Bekar and Reed 2009, 15).

Table 5.8 summarises the male and female statures from Magdalen, in comparison with other, contemporary sites. Overall, the average heights of the Magdalen males (171.5cm) and females (158.3cm) were in keeping with other, broadly contemporary sites. However, it is noted that whilst the Magdalen male mean stature is the second highest of all the comparative mean statures, the Magdalen female mean stature is amongst the lowest, with only two of the comparative sites having lower maximum heights than at Magdalen. These findings seem to imply that the Magdalen females, in particular, may have suffered higher levels of physiological stress, perhaps including insufficient nutrition, during childhood and adolescence, than their male and female counterparts.

Dental enamel hypoplasia

Dental enamel hypoplasia (DEH) refers to defects in tooth enamel, caused by interruptions to enamel development during childhood (Hillson 1996, 165–6). They may appear as lines, pits or grooves in the enamel surface. Prolonged episodes of illness and/or malnutrition, lasting at least three weeks, are thought to result in such defects, thus DEH may be regarded as an indicator of non-specific physiological stress during childhood and adolescence (ibid., 166; Goodman and Rose 1990, 59–60).The rates of DEH were in keeping with, but towards the upper end of, the range of rates from contemporary sites (Table 5.9). Whilst the DEH in adults does not represent episodes of stress (illness and/or malnutrition) pertaining to the time spent in the hospital (because these lesions represent interruptions in the formation of tooth enamel during childhood), it gives a good indication of the levels of health stress suffered during childhood. The data indicates that those excavated from the Magdalen burial ground had experienced comparatively high levels of health stress, which may have included periods of

Mean (m)	Range (m)	Females Standard deviation (m)	Coefficient of variation (%)	No. of skels
1.58	1.47–1.68	0.061	3.9	28
1.59	1.54–1.65	/	/	7929
1.66	/	/	/	1
1.60	1.5–1.69	/	/	4
1.58	1.46–1.72	0.061	3.9	39
1.56	1.51–1.58	0.026	1.7	5
1.59	1.52–1.69	0.042	2.6	66
1.62	1.55–1.74	0.051	3.1	51
1.60	1.48–1.76	0.058	3.6	65

malnourishment. Males were more frequently affected than females in the Magdalen assemblage, but the difference was not statistically significant (x2=2.268, P=0.1321, 1df).

Scurvy and rickets

In addition to stature and DEH, rickets, indicative of vitamin D deficiency, and scurvy, indicative of vitamin C deficiency, may also be of relevance to dietary status, but in the Magdalen assemblage evidence for these conditions was limited. Only one skeleton, infant 4768, exhibited skeletal changes convincingly in keeping with scurvy which, given the young age of the child, probably reflects a nutritionally deficient mother (Brickley and Ives 2008, 45), or unavailability of breastmilk entirely, and no evidence for rickets deformity was noted at all. These findings are consistent with the data from comparative sites. Table 5.10 shows comparative scurvy rates from two of the contemporary sites, although most of the other sites had no diagnosed cases of scurvy at all. Similarly, the rates of rickets recorded at contemporary sites are low, with multiple sites not reporting any cases, in keeping with the Magdalen assemblage (Table 5.11). The rates of scurvy and rickets presented by Roberts and Cox (2003, 247–8) for the late medieval period overall also reflect these trends. These findings are interesting, particularly considering the overall reduction in stature during this period, which may be inferred to reflect generalised physiological stress. It may be suggested that levels of vitamin C were adequate for the time, and that vitamin D was in plentiful supply, although sufficient access to sunlight probably played a significant part in the latter. Whilst specific vegetables and fruit are seldom mentioned in hospital ordinances (Manco 2004), foraged, seasonal produce would likely have provided good sources of vitamin C. Environmental evidence, including samples from latrine drains at St Mary Spital, revealed that inmates had access to pulses (peas and beans), and enjoyed apples, blackberries, raspberries, figs, grapes and wild strawberries, although the evidence from St Mary's seemed to suggest that the foods may not have been allocated equally between the higher-status occupants and the inmates, the latter most likely having relied on a more basic diet (ibid.; Walker 2012a, 162–3).

Cribra orbitalia

Unlike scurvy and rickets, cribra orbitalia, a non-specific skeletal lesion, which is often explored in relation to diet in past populations (eg Boylston 2008, 256–7; Brothwell and Browne 1994, 459–61; Stroud 1998, 179), was relatively common in the assemblage. The calculated prevalence was higher than the rates that have been reported for the comparative assemblages (Table 5.12), and notably higher than the 10.8% CPR recorded for the late medieval period overall (Roberts and Cox 2003, 234–5, table 5.4). It is thought unlikely that observer error or recording bias are significant factors in this result, because the lesion is relatively straightforward to record. Rather, the high rate is considered to be a reliable reflection of the condition in the group, but the reason why it is so frequent is difficult to interpret (see Appendix 14, *Cribra orbitalia and porotic hyperostosis*, for more discussion on the potential causes).

The positive link between cribra orbitalia and susceptibility to respiratory infection has been noted above (see *Non-specific inflammation and specific infection*), but the exact cause(s) of cribra orbitalia lesions, which develop during childhood (O'Donnell *et al*. 2020, 722), are a matter of debate, there being a distinct lack of consensus in the published literature. Several studies have emphasised a link between cribra orbitalia and iron deficiency anaemia or vitamin B deficiency (eg see Zdilla *et al*. 2021, 2; O'Donnell *et al*. 2020, 722), potentially implicating dietary insufficiency as an important cause. The high rate in the Magdalen assemblage could refer to high levels of malnourishment. However, according to Brickley (2018, 5) only the most severe cases of cribra orbitalia – those that show evidence of marrow expansion – may be confidently diagnosed as anaemia, and no such examples were observed in the Magdalen assemblage. Whilst this might imply that the Magdalen cribra orbitalia lesions were not in fact related to iron deficiency anaemia, it should be considered that the less severe, inactive lesions observed may well have been more extensive, perhaps with marrow expansion, when active during childhood. This being said, it is important to acknowledge that anaemia is a symptom, rather than a condition

Table 5.9: Comparative dental enamel hypoplasia rates

		Total assemblage	*Juvenile*	*Adult*	*Adult F*	*Adult M*
Magdalen College, Oxford	CPR (n/N)	55.7% (64/115)	39.3% (22/56)	71.2% (42/59)	82.8% (24/29)	94.7% (18/19)
	CCPR (n/N)	73.6% (64/87)	51.2% (22/43)	95.5% (42/44)	92.3% (24/26)	100% (18/18)
	TPR (n/N*)	37.9% (511/1349)	25.0% (155/620)	48.8% (356/729)	32.2% (145/450)	39.8% (111/279)
Jewbury, York	CPR (n/N)	31.9% (150/470)	/	/	/	/
	CCPR (n/N)	45.7% (150/328)	/	/	/	/
Mews Lane, Winchester, Hampshire	CPR (n/N)	17.8% (13/73)	/	/	/	/
St Bartholomew's Hospital, Bristol	CPR (n/N)	26.7% (8/30)	/	/	/	/
	CCPR (n/N)	61.5% (8/13)	/	/	/	/
The Litten medieval cemetery (Hospital of St Bartholomew), Newbury, West Berkshire	CPR (n/N)	39.3% (22/56)	15.8% (3/19)	51.4% (19/37)	75.0% (9/12)	52.6% (10/19)
	TPR (n/N)	49.5% (266/537)	/	/	/	/
St Leonard, Newark, Nottinghamshire	CPR (n/N)	48.3% (42/87)	/	/	/	/
	CCPR (n/N)	85.7% (42/49)	/	/	/	/
	TPR (n/N)	49.5% (304/614)	/	/	/	/
Hospital of St John the Evangelist, Cambridge	CPR (n/N)	10.9% (44/404)	17.5% (11/63)	9.7% (33/341)	16.2% (12/74)	23.0% (20/87)
	CCPR (n/N)	48.4% (44/91)	64.71% (11/17)	44.6% (33/74)	40.0% (12/30)	48.78% (20/41)
St Mary Magdalen, Partney, Lincolnshire	CPR (n/N)	6.1% (2/33)	20.0% (1/5)	3.6% (1/28)	- (0/1)	5.9% (1/17)
	CCPR (n/N)	8.3% (2/24)	20.0% (1/5)	5.3% (1/19)	/	/
St Nicholas, Lewes, Sussex	CPR (n/N)	28% (29/103)	/	/	37.5% (6/16)	33.3% (22/66)
	CCPR (n/N)	42.0% (29/69)	/	/	50.0% (6/12)	41.5% (22/53)
St James and St Mary Magdalene, Chichester, W Sussex	CPR (n/N)	63.3% (243/384)	33.3% (35/105)	74.6% (208/279)	/	/
	CCPR (n/N)	79.9% (243/304)	77.8% (35/45)	80.3% (208/259)	/	/
St Mary Spital, London**	TPR (n/N)	/	/	13.6% (8184/60145)	/	/

CCPR = corrected crude prevalence rate, CPR = crude prevalence rate, TPR = true prevalence rate. CCPR based on number of observable dentitions. TPR based on total number of observable teeth. / = no data. * Excludes teeth with crown surfaces significantly obscured by calculus, caries or heavy attrition. ** Includes data from periods 14, 15 and 16 only. Jewbury, York data from Watson (1994, 495). Mews Lane data from Strongman (2018, 241). St Bartholomew's data from Stroud (1998, 178). Litten cemetery data from Witkin (2006, 24). St John the Evangelist, Cambridge data from Dodwell (2015, 92). St Mary Magdalen, Partney data from Anderson (2010, 245). St Nicholas, Lewes data from Browne (2010, 102). St James and St Mary Magdalene, Chichester data from Ogden and Lee (2008, 189). St Mary Spital, London data from Connell *et al*. (2012a, 49, 52).

Table 5.10: Comparative scurvy rates

	Total assemblage CPR (n/N)	*Juvenile CPR (n/N)*	*Adult CPR (n/N)*
Magdalen College, Oxford	0.9% (1/115)	1.8% (1/56)	- (0/59)
St Mary Spital, London*	0.1% (4/5387)	0.4% (4/1027)	- (0/4360)
St James and St Mary Magdalene, Chichester, W Sussex	1.0% (4/384)	3.8% (4/105)	- (0/279)

CPR = crude prevalence rate. * NB Data includes period 17. St Mary Spital, London data from Gray Jones et al. (2012, 118). St James and St Mary Magdalene, Chichester data from Lewis (2008, 182). NB No cases of scurvy diagnosed at Litten cemetery, Newbury, Jewbury, York, St Mary Magdalen, Partney, St Nicholas, Lewes, St John the Baptist, Lutterworth, St Leonard, Newark, Hospital of St John the Evangelist, Cambridge, or St Bartholomew's, Bristol.

Table 5.11: Comparative rickets/residual rickets rates

	Total assemblage CPR (n/N)	*Juvenile CPR (n/N)*	*Adult CPR (n/N)*
Magdalen College, Oxford	- (0/115)	- (0/56)	- (0/59)
Jewbury, York	0.6% (3/470)	1.3% (2/154)	0.3% (1/316)
St Mary Spital, London*	0.1% (8/5387)	0.5% (5/1027)	0.1% (3/4360)
The Litten medieval cemetery (Hospital of St Bartholomew), Newbury, West Berkshire	1.8% (1/56)	- (0/19)	2.7% (1/37)
St James and St Mary Magdalene, Chichester, W Sussex	1.3% (5/384)	2.9% (3/105)	0.7% (2/279)
St John the Baptist, Mill Farm, Lutterworth, Leicestershire	4.5% (1/22)	- (0/1)	4.8% (1/21)

CPR = crude prevalence rate. * NB Data includes period 17. Jewbury data from Brothwell and Browne 1994, 466. St Mary Spital, London data from Gray Jones *et al.* (2012, 118), Litten cemetery data from Witkin (2006, 31). St James and St Mary Magdalene, Chichester data from Lewis (2008, 181–2) and Boylston (2008, 254). St John the Baptist, Lutterworth data from Score (2010, 182; articulated skeleton data only). NB No cases of rickets diagnosed at St Mary Magdalen, Partney, St Leonard, Newark, Hospital of St John the Evangelist, Cambridge, or St Bartholomew's, Bristol.

Table 5.12: Comparative cribra orbitalia rates

		Total assemblage	*Juvenile*	*Adult*
Magdalen College, Oxford	CPR (n/N)	32.5% (37/115)	37.5% (21/56)	27.1% (16/59)
	CCPR (n/N)	56.1% (37/66)	70.0% (21/30)	44.4% (16/36)
	TPR (n/N)	48.7% (57/117)	68.0% (34/50)	34.3% (23/67)
Jewbury, York	CPR (n/N)	15.5% (73/470)	24.7% (38/154)	11.1% (35/316)
	CCPR (n/N)	22.2% (73/329)	40.9% (38/93)	14.8% (35/236)
Mews Lane, Winchester, Hampshire	CPR (n/N)	17.8% (13/73)	/	/
St Bartholomew's Hospital, Bristol	CPR (n/N)	16.7% (5/30)	50.0% (2/4)	11.5% (3/26)
The Litten medieval cemetery (Hospital of St Bartholomew), Newbury, West Berkshire	CPR (n/N)	14.3% (8/56)	15.8% (3/19)	13.5% (5/37)
Hospital of St John the Evangelist, Cambridge	CPR (n/N)	6.4% (26/404)	14.3% (9/63)	5.0% (17/341)
	CCPR (n/N)	33.8% (26/77)	64.3% (9/14)	27.0% (17/63)
	TPR (n/N)	30.3% (43/142)	/	/
St Mary Magdalen, Partney, Lincolnshire	CPR (n/N)	9.1% (3/33)	/	/
	CCPR (n/N)	33.3% (3/9)	/	/
St Nicholas, Lewes, Sussex	CPR (n/N)	30.1% (31/103)	25.0% (2/8)	30.5% (29/95)
	CCPR (n/N)	44.3% (31/70)	/ (higher than adult CCPR)	/ (lower than juvenile CCPR)
St James and St Mary Magdalene, Chichester, W Sussex	CPR (n/N)	22.4% (86/384)	34.3% (36/105)	17.9% (50/279)
	CCPR (n/N)	28.9% (86/298)	/	/

CPR = crude prevalence rate, CCPR = corrected crude prevalence rate, TPR = true prevalence rate. CCPR based on number of skeletons with at least one observable orbit. TPR based on total number of observable orbits (L + R combined). / = no data. Jewbury, York data from Brothwell and Browne (1994, 459–61). Mews Lane data from Strongman (2018, 241). St Bartholomew's data from Stroud (1998, 179). Litten cemetery data from Witkin (2006, 31). St John the Evangelist, Cambridge data from Dodwell (2015, 97). St Mary Magdalen, Partney data from Anderson (2010, 247–8). St Nicholas, Lewes, data from Browne (2010, 105). St James and St Mary Magdalene, Chichester, data from Lee and Boylston (2008b, 256).

itself, with iron deficiency just one of the wide range of medical conditions that may cause it (ibid.; Gomes *et al*. 2022, 1062). Furthermore, if the hospital patients and brethren had year-round access to fish from the ponds (see above), it seems less likely that a diet deficient in iron and/or B vitamins would have been a significant factor in the condition, considering that the types of fish likely to have been kept (eg eel, tench, pickerel, bream, perch, roach; Historic England 1999) contain these nutrients. This would, of course, depend on whether these foods were distributed between all those residing in the hospital.

Dental disease – calculus and caries

Besides the skeletal indicators considered above, dental disease is another category which should be considered in relation to diet. Most notable in the Magdalen assemblage was dental calculus, which was observed on 70.1% of all adult teeth (691/986) and affected 95.5% (42/44) of adult dentitions. These rates are far higher than those published for the period overall (CCPR 59.2%, 961/1582 dentitions; TPR 54.0%, 1414/3298 teeth, Roberts and Cox 2003, 261–2, table 5.18) and higher than the rates observed at most comparative sites, the only exception being St Mary Spital, London, where calculus was observed more frequently (Table 5.13). Survival of dental calculus deposits to the point of recording them during osteological analysis depends largely upon taphonomic factors as well as excavation and cleaning technique (Ogden and Lee 2008, 189). Furthermore, interpreting calculus rates is difficult without taking into account the age distributions of comparative sites, given that the development of calculus is a cumulative process and therefore is seen more frequently in populations with higher numbers of older individuals (Connell 2012, 235). Although a more detailed study of calculus was beyond the scope of the project, it is worth bearing in mind that the high calculus rate at Magdalen is perhaps more notable given the paucity of mature and older adults in the assemblage. Whether the comparatively high rate in the Magdalen assemblage reflects more favourable taphonomic conditions and post-excavation processing techniques, or whether it indicates genuine higher levels within the population is unclear. It is obvious, however, that effective oral hygiene methods were not regularly practised by the Magdalen population and although protein and carbohydrates within the diet likely had an overall effect on the levels of calculus observed, the association with poor oral hygiene is thought to be a more relevant factor (Roberts and Cox 2003, 262; Lieverse 1999, 224; Hillson 1996, 254).

In addition to calculus, dental caries was more prevalent in the Magdalen assemblage than at most other contemporary sites (Table 5.14) and double the overall rate calculated for the period (TPR 5.5%, 1980/35665; Roberts and Cox 2003, 258–9, table 5.15). Only at St James and St Mary Magdalene, Chichester was the rate similar to that at Magdalen. However, what a high caries rate suggests about the

Table 5.13: Comparative dental calculus rates

		Total assemblage	*Juvenile*	*Adult*
Magdalen College, Oxford	CPR (n/N)	53.0% (61/115)	33.9% (19/56)	71.2% (42/59)
	CCPR (n/N)	70.1% (61/87)	44.2% (19/43)	95.5% (42/44)
	TPR (n/N)	51.3% (886/1726)	26.4% (195/740)	70.1% (691/986)
The Litten medieval cemetery (Hospital of St Bartholomew), Newbury, West Berkshire	CPR (n/N)	33.9% (19/56)	10.5% (2/19)	45.9% (17/37)
	TPR (n/N)	32.4% (174/537)	/	/
Hospital of St John the Evangelist, Cambridge	CPR (n/N)	20.8% (84/404)	23.8% (15/63)	20.2% (69/341)
	CCPR (n/N)	92.3% (84/91)	88.2% (15/17)	93.2% (69/74)
St Leonard, Newark, Nottinghamshire	CPR (n/N)	44.8% (39/87)	/	44.8% (39/87)
	CCPR (n/N)	79.6% (39/49)	/	79.6% (39/49)
	TPR (n/N)	49.7% (305/614)	/	49.7% (305/614)
St James and St Mary Magdalene, Chichester, W Sussex	CPR (n/N)	49.7% (191/384)	6.7% (7/105)	65.9% (184/279)
	CCPR (n/N)	62.8% (191/304)	(7/?)	(184/?)
St Mary Spital, London Period 14 (*c* 1120–1200)	TPR (n/N)	80.5% (5809/7215)	61.3% (632/1031)	83.7% (5177/6184)
St Mary Spital, London Period 15 (*c* 1200–50)	TPR (n/N)	76.2% (16544/21711)	55.4% (2943/5317)	82.9% (13601/16394)

CPR = crude prevalence rate, CCPR = corrected crude prevalence rate, TPR = true prevalence rate. / = no data. Litten cemetery data from Witkin (2006, 21). St John the Evangelist, Cambridge data from Dodwell (2015, 92). St Leonard, Newark data from Bishop (1983, 31). St James and St Mary Magdalene, Chichester data from Ogden and Lee (2008, 189). St Mary Spital, London data from Connell *et al*. (2012a, 44–5, 56–7; all burial types). No data present for St John the Baptist Hospital, Lutterworth, but calculus rate noted as low (Score 2010, 182).

Magdalen individuals' diets is obscured by the fact that the association between the two is complex. Dietary sugars are known to relate directly to the development of dental caries (Hillson 1996, 278), and certainly some level of sugars will have been consumed, at least via fruit (the dearth of scorbutic changes in the assemblage is testament to the likely availability of at least some fruit products; see above) but in a medieval assemblage such as Magdalen, the rate of caries may more closely be linked to diets which relied on carbohydrate-rich plant foods as opposed to animal products (Hillson 1996, 278–83; Mays 2007, 135–7). As discussed above, grain would have provided the majority of calories

Table 5.14: Comparative dental caries rates

		Total assemblage	*Juvenile*	*Adult*
Magdalen College, Oxford	CPR (n/N)	40.0% (46/115)	17.9% (10/56)	61.0% (36/59)
	CCPR (n/N)	52.9% (46/87)	23.3% (10/43)	81.8% (36/44)
	TPR (n/N)	10.5% (182/1726)	3.9% (29/740)	15.5% (153/986)
The Litten medieval cemetery (Hospital of St Bartholomew), Newbury, West Berkshire	CPR (n/N)	30.4% (17/56)	10.5% (2/19)	40.5% (15/37)
	TPR (n/N)	9.3% (50/537)	/	/
Hospital of St John the Evangelist, Cambridge	CPR (n/N)	/	/	13.2% (45/341)
	CCPR (n/N)	/	/	60.8% (45/74)
	TPR (n/N)	5.3% (?/?)	1.5% (?/?)	6.3% (103/1630)
St Mary Magdalen, Partney, Lincolnshire	TPR (n/N)	1.6% (6/371)	/	/
St Leonard, Newark, Nottinghamshire	CPR (n/N)	20.7% (18/87)	/	/
	CCPR (n/N)	36.7% (18/49)	/	/
	TPR (n/N)	7.3% (45/614)	/	/
St James and St Mary Magdalene, Chichester, W Sussex	CPR (n/N)	/	/	66.7% (186/279)
	CCPR (n/N)	/	/	72.0% (186/?)
	TPR (n/N)	/	/	15.8% (67/?)
St Mary Spital, London Period 14 (*c* 1120–1200)	TPR (n/N)	8.0% (601/7546)	4.2% (43/1031)	8.6% (558/6515)
St Mary Spital, London Period 15 (*c* 1200–50)	TPR (n/N)	8.0% (1803/22513)	3.8% (202/5317)	9.3% (1601/17196)

CPR = crude prevalence rate, CCPR = corrected crude prevalence rate, TPR = true prevalence rate. / = no data. Litten cemetery data from Witkin (2006, 21). St John the Evangelist, Cambridge data from Dodwell (2015, 92). St Mary Magdalen, Partney data from Anderson (2010, 245–6). St Leonard, Newark data from Bishop (1983, 31). St James and St Mary Magdalene, Chichester data from Ogden and Lee (2008, 192). St Mary Spital, London data from Connell *et al.* (2012a, 44–5, 48; all burial types).

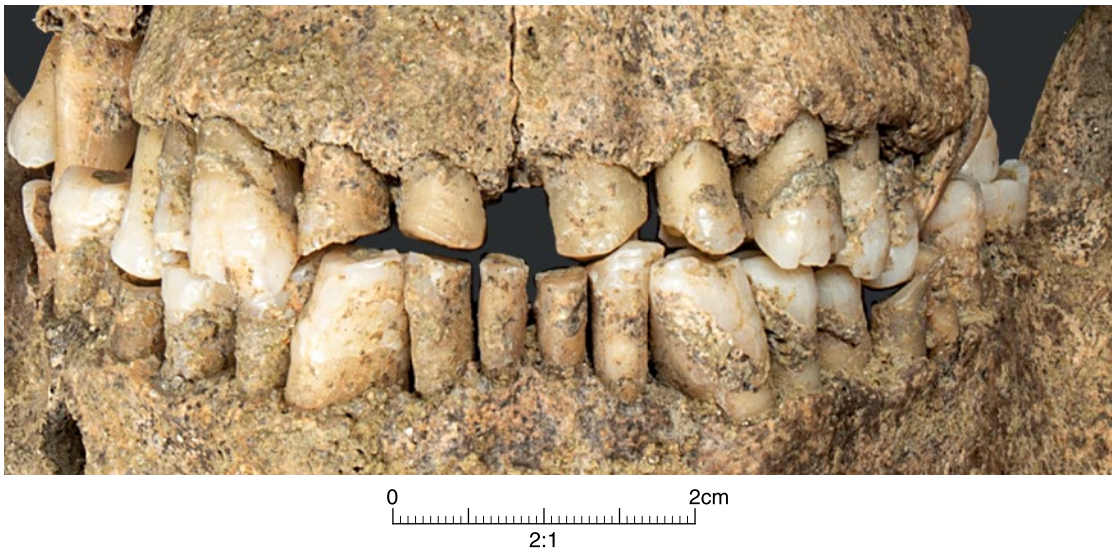


Fig. 5.7 Heavy, uneven dental wear and enamel chipping, mature adult male skeleton 4205

to the diet of most of the English population, in the form of bread, ale and, for the poorer sections of society, as pottage (a thick soup) (Stone 2006, 11). That bread would have been a staple of the diet (Manco 2004), is perhaps evidenced by the high rate of dental enamel chipping observed, likely resulting from consumption of coarse foods such as bread, containing high levels of grit from the quern stones that would have been used to grind grain to flour (Bonney 2017; Molnar 2011, 686). Three-quarters of observable adult dentitions (CCPR 75.0%, 33/44) had at least one tooth with chips in the enamel, mainly affecting the occlusal margins (Fig. 5.7). Beans and other starchy vegetables, much of which was probably cultivated in gardens owned by the hospital, probably also made up a significant part of the diets of inmates and brethren alike. Whilst these foodstuffs undoubtedly had some effect on the development of caries, the high rate is also in part likely related to poor hygiene practices, as evidenced by the high rate of calculus.



Fig. 5.8 Unilateral cleft anterior palate, adolescent skeleton 3254 (superior, anterior and inferior views)

Congenital deformity, social perception and care

Whilst the vast majority of congenital and developmental conditions observed in the Magdalen assemblage would not have affected mobility, function or physical appearance (eg cases of sacral-



Fig. 5.9 (above and right) a) Skeletal dysplasia, probably achondroplastic dwarfism, young child skeleton 3159 (estimated age 1.5–2.5 years, based on dental development); b) selected long bones from skeleton 3159 are shown in comparison with those from other young juveniles from the same assemblage (estimated ages of the comparative material also based on dental development)

isation, supernumerary vertebral segments etc), two juvenile skeletons had outwardly obvious physical deformities that had undoubtedly had a profound influence on their unfortunately short lives. These were adolescent 3254 with a cleft palate (Fig. 5.8) and young child 3159 with probable achondroplastic dwarfism (Fig. 5.9), both conditions which would have denoted them as 'different' from the moment they were born.

Exactly how impairments and disabilities, both physical and social, were viewed in the past is difficult to ascertain, and the correlation between social exclusion and severity of impairment is poorly understood (Redfern 2012a, 187). With conditions that would have been obvious at birth, skeletons 3254 and 3159 may well have been regarded as 'monstrous' to the community around them, particularly skeleton 3254 with a facial defect (ibid., 189). Whilst some place weight on the probability that, despite potentially being regarded as subhuman, the ties of kinship would have protected these unfortunate newborns (Covey 1998, 8, 25), others suggest that developmental anomalies evident at birth would have caused parents to abandon their baby or place it in the care of others (Safford and Safford 1996, 2; Redfern 2012a, 193). Relevant here may be the medieval belief in sick children as 'changelings', which may have provided parents with an excuse to abandon or neglect their disabled child (Kuuliala 2011; Lewis 2016b, 25). For unfortunate individuals such as this to survive, the Church and their emphasis on charity was crucial during this period. The Church teachings focussed on charity, enabling impaired people to be classed as the 'deserving



poor' (Covey 1998, 18, 25; in Redfern 2012a, 189). Deformed children were often passed to the care of monastic institutions, which saw charity as an important aspect of their function, although they were often accepted in return for money and land (Safford and Safford 1996, 13–14). Lewis (2016b, 28) mentions the two archaeological cases of Down syndrome in the UK, which were recovered from early medieval hospital sites, and Brothwell's (1960, 148) suggestion that the children survived because of Christianity's tolerance of mental impairment.

It is worth considering, in the case of skeleton 3254 with a cleft lip and palate, that their survival to adolescence may be testament to an increased level of care they received as an infant. Palate defects are one of the main factors contributing to poor feeding, even amongst modern children (WHO 2009), and this will certainly have been true in the past (Craig-Atkins *et al*. 2018, 652). At a time when breast-feeding was the norm (Goldberg 1995, 16; Snell 2020), a child who could not feed in this way would have required significant input from their caregiver/s. Whilst medical studies have shown that children with mild cleft palates may be able to suckle successfully (Lewis 2016b, 29), the cleft defect in skeleton 3254, although unilateral and confined to the anterior part of the palate, did result in communication between the oral and nasal cavities, and would certainly have involved the lip. How well they would have been able to breastfeed is not certain, although babies with cleft palate, or cleft lip and palate, are known to have difficulties in creating suction because the oral cavity cannot be adequately separated from the nasal cavity during feeding (Reilly *et al*. 2013, 349).

If skeleton 3254 had needed a higher level of care as an infant, this may have been provided by their own mother/family but, as highlighted above, it is also plausible that this individual, who had died in adolescence, had been a resident at the Hospital of St John since infancy, having been fed and cared for by the brethren and sisters (assuming this was the hospital's function, see above). On the other hand, that this individual died during adolescence might reflect the fact that, once past young childhood and the perceived age of 'cuteness' (Lewis 2016b, 25), they were no longer supported, perhaps having turned to the church or hospital for care. Lewis (ibid., 29) found that a notable proportion of archaeological skeletons with physical impairments (including club foot, Down syndrome, long-term paralysis, hip dislocations and cleft palates), died during adolescence, and suggested that paralysed individuals, for example, were no longer cared for when they ceased to be protected by their 'child' status and when they were expected to become contributing members of society. This is perhaps not so relevant for an individual with a cleft lip and palate, although a facial deformity during this period may well have resulted in social exclusion.

Both skeletons 3254 and 3159 are important additions to the palaeopathological record. Comparative archaeological examples of non-adult achondroplastic dwarfs are scant, the existing cases having been noted above (see Appendix 14, *Skeletal dysplasia*). The fact that skeleton 3159 is one of the few non-adult examples published, and that the skeleton is almost complete, with both cranial and post-cranial traits observable, make it all the more valuable. Several cases of cleft lip and/or palate have been identified in children from archaeological contexts, including a case from St Oswald's Priory, Gloucester (Lewis 2013), and a very similar example of cleft lip and anterior palate in an adolescent skeleton from St Mary Spital hospital, London, although this skeleton was from the later period, post-dating the Magdalen assemblage (Redfern 2012b, 133). Of 164 infants recovered from a well in the Athenian agora, nine (5.4%) exhibited evidence for maxilla deformities (Liston and Rotroff 2013, 74–5) further indicating the potential social exclusion that infants with such defects may have suffered.

Occupation and activity

The most convincing evidence of occupation and activity was observed as worn grooves/notches in the enamel surfaces of one to two teeth in three adult skeletons, although the following discussion on trauma and interpersonal violence is also relevant here. The skeletons with the grooves/notches included middle adult females 3055 and 3409 and adult (unspecified) male 4849 (Fig. 5.10) and are described in full in Appendix 14, *Adult dentitions*. Similar notches were observed in the anterior teeth of medieval Norse female skeletons from Greenland (Scott and Jolie 2008, 257). In this study, the notches were assumed to result from the females taking part in the production of textiles using woollen yarn, the manner of biting and angling up while pulling the thread thought to account for the notches/wear being limited to the upper teeth (ibid., 258–9). Similar physical motions that occur during spinning (ie pulling and biting) might also occur during the act of sewing, but for the purposes of cutting yarn. That is, using the teeth to quickly cut through the thread, in favour of using scissors, as done by modern sewers (ibid., 259). It certainly seems plausible that the examples of dental modification from Magdalen resulted from an activity such as holding/pulling cord or thread, although a wide range of other activities in which the teeth are used as a third hand has been suggested in the literature, including as basket working, stripping branches, softening sinews, cutting of pieces of meat, hide preparation, and leather working (Molnar 2011, 687). It is known that cloth and leather played an important role in the town's economy during the medieval period (Crossley 1979, 22). By 1130, guilds of weavers and corvisers had been established in Oxford, and there are multiple historical records pertaining to purchases of cloth; Henry II and John bought cloth in Oxford, and between 1320 and 1263 the town

supplied cloth seven times for the king to give in alms, and between 1230 and 1263. Microscopic examination may be useful for interpretation of the modifications (Molnar 2011, 686–7) but this was beyond the scope of the current project. Of note, three adult male skeletons from St John's Hospital, Cambridge, had abnormal wear on the maxillary incisors interpreted as para-functional wear from some habitual activity (Dodwell 2015, 93).

Trauma and interpersonal violence

Analysis of trauma in archaeological assemblages provides a valuable insight into the risks of injury encountered by a population (Redfern 2012d, 259). Whilst it is normally impossible to identify the exact cause of an injury (eg a fracture), the patterns of trauma and types of injuries observed may allow for suggestions to be made, and it may be possible to identify certain risk factors for different groups of people (eg children/adolescents, males/females; ibid.).

Trauma accounted for 7.8% (19/243) of the total cases of pathology and the majority of cases were antemortem fractures (17 adult skeletons affected, total assemblage CPR 14.8%, 17/115, adult CPR 28.8%, 17/59). The Magdalen rates are in keeping with the wide range of CPRs that have been reported for other, contemporary sites, although some sites had far higher rates, including St Mary Spital (20.9%, 1125/5387; Walker 2012b, 88) and St James and St Mary Magdalene, Chichester (25.3%, 97/384; Judd 2008, 229). Lower rates were observed at St Mary Magdalen, Partney (6.1%, 2/33; Anderson 2010, 247), the Litten medieval cemetery, Newbury (3.6%, 2/56; Witkin 2006, 28) and Jewbury, York (3.2%, 15/470; Brothwell and Browne 1994, 477). Given the small number of Magdalen cases overall, observations of antemortem fracture patterning by element, age and sex are limited, although it was observed that females were more frequently affected than males (female CPR 37.9%, 11/29; male CPR 26.3%, 5/19) and radii were the most frequently fractured bones (left TPR 5.0%, right TPR 4.7%). According to Roberts and Cox (2003, 238–9, table 5.7), radii are amongst the most frequently fractured bones, nationally, in late medieval assemblages. At St Mary Spital, London, of all long bone fractures, those of the forearm were most frequently involved, although the ulna was more commonly affected than the radius (Walker 2012b, 95–6), and at St James and St Mary

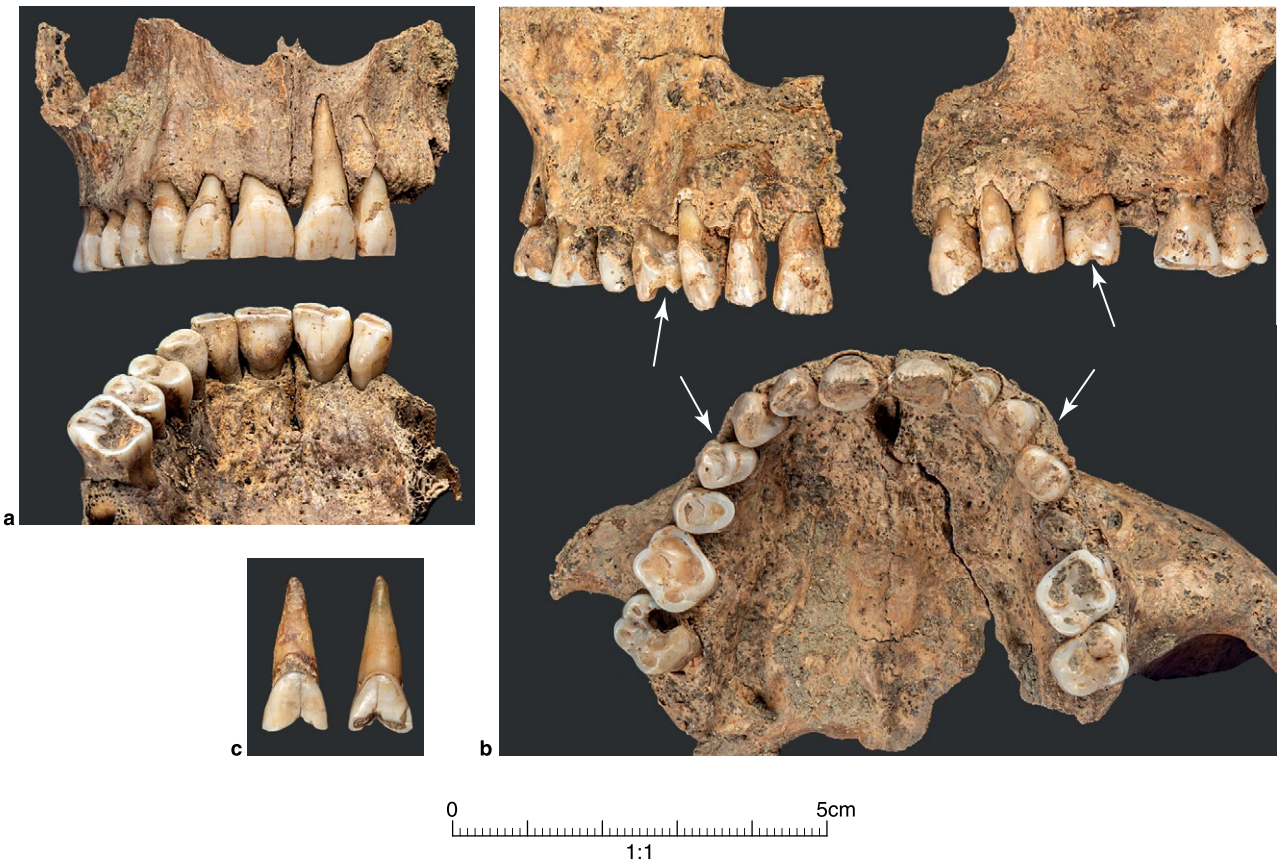


Fig. 5.10 Dental modification, possibly occupational: a) middle adult female skeleton 3055, shallow notches through incisal surfaces of the maxillary central incisors; b) middle adult female skeleton 3409, marked grooves through the occlusal surfaces of first maxillary premolars, with notable rotation of these teeth visible in the inferior view; c) adult (unspecified) male skeleton 4849, marked groove through incisal edge of maxillary central incisor (loose tooth, labial and lingual surfaces shown)

Magdalene, Chichester, a notable proportion of the long bone fractures involved the forearm, many of which were consistent with falls onto an outstretched hand (Judd 2008, 231), as may have been the case for middle adult female skeleton 4745 from Magdalen, with bilateral Colles fractures (distal radii/wrists; Fig. 5.11).

The higher rate of fractures amongst females compared to males in the assemblage is interesting, although the low number of cases overall preclude statistical analysis. Women from this period, particularly those of lower economic, working, status, would have undertaken a huge variety of tasks in which minor accidents and injuries were likely commonplace (Shapland *et al*. 2015, 281). This includes tending to animals and gardens (in rural areas), cleaning and washing, collecting water and cooking, baking and brewing, spinning and weaving, as well as looking after children (ibid.).

As noted above, whilst the exact mode of injury is difficult to ascertain from the majority of palaeopathological fractures, those involving the skull, in particular the facial region, are more likely than other skeletal regions to have resulted from interpersonal violence, these areas being commonly targeted in violent assaults (Brickley and Smith 2006, 164; Jurmain 1999, 199). The only two cases of probable perimortem trauma observed involved facial regions and both instances involved middle adult females (skeletons 3409 and 4473). The fractures observed in both cases involved a zygomatic (cheek) bone and the mandible (right side in 3409, left side in 4473; Fig. 5.12). The right maxilla was also fractured in skeleton 3409. In both instances, the fractures were likely sustained from single blows and the absence of healing suggests that the injuries inflicted may have been fatal. It is of course possible that these injuries were part of wider, more severe patterns of trauma involving soft tissues only (because no other injuries were observed on these skeletons).



Fig. 5.11 Healed bilateral Colles fractures, middle adult skeleton 4745, medial view of left and right ulnae and radii (note posterior angulation of the distal radii and secondary joint changes at the distal radio-ulnar joints)

Shapland *et al*. (2015, 281), in their study on medieval female skeletons, found that injuries indicative of interpersonal violence only started to appear in females over 17 years of age, indicating that the risk of violence rose as girls turned into young women, perhaps reflecting domestic violence after marriage. This is certainly a plausible interpretation for the injuries observed here. Furthermore, despite the admission rules of the hospital, which included exclusion of the wounded, individuals suffering from trauma were indeed taken in at the Hospital of St John, as attested to in 14th-century coroner's inquests (James 2013, 14). For example, a Robert Attewyndyte who died, probably from infection, after he was admitted with a broken finger and arm following a violent encounter over dung in a stable outside the south gate of Oxford, with a William of Compton-in-Hennemersh (Salter 1912). In 1396, a man named Roger was admitted after falling off the Little Bridge (now Magdalen Bridge) and later died. Lastly, John Grymusby was killed at the hospital in 1389 whilst sleeping in his bed when he was struck by Henry Herdeller with an axe. It is unclear whether John was a brother, patient or a servant at the hospital (James 2013, 14).

THE POPULATION – SUMMARY AND CONCLUSIONS

This discussion has considered the osteological evidence in the context of the rest of the site and a number of comparative contemporary assemblages. The composition of the Magdalen assemblage, in terms of ages at death and sex ratio, is unusual. Several factors may have caused this, including excavation and methodological bias, burial zonation, cultural and social factors, and the function of the hospital. It is likely that all of these have influenced the assemblage to varying degrees, but it is impossible to postulate the extent to which each may have affected the overall mortality profile.



Fig. 5.12 Probable perimortem fractures: a) middle adult female skeleton 3409 (fracture through right zygomatic bone, note the separate sliver of bone, bordered by the fracture and the zygomaxillary suture, and fracture through left mandibular ramus; b) middle adult female skeleton 4473 (fracture through left zygomatic bone and left mandibular ramus)

The high level of infection and presence of rare congenital deformities (probable achondroplasia and cleft palate) within the assemblage are notable. Indeed, the congenital deformities, although unusual, are perhaps not surprising for a hospital assemblage, considering historical evidence of the medieval perception of deformities and the role of the Church and their hospitals in the care of such individuals.

The osteological indicators of diet considered (stature, rickets and scurvy, dental enamel hypoplasia, cribra orbitalia, and dental disease), would seem to be consistent with the historical context. For example, the high rate of calculus may reflect high levels of protein, much of which may have been provided by fish from the ponds, alongside the carbohydrate-rich staples of the period which would have included bread and starchy vegetables. Consumption of these foods may also be reflected in the high caries rate observed. The low rate of scurvy certainly indicates that levels of vitamin C must have been adequate, which would seem to fit the notion that those in the hospital had access to berries and other seasonal produce. The rates of the more general indicators of physiological stress, that is cribra orbitalia and DEH, are high, and whilst this may point to malnourishment during childhood, it is impossible to relate these conditions to diet with any certainty. Prolonged childhood illness or disease may equally have played a part in the prevalence of these conditions. The comparatively low average female stature is an interesting finding, indicating that females may have suffered higher levels of health stress than males during growth. Again, the multitude of environmental factors that may affect final achieved height cannot be pinpointed, but comparatively insufficient levels of nutrition amongst girls within the population is one consideration.

Overall, the osteological findings would seem to be consistent with a population that primarily comprised the poor sick, likely orphans, and mothers, some of whom may have died in childbirth, as well as individuals who had experienced a high burden of disease, indicated by bone inflammation, numerous systemic conditions and multiple cases of tuberculosis. Indicators of childhood physiological stress were also prevalent and probably refer to a combination of disease burden and malnutrition, both reflective of conditions outside the hospital, prior to admittance. Whilst the evidence for health stress and disease burden may appear incongruous with the evidence of good nutrition in the hospital, it is in keeping with the fact that those most in need were being admitted. This supports historical knowledge which emphasises the role of medieval hospitals in providing respite and nourishment for those who needed it, rather than curing the sick.

Chapter 6

Discussion

by Steve Teague

THE SITE BEFORE THE DEVELOPMENT OF THE TENEMENTS

Before the burh

The earliest features dated no earlier than the late Anglo-Saxon period, and probably not before the 10th century. A small quantity of early prehistoric struck flint was recovered, dispersed across the site and within later contexts. The assemblage is heavily blade focussed, suggesting a Mesolithic or perhaps earlier date (Donnelly, Chapter 3). There is a lack of discernible Neolithic or later material, despite the proximity of known late Neolithic and Bronze Age monuments to the north (Lambrick 2013; Wallis 2014). Perhaps the low-lying nature of the Magdalen College site rendered it susceptible to flooding, particularly by the later Bronze Age, when there was a rise in the level of the water table (Dodd 2003, 7). Similarly, activity during the Roman period was attested only by a few finds including a handful of residual pottery sherds; notably, Roman material was completely absent from what is one of the largest assemblages of brick and tile yet recovered from the city. Nonetheless, the recovery of three Roman coins including a radiate of the British usurper Allectus (AD 293–6) from an early soil layer points to activity located not far from the site.

The most significant find prior to the 10th century was an Ansate or equal-arm brooch dating from the middle to late Saxon period (Fig. 3.28, no. 5). The pit in which it was found clearly dated from the 12th century or later, suggesting that the brooch was redeposited from an earlier feature that did not survive, although it is alternatively possible that the object was brought to the site as an heirloom or curiosity. It may therefore provide tangible evidence for a middle Saxon presence on the site and, apart from a scatter of early to middle Saxon pottery, is perhaps the only object of such a date found in central Oxford (Beckley and Radford 2012a). The nearest known contemporary settlement lies on the north side of Oxford at the Radcliffe Infirmary, where a sunken-featured building and other features were recorded associated with 6th–7th-century pottery and loomweights (Spenbrooke 2020, 133–4). Slightly further afield on the southern outskirts of modern Oxford at Oxford Science Park, Littlemore, excavations revealed ten sunken-featured buildings that were perhaps 6th century in date (Moore 2001). One possibility is that the brooch furnished a grave, though no Anglo-Saxon cemetery of this date is known within central Oxford. A 6th-century furnished grave was recorded at Stephens Road, Headington, and a number of Anglo-Saxon objects recorded within the northern part of Oxford suggest the presence of one or more cemeteries (Beckley and Radford 2012a, 36–7). It has been suggested that the otherwise undated north–south aligned graves found at Pembroke College in 1732 could have formed part of a pagan Anglo-Saxon cemetery (Dodd 2003, 12).

The burh hinterland

The earliest features on the site are dated to the later 10th century and therefore are contemporary with the burh. There is little to suggest that the scatter of features represents anything more than peripheral activity outside the burh defences rather than suburban settlement. The most significant feature, Ditch 1, was dated to the mid-10th or early 11th century by radiocarbon dating and the presence of St Neots ware pottery (Fig. 2.1). The ditch ran along the southern edge of the excavation within the new library building and parallel with High Street, which would have followed the main approach into the east gate of the burh from a crossing point over the Cherwell (Fig. 6.1). There is a reference to the existence of a bridge here in 1004 (Jaine 1971; Sawyer 2024, 909). The ditch, at least 1.33m wide and no more than 1.0m deep, probably served as a boundary dividing the thoroughfare from the land to the north. It may have also served as a drain (into the River Cherwell to the east), though the apparent presence of an opening near its east end would perhaps preclude this function. Perhaps contemporary with the ditch, and certainly predating the laying out of the tenements, was a series of parallel shallow ditches that probably delimited one or

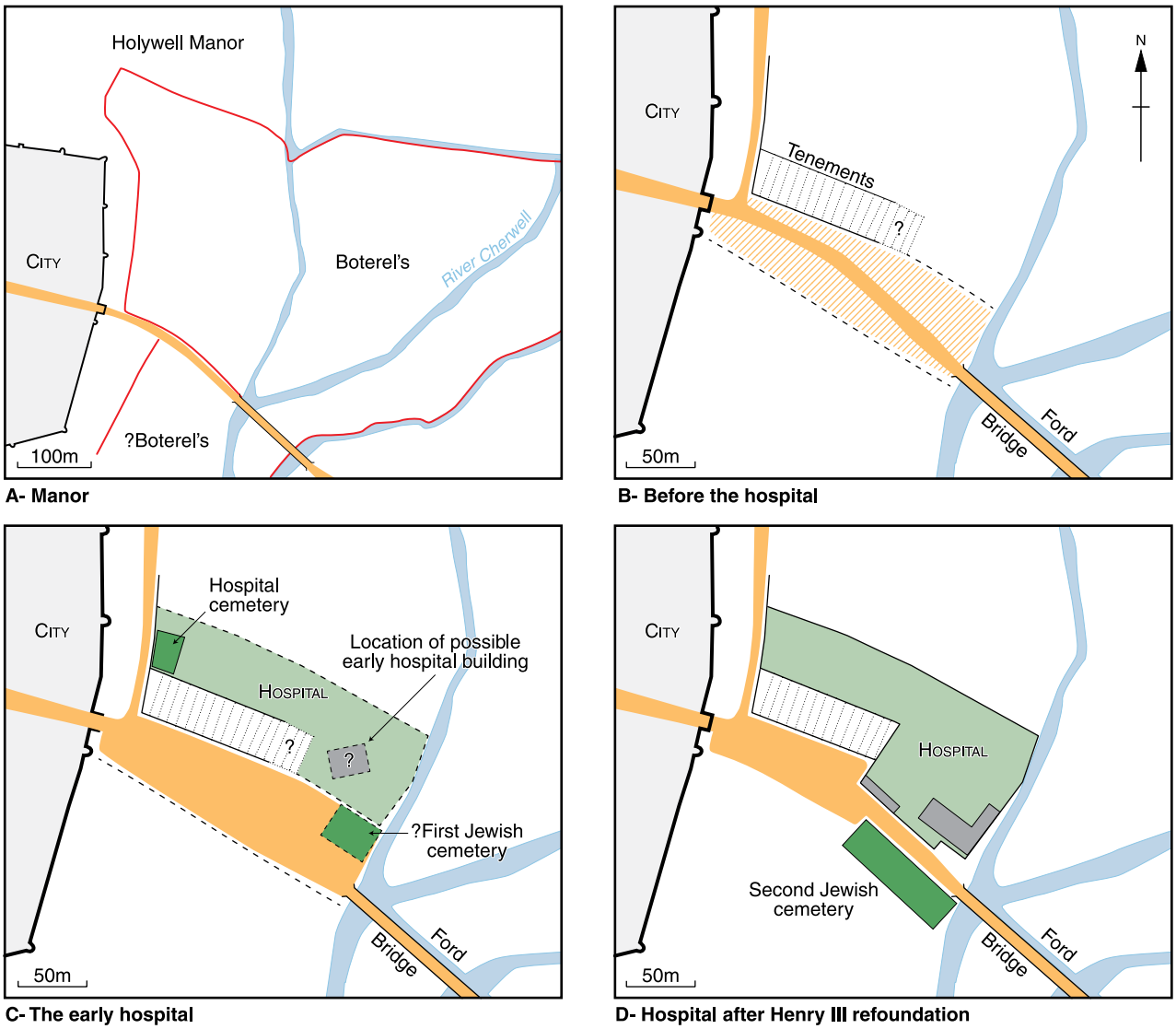


Fig. 6.1 The site and surrounds between the 10th and 13th centuries with suggested locations of cemeteries and roads

more trackways. The most convincing, delimited by Ditch Group 2, lay on a NE–SW alignment and if projected southwards would join the High Street at a point immediately in front of the site of the east gate of the medieval town and its assumed late Saxon precursor. The only dating evidence was a sherd of Cotswold ware that may date from the late 10th or 11th century (Blinkhorn, Chapter 3). Nonetheless, its alignment and stratigraphic position suggest that it was contemporary with the eastern entrance into the burh. Furthermore, excavations at Queen's College revealed a NW–SE aligned metalled trackway that was also aligned on the east gate and whose surface contained animal bone that was radiocarbon dated to the late 9th century (Teague and Brown 2020, 142–3). The trackways at Magdalen and at Queen's College do not comply with the regular 'grid' layout of the medieval streets which is broadly aligned with High Street and the town defences. Furthermore, the trackway at Magdalen College would meet at right-angles the projected alignment of the one at Queen's College. Whether this is significant is open to question but there remains the possibility that both trackways predate the purported eastern burh extension and that the site of the east gate itself was influenced by their confluence. However, the two differ in character, with only the Queen's College thoroughfare given a metalled surface, which was similar in nature to the street surfaces found elsewhere within the burh (ibid.).

The unmetalled track at Magdalen College, flanked by ditches, therefore suggests a non-urban or rural character for the locality, perhaps within a predominantly agricultural landscape. This may be attested by the presence of a large amount of fired clay with wattle impressions found at the east end of Ditch 1 that is likely to derive from the drying floor of a crop-processing oven (Poole, Chapter 3). Although some evidence for iron smithing was found within the fills of the ditch (see below), the fired clay is not indicative of the

high-temperature hearths that would have been required. Much of the charcoal has been identified as deriving from burnt wattles of hazel. Oak heartwood was also present and would have provided sufficient heat for the oven, particularly for a larger structure. The interpretation of the fired clay as deriving from such an oven is also supported by the exceptionally large quantity of fully processed rye and free-threshing (bread) wheat grains recovered with it. The drying of the cereal grains would have followed harvesting and threshing and would have prevented germination during its subsequent storage. The kiln may have been either situated within a building or freestanding, like the 12th/13th-century example excavated at Allcourt Farm, Lechlade (Stansbie *et al*. 2013, 32–5). Research by Rickett (2021) suggests that such structures remained essentially unchanged in design from the typical Roman T-shaped dryer until the post-medieval period, with Saxon and earlier medieval examples more likely to be built of wattles plastered with clay, as at Wallingford Castle (ibid., 33).

Any farmstead associated with the crop harvesting and processing was not located within the present excavations and may lay further to the east. Nonetheless, it is likely that the crop-dryer was in close proximity to where the remains were dumped into the ditch. Evidence for plough furrows, albeit of 12th- or 13th-century date, was found during excavations immediately to the north of the site at the Grove Buildings (Roberts 1999, 277 and fig. 4), indicating that this area was under the plough by this time, and there is no reason to suggest it was not occurring earlier. Further evidence that the area was under cultivation was provided by the probable plough soil into which the graves of the 12th-century cemetery were cut in the northern part of the site, which contained much St Neots ware and later pottery and animal bone that may have derived from manuring. The only indication of nearby settlement was provided by pit 4864, at the northern edge of the site, which also yielded a large quantity of pottery and bone. The pit was situated well away from the High Street frontage, and any associated occupation must have lain to the north or east, although no such activity was found by the (admittedly limited) excavation at the Grove Buildings (Roberts 1999). The fills of the probable quarry pits (Pit Group 1) located towards the south-west corner of the site suggest some activity was occurring here. These pits are not firmly dated, and the few sherds of 10th/11th-century pottery recovered from them may well be residual (perhaps from pre-existing plough soil), with the pits simply representing an early part of the pit sequence within 12th-century Tenement A (Pit Group 3). Nonetheless, given their proximity to Longwall Street, possibly originating as an extramural thoroughfare following the line of the burh defences, it is possible that they were dug to extract gravel for the road surface. Similarly, the shallow pits that cut Ditch 1 and contained late Saxon pottery (eg 9758 and 9350) may have contained redeposited material rather than representing activity of this date.

THE EARLY DEVELOPMENT OF SUBURBAN TENEMENTS

Suburban expansion outside the town defences did not occur on any scale until the 12th century. This also seems to have been the case in the northern, western and much of the southern suburb, apart from adjacent to the Thames crossing, where structures dating from the 10th century and later were recorded (Dodd 2003, 41–2). This lack of development prior to the 12th century, and possibly up to the late part of that century, has been demonstrated within the northern suburb by excavations at the Ashmolean Museum Extension and Classics Centre (Teague and Ford 2020b; Norton and Cockin 2008), within the southern suburb at Brewer Street and the Westgate Centre (Teague *et al*. forthcoming a) and within the western suburb at Paradise Street (ibid.; OA 2021a). By contrast, little previous excavation has occurred within the suburb between the east gate and the River Cherwell, the most significant being on the site of the infirmary of the Hospital of St John, close to the river (Durham 1991; Fig. 6.1, maps C and D). Excavation below the levels of the 13th-century hospital were rather limited and only recorded a 'reclamation' deposit, suggesting that the hospital was built on previously unoccupied land (ibid., 63–4). It has been suggested (Dodd 2003, 53) that at the time of the Domesday Survey of 1086 Oxford was in decline, with much 'waste' or empty land within the town. This situation appears from the documentary evidence to have persisted into the 12th century (ibid., 59).

It is entirely possible that suburban expansion at Magdalen College commenced soon after the Conquest, although dating evidence relies solely on the presence of medieval Oxford ware and Cotswold ware, pottery fabrics which were still current up to the late 12th or 13th century. Nonetheless, the absence of specifically late 12th-century pottery from the mass of early pits together with a lack of ceramic building material suggests a date no later than the mid-12th century. Given the density of early pits, it would be reasonable to assume that the tenements were formed about the same time during the late 11th or more likely the early part of the 12th century.

Origin and organisation of the tenements

The excavations revealed evidence from at least three tenements. It appears that, once the tenements were formed, the boundaries between them remained essentially unchanged until their acquisition for the new site of Magdalen College School in 1849. Though the boundaries were not clearly defined prior to the 13th century, when most of the timber buildings were replaced in stone, the

arrangement of the pits, timber buildings and boundary ditch fragments prior to this corresponded closely with the more discernible later medieval boundaries.

The medieval title deeds given in the Cartulary of the Hospital of St John (Salter 1914, 72–146) refer to 15 tenements extending from the gate into the hospital on the east and the corner of Longwall Street to the west (see Chapter 1). It is clear that the three westernmost properties listed in the deeds correspond to the excavated tenements. Though the earliest deeds date from shortly after the hospital's second foundation in 1231, it is likely that the tenements were in existence beforehand (Fig. 6.1, map B), and the hospital gradually acquired ownership of them over the course of the following two centuries. One deed concerning a tenement near the east end of the group is dated *c* 1220 and refers to the house of Edred, therefore predating the second foundation of the hospital (Salter 1914, 87). Unfortunately, dimensions of the plots are only listed in one deed of 1347 concerning a central tenement which Salter (ibid., 94) records as 125ft (7 perches and 10ft) from north to south and 81ft (4 perches and 15ft) wide (see Chapter 1). In a deed of 1246–7 concerning the second most westerly tenement (Tenement B), Adam Faber, who occupied the end tenement (Tenement A), granted to Roger Exemplarius a piece of land 42ft wide. If this deed does indeed refer to the transfer of ownership of Tenement A, as Salter implies (ibid., 133–4), then this offers direct evidence for the width of the tenement. Unfortunately, the western limit of Tenement A lay outside the excavated area, at least alongside the High Street frontage, so its full width can only be estimated, something that is complicated as Longwall Street was widened at its junction with High Street in the 18th century. Tenement A measured at least 11.5m (38ft) wide at its southern end if measured up to the outside edge of the present college boundary wall, and 13.4m (44ft) if it extended up to the pavement edge on Longwall Street, probably the maximum width (the Greyhound Inn was 33ft 9in in 1772: Table 1.1). The width of Tenement B is estimated to be *c* 15.2m, which exactly corresponds to three rods, and the width of Tenement A as given in the 1246–7 deed would be *c* 2.5 rods. The estimated depth of Tenement B (along its junction with Tenement A) is estimated to be *c* 37m (121ft, or 7 rods) assuming that the medieval High Street frontage of the properties corresponded with the tenements depicted on Isaac Taylor's map of 1750 (Fig. 1.4). This dimension corresponds closely with the length of the central tenement (125ft, or 7.5 rods) given above and is therefore probably a reflection, at least, of the length of the other tenements to its west.

The evidence suggests that the tenements were set out as part of a single planned process, probably during the first part of the 12th century. The tenements formed a block of land along the southern edge of the manorial estate of the lord Peter Boterel, whose land extended up to the town defences to the west, to the River Cherwell to the east and northwards to the manor of Holywell (Salter 1917, xi) (Fig. 6.1, maps A and B). Boterel, whose family also held Chalgrove Manor and were also constables of Wallingford Castle, died in 1165 (Townley 2016). He would therefore have been contemporary with the formative years of the tenements and may have instigated their formation, perhaps as a source of rental income. He may have also been responsible for the reconstruction of the Church of St Mary, Chalgrove (Keevill Heritage 2017, 15; Townley 2016) and certainly granted land within his manor to the Hospital of St John (see Chapter 1 and below).

Early evidence for smithing

Evidence for iron smithing was found within most of the features that are thought to predate the tenements, particularly Ditch 1, the possible trackway (Ditch 2) and the adjacent pits. Most of the diagnostic bulk material comprised smithing hearth bottoms, 13 of which were recovered from the pre-tenement phase, including seven from pit 9361 that were found in association with sherds of St Neots ware. Also present in Ditches 1 and 2 were micro-slags, hammerscale flakes and spheres, the former derived from ordinary hot working of iron objects and the latter from high-temperature welding. One smithing hearth bottom in pit 5002 was almost pure iron, suggesting it was a piece of bloom, and therefore associated with iron smelting rather than smithing. It is, however, very unlikely that smelting was undertaken on the site, as such activities were typically undertaken well away from urban areas and close to sources of iron ore and woodland, the latter being required to provide charcoal to fuel the furnaces. It is likely that the bloom was accidentally incorporated with the wrought iron when it was bought from the smelters. A comparable instance was recorded at Queen's College, where slag from both smelting and smithing was found in 10th–12th-cellars and pits but there was no evidence for *in situ* metalworking, the material having apparently been dumped into these features from elsewhere (Keys 2020, 185–6). Similarly, at 116 High Street, smithing debris found within a late Anglo-Saxon cellar pit also seems to have been brought onto the site from elsewhere (Dodd 2003, 43). Nonetheless, this does provide evidence that smithing was undertaken somewhere within the vicinity during the 10th–12th centuries. Perhaps the debris found within the late Anglo-Saxon features on the present and foremen-tioned sites was obtained from presently unlocated smithies for secondary use such as road or yard metalling and in foundations.

Despite extensive excavations within the burh and later town defences, Magdalen College presents the first firm evidence for smithing, at least from the 12th century. The location of the site, immediately outside the east gate, would have been ideally placed to serve the people of the town for the

manufacture and repair of iron objects, farmers for agricultural tools and travellers for the needs of their horses and carts. Smithies are documented at the town gates, with forges outside the north and east gates, and outside Smith Gate as its name implies, though extensive excavations outside Westgate and Littlegate did not find any such evidence (Teague *et al*. forthcoming a). The earliest evidence for smithing was found within Tenement A during the first part of the 12th century (Phase 2) within timber Structure 1, the earliest building on the High Street frontage. Despite the lack of surviving floor deposits and hearths, two of its postholes contained enough flake and sphere hammerscale and iron chippings/flakes to indicate that smithing was undertaken within the structure, unless this material had percolated down from deposits higher in the stratigraphic sequence. No smithing hearth bottoms were recovered from the pits to the rear of the structure, unless pit 5002 is in fact contemporary and the few sherds of St Neots pottery within it residual. Later in the 12th century (Phase 3) the focus for smithing, at least on the surviving evidence, appears to have lain in Tenement B Structure 2, where two postholes and a possible rake-out pit produced significant quantities of micro-slags associated with secondary smithing. As with Tenement A, little bulk slag was found in the pits to the rear and included just a single smithing hearth bottom, which together suggests that smithing in both tenements was not occurring on any great scale during the 12th and early 13th centuries. Three whetstones, used by smiths to file and sharpen metal objects, recovered from the early phases do however support the evidence that secondary smithing was undertaken in Tenement B during the 12th century.

Buildings and occupants

The excavations provided an opportunity to examine the development of structures along a significant length of a medieval street frontage. Until the last decade or so, excavations on any scale within such areas in Oxford were rare (Dodd 2003, 60). The only other recent excavation of comparable size, situated within the southern suburb, occurred at Brewer Street (Teague *et al*. forthcoming a). At Magdalen College, several timber structures likely to represent houses were located along High Street and were replaced in stone during the 13th century (*The rebuilding of the tenements and later developments*, below). A similar sequence occurred at Brewer Street, where 12th-century timber buildings were replaced in stone during the early to mid-13th century.

The structures survived as postholes whose arrangements were often fairly irregular or discontinuous, though rectangular layouts were discernible within Tenements A and B where the largest areas were exposed (Structures 1, 1A, 2, 3). From the available evidence the structures were orientated gable-end to the street, though in no case was their full length available for investigation. Nonetheless, they were probably at least 6m in length, assuming the contemporary frontage corresponds with or lies immediately beyond the south wall of the current library building. The reason for this orientation is not clear given the plentiful width of frontage available for building. Within Tenement B, the earliest building, Structure 3, was seemingly a lightly built structure only *c* 3.2m wide, the remaining area of the frontage being set aside for pit digging. It was only from the late 12th century (Phase 3) that much of the remaining frontage was built up, when a second structure (Structure 2) was added, the earlier infilled pits necessitating its larger postholes. This second building may have been the result of increased fortunes of the tenant or perhaps Tenement B had been subdivided into two separate plots, which may have been the case during the later medieval and post-medieval periods (see below). Nonetheless, any such boundary to the rear was not readily apparent in the layout of the pits, at least prior to the 13th century. A similar situation may have occurred within Tenement A, though it is not clear whether later Structure 1A was simply an extension of Structure 1, the latter being *c* 4.2m wide. Within Tenement C, Structure 5 was the most complete building, occupying an area formerly set aside for pits, and therefore representing a growing need for space. This hall-like structure may have measured *c* 4.1m wide and extended beyond 7.2m in length and was built with substantial postholes. Constructed no earlier than the late 12th century, it appears to have been still extant during the 13th century. An infant buried against its south-east corner returned a radiocarbon date range of cal AD 1240–1420 (Table 2.1 and Griffiths, Chapter 4).

The shallow nature of many of the postholes and the dimensions of the other buildings would imply single-storey, relatively flimsy structures, though the presence of a pair of substantial postholes within Structure 1 in Tenement A suggests that it could have supported a staircase serving a second floor above. The lack of internal features and floors, particularly central hearths within Structures 1 to 3, is somewhat surprising, though it is possible that these levels had been removed during the construction of their stone successors. There are suggestions of a robbed hearth within Structure 2 and there were areas of scorching within Structure 3. Better preservation occurred within the structures located within Tenement C, where floors of gravel and sand survived with more evidence for the presence of hearths. The material for the floors would have been adequately sourced from the numerous pits that were found towards the rear of the tenements.

Given that the earliest structures originated prior to the widespread introduction of ceramic roofing tiles in the late 12th century, it is likely that the buildings were initially roofed with thatch or perhaps wooden shingles, though any evidence would only survive if they had been destroyed by

fire. The best evidence for roofing tiles was found in Tenement C, where fragments of early ceramic tile suggest that both Structures 4 and 5 were given tiled roofs, perhaps as early as the late 12th century. This may suggest the occupants were wealthier than those of the other two tenements, and this may be supported by the presence of at least two substantial structures on the tenement.

Most of what can be gleaned concerning the status and diet or the occupants and activities within the tenements comes from material recovered from pits located outside and largely to the rear of the buildings. The late 11th- and 12th-century pottery from the tenements is not particularly remarkable and conforms with other contemporary sites in the town (Blinkhorn, Chapter 3). It is dominated by locally produced medieval Oxford ware with lesser quantities of Cotswold ware and Kennet Valley ware from neighbouring counties. Comparisons of the domestic vessel forms between Tenements A and B showed that jars predominated in both, with smaller but similar proportions of largely undecorated bowls and jugs. There was considerably less pottery available from Tenement C which does not justify comparisons though it is noticeable that there were no bowls present. The complete absence of high-quality wares or imports, together with the largely plain nature of the assemblages, suggests that the occupants were not particularly wealthy, at least within Tenements A and B.

The only lamp recovered from these early phases was a single ceramic cresset lamp in medieval Oxford ware (Fig. 3.1, no. 8) recovered from Pit Group 9, adjacent to the east side of Structure 3 in Tenement B. Although such vessels may have been used in a domestic context, they may also indicate the requirement for light for craftworking or that the occupants were literate. Perhaps it was used to illuminate spinning, the occurrence of which is indicated by a spindle whorl (Fig. 3.27, no. 1). Two whetstones from the same pit group, one used as a point sharpener (Fig. 3.19, no. 1), perhaps elucidate further the activity that was undertaken within Structure 3. Though such whetstones may have been used to sharpen domestic knives, the point sharpener suggests a more specialised tool, perhaps used for writing on wax or for punching leather. There is some evidence for smithing within the adjacent Structure 2, which was added later to Tenement B. A shallow scoop (9330) next to the robbed remains of a hearth contained 1.9kg of micro-slags diagnostic of secondary smithing. The weighing of expensive materials such as spice seems to have occurred in Tenement A, given the recovery of part of a folding balance (Fig. 3.28, no. 3) from Pit Group 3.

As would be expected, the overwhelming majority of the animal bone was recovered from pits which were either dug for refuse disposal or were disused gravel quarries. Across all three tenements sheep and sheep/goat were the most prominent of the domesticates eaten prior to the late 12th century (Phase 2) and formed over half the of the assemblage, followed by cattle and pig. The sheep were largely slaughtered at between two and three years of age. The age of the sheep suggests that mutton was consumed rather than the more succulent lamb that was presumably available to wealthier households. The low incidence of poultry remains, comprising chicken, goose and duck, and the low consumption of game together with the consumption of mutton conforms to a typical diet during the 11th and 12th centuries in Oxford, such as within the tenements at Brewer Street (Strid forthcoming). Pit 6860 within Tenement C contained both roe deer and woodcock bone and provides evidence for more elaborate dining here. Herring and eel were the predominant fish eaten, the former at least obtained from local markets. An exception was found in pit 5058 in Tenement A, which contained a large and varied quantity of freshwater fish including roach, gudgeon, bleak, minnow, dace or juvenile chub, juvenile pike, bullhead and three-spined stickleback as well as possible burbot, ruffe and stone loach. It is unlikely that stickleback would have been consumed, and minnows were primary used as bait, suggesting that at least some of this assemblage was caught locally, perhaps by the inhabitants of Tenement A themselves. These fish would have been caught in a range of nets and traps in the town's 'free waters', which extended from the Cherwell at Magdalen Bridge to the Thames at Godstow (Nicholson, Chapter 4). The plant remains are less informative, comprising predominantly charred grain, mainly fully processed free-threshing bread wheat and few food remains of legumes and hazelnut shells. It is unlikely that the grains were being consumed or milled and they probably represented discarded hearth kindle or accidental burning of floor coverings.

The later 12th to early 13th century (Phase 3) saw an increase in the consumption of beef across Tenements A and B, though the lack of pits within Tenement C during this phase prevents any meaningful comparison. The decreasing proportions of sheep and their increase in slaughter ages to largely 4–6 years reflects the growing wool trade from the period, meaning the animals were kept longer (Smith, Chapter 4). Such trends are commonly found across many sites in Oxford where there are sufficiently large assemblages to make parallels, such as at Brewer Street and the Ashmolean Museum Extension (Teague *et al*. forthcoming a; Teague and Ford 2020b). Occasional venison seems to have been eaten in Tenement A, which may indicate that the occupants here could occasionally afford more expensive cuts of meat, at least for special occasions, or were hunting themselves. An eel bone from a very large fish, a fairly expensive item, found within a hearth deposit within a kitchen area of Structure 4 provides further evidence for the relative wealth of the inhabitants in Tenement C.

The plant remains from Phase 3 suggest an increase in the diversity of food plants compared to Phase 2, though this may have been influenced by the fact they only survived through mineralisation and were largely retrieved from a single pit (3955) within Tenement B. Most comprised wild fruits, largely elderberry and blackberry which would have been readily available from nearby hedgerows. Two pits from Tenement B (6203 and 9185) each contained significant concentrations of charred grain, one containing clean free-threshing (bread) wheat grains and the other a mixture of rye and free-threshing wheat. There is a suggestion (see Giorgi, Chapter 4) that these had been processed and stored, perhaps on site, prior to milling. However, there was no evidence for corn-dryers or similar large hearths, and the grain was mixed with chaff and possible straw fragments, which would add more weight to the suggestion from the previous phase that it arrived on site as crop-processing waste and was used for floor coverings or as kindling for domestic hearths. Nonetheless, it does provide evidence for nearby harvesting, perhaps within land situated to the north of the tenements and the cemetery. Excavations to the north at the Grove Buildings revealed that this area was under the plough, given the presence of furrows containing pottery dating to the late 12th and 13th centuries (Roberts 1999, 277).

There is evidence for the keeping of horses in all three tenements, given the number of equine bones found within several pits. There is no evidence for butchery and as horsemeat was not generally consumed the bones are likely to derive from working animals. Pit 6303 (Tenement B, Pit Group 6) contained the remains of at least two animals of advanced age judging by the wear on their teeth, one also showing evidence for bit-wear damage. It seems likely that the animals were stabled on site, possibly within the small structure located immediately behind Structure 2.

Infant burials

The excavations revealed the remains of three neonates, aged from birth to one month, that had been interred towards the southern end of the site and were therefore clearly well outside the cemetery to the north. One infant was identified within the upper fill of a Phase 2 pit in Tenement B but is likely to have been interred within an otherwise unrecognised grave, located immediately to the west and probably contemporary with late 12th-century Structure 2. A second infant was interred in a small pit against or possibly within a late 12th-century timber building in Tenement C (Structure 5) and was radiocarbon dated to cal AD 1240–1420 (Table 2.1 and Griffiths, Chapter 4). The remains of a third neonate were found a little further south within the tenement and possibly located within a northward extension of Structure 4; they probably date from the early 13th century.

It is likely that the infants died during childbirth or shortly after and the mothers presumably resided within Tenements B and C. The remains add to the growing number of medieval infant burials found outside known cemeteries within Oxford and elsewhere. At Brewer Street, an infant associated with a 12th-century building on the street frontage dated to cal AD 1050–1265 (Teague *et al*. forthcoming a), and at the Mitre Inn remains of a neonate of similar date were found in a garden soil (OA 2022). In a rural settlement at Graven Hill, Bicester, an infant was buried below the floor of a late 12th- or 13th-century farmstead building (Allen *et al*. 2023). Such burial of infants in non-cemetery contexts is well documented and reflects the interment of unbaptised and stillborn infants that were not permitted in consecrated ground at this time (Gilchrist and Sloane 2005, 72).

THE CEMETERY AND THE HOSPITAL OF ST JOHN

A Jewish or hospital cemetery?

One preliminary interpretation of the cemetery was that it may have represented part of the original Jewish burial ground known to have been situated outside the east gate of the town and on the north side of the High Street. The date of the foundation of this Jewish burial ground is not recorded, but it cannot have been prior to 1177, as Jews were forbidden to bury outside London before that date. The Jewish burial ground is recorded as having been relocated elsewhere – probably to the southern side of the High Street – in 1231 when the king granted the original site to the refounded hospital (Chapter 1). However, Bayesian modelling of radiocarbon dates from the excavated cemetery (Griffiths, Chapter 4) indicates that there is a 60% probability that burial began before cal AD 1177. Even more problematic for an interpretation as the Jewish burial ground are the preliminary findings of the DNA evidence obtained from 40 of the skeletons, of which 22 individuals had sufficient DNA preservation to suggest ancestry within north Europe, none of which harboured any Near Eastern-related genetic ancestries. This is despite the perceived 'Jewish' burial traits such as the largely well-ordered layout of the cemetery, infrequent intercutting of graves and the absence of iron coffin fittings, though the latter is a modern Jewish custom. It is therefore concluded that the excavated burial ground is very likely to have instead been associated with the Hospital of St John the Baptist.

The exact location of the original Jewish burial ground remains uncertain, though it is likely to have lain further to the east, in the area of the hospital buildings as refounded in 1231 (Manix 2014) (Fig. 6.1, maps C–D). There is, as yet, no convincing evidence that any of the burials found to the east within the area of the present Chaplain's Quad, traditionally thought to be the site of the first

Jewish cemetery, date prior to 1231. Excavations on the site of the infirmary to the east failed to find evidence of human remains below the levels of the 13th-century infirmary (Durham 1991).

The origin of the cemetery

On topographical considerations alone it is assumed that the cemetery was established after the tenements had been set out during the first half of the 12th century. Although no clear boundary between the two was apparent, the southern extent of the cemetery respected the rear boundary of Tenements A and B that became more apparent later during the medieval period. Radiocarbon dating and Bayesian modelling clearly indicate that the cemetery, or at least the part of it that was exposed within the excavation area, was established during the late 12th century and ceased to be used during the early decades of the succeeding century. The northern and eastern extents of the cemetery lay beyond the excavated area, but its western extent is likely to have been delimited by Longwall Street, which is known to have also defined the extent of Adam Faber's corner tenement in 1247 (Tenement A). Nonetheless, the cemetery did not extend northwards as far as the modern Grove Buildings, since the previous excavation there found no evidence for graves (Roberts 1999). It seems likely that the northern extent of the cemetery was delimited by the boundary that formerly separated Magdalen College Grove (or gardens) to the north and Magdalen College School to the south. This boundary is depicted on the Ordnance Survey map of 1874–5 and can be correlated closely with the earlier maps of Agas (1578), Loggan (1675) and Taylor (1750), so was evidently of some antiquity. These maps clearly show that by the late 16th century the tenements to the west of Magdalen College all extended to a common northern boundary, which encompassed the area of the former cemetery. These enlarged tenements were shown incorrectly on Durham's (1991, fig. 2) reconstruction of the 13th-century suburb, since the existence of the cemetery was unknown at the time.

There is no indication in the hospital cartulary of how the tenements acquired the site of the cemetery, though given the dating evidence, the cemetery must have been in existence and used prior to the refounding of the hospital in 1231. Evidence from the cartulary states that the first hospital was given parcels of land between 1191 and 1199 by Hugh Malaunay, both inside and outside the town walls, the latter of which had been formerly held as part of Peter Boterel's manor (Salter 1917, ix–x). Though later traditions suggest that Hugh Malaunay was the 'founder' of the first hospital, a deed within the Godstow Cartulary, thought to date between 1180 and 1190 and possibly as early as the 1160s, refers to the Hospital of St John in regard to land adjacent to the house of Simon, the priest of St Peter-in-the-East (ibid., viii–ix). Therefore, Malaunay's grant must refer to land acquired by the hospital sometime after its foundation, rather than providing the date when the institution was first established.

The site of the buildings of the first hospital is uncertain. There was a notable lack of convincing archaeological evidence found for 12th-century buildings during the excavations and geophysical survey at the Grove Buildings. Indeed, the findings there seem to imply that the site was under the plough from the late 12th century onwards (Roberts 1999). A gravel 'floor' surface found during a watching brief alongside Longwall Street (Fig. 1.1) was suggested to have formed part of a medieval building as it contained three small sherds of pottery of late 11th- to mid-13th-century date, though a fourth sherd dating to the 16th–18th centuries was also present. The surface sealed a substantial ditch from which a single sherd of late 11th–12th-century date was retrieved (ibid., 277). The ditch may have been the continuation northwards of the late medieval enclosure (Ditch 5) found during the present excavation, which cut the cemetery and possibly pertained to an early boundary of Magdalen College. If this is correct, then the gravel surface revealed above the ditch at Longwall Quad is likely to be of post-medieval date, as attested by the 16th–18th-century sherd.

One explanation for the origin of the cemetery is that it formed part of a distinct parcel of land that had been acquired by the hospital from Hugh Malaunay sometime during the 1190s (see Chapter 1). This parcel, measuring *c* 45m along the Longwall Street frontage, was bounded to the south by pre-existing tenements and to the north by a boundary that later became that of Magdalen College Grove (Fig. 6.1, map C). Although it is possible that the hospital buildings occupied the remaining unexcavated northern half of the plot, this seems unlikely given its narrow width, of no more than 27m, and location well away from highways leading into the town. The rather standardised quoin and gutter forms of Taynton architectural stone found in Phase 2 and 3 could have adorned a Norman structure such as the first hospital but equally could have been retrieved from rubble from other buildings of this date within the town. The buildings of the first hospital may thus have lain further east, closer to the site of the second hospital. It is possible that the large rectangular anomaly revealed by geophysical survey in the Great Quadrangle in fact represents a building from the first hospital (Stratascan 2005; see Chapter 1).

The cemetery revealed by the present excavation comprised at least 112 individuals, over half of whom were children or infants, and more than half the adults that could be sexed were identified as female. With the exception of the individual in grave 3128, this represents a secular population rather than the Hospital brethren, who would have been interred in a separate cemetery adjacent to their chapel. This seems to be the case for the refounded hospital, where burials were found adjacent to the site of its chapel within the

Chaplain's Quad at Magdalen College (Hassall 1977). A deed of 1293 in the cartulary seems to confirm the presence of the brethren cemetery to the west of where Magdalen College Tower currently stands (Salter 1914, 37–8). A recent watching brief within this area revealed disarticulated remains of at least four adult individuals which were initially believed to be from the Jewish cemetery (MOLA 2017, 31–3). Subsequent radiocarbon dating of one of the individuals returned a date of cal AD 1265–1301 (at 95% confidence), which would make it contemporary with the hospital. The same deed states that a piece of land on the opposite side of the High Street was granted to the hospital by the king for 'the burying of its patients who had died in the hospital' (Fig. 6.1, map D). It is possible that this vacant plot was formerly that of the second Jewish cemetery which was established after the hospital acquired the original site in 1231 and abandoned after the expulsion of the Jews in 1290. Presumably there was insufficient space within the grounds of the hospital to accommodate burial of its patients. While it is possible that the patients of the second hospital were originally interred in the cemetery that was found during the present investigations, the dating evidence suggests that the excavated part of this cemetery had ceased to be used by the early to mid-13th century. Also, there is still considerable doubt whether the earlier 12th-century hospital functioned in the same manner as its successor – that is, providing for the needs of the sick and infirm as well as acting as a charitable institution. The Hospital of St Cross at Winchester, for example, was never seen as supporting the sick and infirm as this duty was provided throughout the Middle Ages by the city's other hospitals such as the Hospital of Mary Magdalen situated about a mile from the city and perhaps by the Sustren (Sisters') Spital situated just outside King's Gate (Ottaway 2017, 319–21).

Medieval hospitals, which were under ecclesiastical jurisdiction, did not have automatic burial rights as this was the reserve of the parish churches who guarded this right rigorously as burial earned the priest a mortuary fee (Bridge 1999, 98). Indeed, the Hospital of St John did not obtain burial rights until 1245, when the king notified the archdeacon of Oxford that the Pope had given command to the Bishop of Lincoln to provide a cemetery for the hospital where the brethren and the patients may be buried (Salter 1917, xxii). Salter concluded that originally both the brethren and the patients were buried in the churchyard of St Peter-in-the-East (ibid.). This poses further questions concerning the origin of the cemetery at Magdalen College which are difficult to reconcile with the excavated evidence. Perhaps the cemetery represented an extramural extension of the church's cemetery under special arrangement with the hospital to allow burial of its brethren and patients, after paying a suitable mortuary fee to the parish priest. Therefore, it is possible that the individuals buried in the cemetery represented both poor parishioners and individuals that benefited from the charity of the first hospital.

The cemetery population

Detailed analysis of the 112 skeletons found that the population comprised relatively even numbers of adults (59) and children (53), was biased in favour of females (1.5 female adults to every male) and had an erratic age-at-death profile. Compared with similar contemporary assemblages these patterns are unusual and may be the result of the conflation of a number of factors regarding the origins of the buried population. This may have been further complicated by the changing focus of the hospital over the period during which the cemetery was in use, resulting in an assemblage that could include brethren, pilgrims and travellers, orphans and expectant mothers, as well as the sick and infirm. According to Sweetinburgh (2004, 11), the form and function of medieval hospitals was very much linked with their local context, the aspirations and desires of their founders and patrons, and the presence of urban settlements (among other factors); the patterns observed here may therefore simply reflect the particular circumstance of the hospital.

Evidence for disease and overall poor health was abundant in the skeletons, highlighting the hospital's charitable mission to help the disadvantaged and those in need. Two of the juveniles had congenital defects – a cleft palate and achondroplastic dwarfism – which are rare in the archaeological record. More generally, lines of arrested growth on the teeth (dental enamel hypoplasia), pitting in the roofs of the orbits (cribra orbitalia) and non-specific bone inflammation were prevalent, consistent with individuals who experienced a high burden of health stress, including insufficient nutrition and chronic illness. This burden was greater among females, indicated by their height being on average shorter than their contemporary counterparts, whereas males were on average taller. A high proportion of skeletons showed evidence for tuberculosis, giving an overall prevalence which is comparable to, if not higher than, the 9% (12/132) recently reported for skeletons excavated from the Hospital of St John, Cambridge (in use *c* 1204/1214–1467/1511; Dittmar *et al*. 2023). This is consistent with the national picture, in which tuberculosis, and infection more generally, increased during the medieval and post-medieval periods, reflecting urban crowding, poor sanitation and poverty (Roberts and Cox 2003).

Overall, these observations would seem to emphasise a group of poor individuals, predominantly women and children, who had experienced harsh childhoods and chronic ill health throughout their lives. They are comparable to a subset of the assemblage from the Hospital of St John, Cambridge, a predominantly female group, referred to as the 'poor, young and ill' and characterised by tuber-

culosis, young ages at death and frequent cribra orbitalia and non-specific bone inflammation (Inskip *et al*. 2023, 1588–9). Considered to represent townspeople, possibly orphans who could not work and had no family, the Cambridge skeletons form one of several different groups, most of them poor, identified from skeletal and molecular analysis of the assemblage. Other groups include the life-long poor, the situationally poor, those who fell into poverty, and poor university scholars and visitors to Cambridge, reflecting a heterogeneous burial population. By comparison, the skeletal evidence from Magdalen gives the overall impression of a more restricted, or less mixed, burial population. This difference may reflect differences in how the two institutions conceived of their charitable mission, who they chose to look after, and the factors which influenced those choices, such as donors and theology. In this respect, the Magdalen assemblage not only provides important new information on the health, demography and disease of Oxford's medieval populace, but it also affords an important new perspective on medieval poverty, charity and the functioning and role of medieval hospitals.

LATER MEDIEVAL DEVELOPMENT

Buildings and occupants

During the first part of the 13th century the timber frontage structures were replaced in stone. It is not clear from the surviving evidence whether this represented a single episode, although this is perhaps unlikely given that the three tenements were probably in different ownership, at least prior to the late 13th century, after which the Hospital of St John seems to have been acquiring the three tenements (see Chapter 1). It was not possible to establish more precisely when the rebuilding occurred, though in all three tenements it occurred sometime after the introduction of Brill/Boarstall ware pottery during the early part of the 13th century. Radiocarbon dating of a charred nut shell and twig from an early occupation deposit from Building 1 in Tenement A gave two consistent dates and suggests that the building was in use by the middle part of the century, perhaps as early as the 1220s (95.4% confidence; SUERC-100273 and SUERC-100277; Table 2.1). The replacement of timber houses in stone occurred with increasing frequency in Oxford from the late 12th century, as attested by the few deeds of this period that survive (Munby 2003, 60–1). Undoubtedly, the earliest stone houses were only within reach of the wealthier inhabitants of the town, though by the time of the numerous examples in the 1279 Hundred Rolls, they were becoming common. By the early 13th century, the deeds also commonly refer to houses in Oxford as consisting of a solar (or first floor chamber) and a 'cellar', but later in the century halls were increasing referred to in conjunction with a 'seld' (or shop) and a solar (ibid.). Opportunity to examine medieval street frontages within medieval Oxford, where the earliest buildings are normally located, are relatively rare. A notable house still standing at 4a Merton Street was constructed around 1200 and originally consisted of a solar and (ground) cellar; a back range was later added (Poore *et al*. 2006). Typical early stone houses were probably more akin to those found within two humbler tenements excavated on Brewer Street, built on narrow and shallow foundations and probably supporting a timber superstructure and replacing timber precursors during the late 13th century or later (Teague *et al*. forthcoming a). In common with buildings of this period, their roofs were furnished with plain peg tiles, which would have been capped with glazed ridge tiles. Roof furniture was exceptionally rare at the present site, with four fragments found, three of which were from a finial that may have originated from the shoulder of a glazed roof louver found in Tenement A (Fig. 3.17, no. 1). This may have embellished the roof of a kitchen or perhaps the smithy workshop (Building 1).

Adam Faber's former tenement (Tenement A)

Building 1 within Tenement A, of which we have the earliest deeds, was under the ownership of Adam Faber in 1246–7, when he granted Roger Exemplarius (who held Tenement B, or at least its western part; see below) a piece of land 42ft wide (Salter 1914, 133–4). A charter dated to 1302 states that the tenement was given to the hospital by Thomas, son of John le Mareschal (ie a Farrier, who also held Tenement B, see below), when it was described as a house in the corner with a forge between Nicholas, son of John le Mareschal, on the east and the road (presumably Longwall Street) on the west (ibid.). Clearly the Mareschal family held both Tenement A and at least part of Tenement B by 1302. Adam Faber's surname indicates that he was a blacksmith, and he probably lived and operated his business within Tenement A. It is not known when he acquired the tenement, though it would be reasonable to assume that he constructed Building 1 to serve his requirements as a smith. Clearly it was still in operation in 1302, long after Faber had died.

The foundations of Building 1 were substantial enough for a structure that was built entirely in stone, and probably sufficient for a floor above as implied by a possible internal staircase foundation on its north wall. Such a structure would have reduced the risk of fire both to the building and its neighbouring tenements, particularly compared to its timber forerunner. Nonetheless, the substantial nature of the walls would imply a building of some substance and has direct parallels in the 13th-century house at 4a Merton Street (Poore *et al*. 2006) in both size and its lengthways orientation with the street, which both buildings directly fronted. The Merton Street house measures *c* 11.6m in length, identical to the reconstructed length of Building 1, if it is assumed that it occupied the full available street

frontage. Similarly, the width of the Merton Street house is *c* 5.9m, only slightly more than Building 1 which is estimated to be 5.3m wide. The house on Merton Street was adorned with late Norman or early Gothic-style decorative windows on its upper chamber or solar and had an entrance on its frontage (ibid., 224). Unlike the Merton Street house, Building 1 had a range of at least two rooms attached to its north side from the outset, the eastern of which (Room 2) could conform with the hall-like structures that are commonly referred to in 13th-century deeds. Too little of the internal deposits survived to suggest the function of these rooms but they were presumably set aside for domestic living quarters.

It is possible that the foundations revealed along the Longwall Street frontage (Building 5) represent the four selds mentioned in the inquisition order of 1300. Though too little remained to establish its function, the building appears have been subdivided into up to four parts, with a possible pentice or covered walkway along its western side. A well-known example of such a covered walkway, albeit on a larger scale, still exists in Winchester (the Pentice, High Street) and dates from at least 1417 (Ottaway 2017, 3623 and fig. 7.5).

Roger Exemplarius' and Thomas Marescallus' former tenements (Tenement B)

The earliest reference we have to Tenement B is in deeds of 1246–7 when the Hospital of St John granted it to Roger Exemplarius, who held it until 1285 when he quitclaimed it back to the hospital (Salter 1914, 132). He may have therefore been responsible for the construction of Building 2, which replaced a timber predecessor during the first part of the 13th century. Unlike Adam Faber's house, this building occupied only about half the width of the tenement and had less substantial foundations, so it was perhaps partly timber-built and/or of one storey. It appears in its earliest phase to have been domestic in nature, with two rooms on the frontage, one of which served as a kitchen, though it is possible that the second room may have been a seld (shop), so possibly there was an upper storey or solar above both rooms. There were hints of a third room to the rear that may have served as living quarters. The surname 'Exemplarius' (or 'Saumpler') indicates an occupation as a scribe or copier of books or legal documents.

As with the previous phase, it is unclear whether Tenement B comprised two dwellings, given the layout of Building 2 and possible separate timber-built outbuildings to its rear (Structures 8 and 9) that may have served as halls or stables. Building 6, which occupied the eastern part of the frontage, if it was indeed a separate residence, was seemingly added during the 14th century in place of the earlier timber-built Structure 3. The existence of two houses on the tenement was the case prior to 1554 when it contained two houses on a single lease rented at 18s and 20s each, after which it was united before once again becoming two separate houses by 1772 (Salter 1914, 152). Salter's interpretation of the earlier deeds (ibid., 132) suggests there were two selds (or shops) that were shared by a common solar, presumably above, the eastern seld (Building 6) being held in 1300 by Thomas Marescallus when a rent of 12d was due to the hospital. Though it is possible that the rear of the tenement was shared between the two suggested tenancies, a scatter of postholes projecting southwards of the south-west corner of Structure 9 may have been part of a fence that separated the two.

During the 14th century (Phase 5) the distinction becomes less clear, as the substantial hall-like stone-built Building 7 was added to the rear of the tenement that straddled the postulated boundary between the two buildings on the frontage. It was at least of equal size to Buildings 2 and 6 combined and could have represented a house by itself, particularly given the presence of a domestic hearth in its north room. Its construction formed part of a major reorganisation of the rear of the tenement, along with the addition of frontage Building 6. If the identification of Tenement B as containing two houses is correct, by 1321–2 they appear to have been combined as one holding, since John le Mareschal (son of Thomas) quitclaimed to the hospital the western tenement (Salter 1914, 132). He may be related to John Marescallus, who granted a seld in the eastern part by 'Richard de Oxonia, marescallus' in 1276–7 (Salter 1914, 128). Separate deeds of 1284–5 state that Lucia (widow of Philip le Notur, ie notary) granted a building known as 'The Hall' to John Marescallus and Matilda his wife, together with a solar, an 'osthous', a 'garderobe' and a 'wall', each of which was contained in a separate deed (Salter 1914, 129–32). There is no mention of the seld in the 1284–5 deeds, so perhaps it was rented out separately from the rest of the tenement. If the identification of Lucia's tenement as the eastern part of Tenement B is correct, then some of the excavated structures could be equated with those in the deeds. The solar, which seems to be a separate building from The Hall, is likely to have existed above the seld, probably Building 6. The hall would fit with Building 7, or at least part of it. The 'osthous' at this date would simply mean a kiln; it occurs too early to refer to an oast-house for the drying of hops, which were not introduced until the later 15th century for the brewing of beer, but was perhaps used for drying of other crops used for brewing such as oats, rye and wheat. The large northern room of Building 7 (Room 2) contained the robbed remains of a stone hearth (4781) that may have replaced an earlier installation surviving as a pair of fire pits (Fig. 2.44).

As stated above, the Mareschal family had by 1302 also acquired the former tenement of Adam Faber (Tenement A) and the layout of the buildings to the rear of both tenements seems to suggest a single complex surrounding an inner courtyard, built

around the same time. Whether the family actually resided in these buildings or let parts of it is not known given that the Marescallus family also held Tenement C and a further three tenements to the east (Salter 1914, 112–24). There are no further deeds until the early 16th century, by which time Tenements A and B were subject to separate leases (see below).

The house of Philip the Notary (Tenement C)

The cartulary states that the next tenement to the east was the house of Philip the Notary in 1275–6, at which time Richard Marescallus remitted and quitclaimed to John Marescallus a rent due from his house. His widow, Lucia, then quitclaimed her house to the hospital in 1285–6. Their son, also called Philip, continued to live in the house until 1288, after which Thomas, son of John Marescallus, released and quitclaimed it in 1293–4 to the hospital (Salter 1914, 125–8). Though only the western end of frontage Building 3 lay within the excavation area, the building was clearly substantial, probably of two storeys, and perhaps of similar size to Building 1 in Tenement A. This evidence, together with the presence of hearths in one room, would support the view that this was a domestic house. Unlike the deeds for the element to the west, the documents here refer specifically to a house, suggesting that there were no other structures such as selds within the tenement. This agrees with the archaeological evidence, notwithstanding the small area investigated.

Smithies

The reconstruction of the tenement buildings in stone during the early part of the 13th century saw a considerable increase in the intensity of smithing in both Tenements A and B. The stone walls would have reduced the fire risk and, unlike the earlier timber structures, were built contiguously along the High Street frontage. The good survival of floor deposits and associated hearths within both the main frontage buildings (Buildings 1 and 2) contributed to the *in situ* evidence for smithing from the early 13th to mid-15th centuries. Compared to the earlier smithies, bulk slag, particularly smithing hearth bottoms, was found in appreciably larger quantities both within the buildings themselves and in pits to their rear. The overwhelming majority of the bulk smithing slag was retrieved from Tenement A, which would support the view that primary smithing (the production of iron objects) was largely undertaken here. Such slag is produced from the hammering of wrought iron (obtained from the smelters) to remove as much slag as possible in order to make the iron less brittle and easier to forge into thin sections before forging into metal objects. Micro-slags, namely flake and spherical hammerscale, were present in dense quantities within the floor deposits associated with several hearths within each building, providing firm evidence that both properties were



Fig. 6.2 Blacksmith depicted in the Gorleston Psalter manuscript, early 14th century (British Library, MS 49622.154v)

the site of smithies. Furthermore, and perhaps uniquely for a medieval tenement, we can equate the use of a smithy with the residence of a known smith, Adam Faber, who is known to have owned Tenement A in 1246–7 when it was described as having a forge (see above). Building 2 seems to have continued to operate separately from Building 1 after both tenements were under the same ownership by the Mareschal family later in 13th and into the early 14th century at least. The name Mareschal, or Marshall, from Anglo-Norman and Old French *marescal*, was an occupation name for a person who tends horses, and as this occupation is closely associated with blacksmiths, it may be that the Mareschal family were blacksmiths associated with the shoeing and caring (and perhaps hiring) of horses, or at least let out their tenements to such smiths.

Other than slag, there was scant evidence regarding the iron objects that the smiths were producing or repairing. Notably, there is a lack of the wrought iron bars and strips which the blacksmiths would have sourced from smelters to shape into tools and other objects. In contrast, excavation of a medieval monastic forge at Waltham Abbey, Essex found bar iron, blanks and semi-finished products (Huggins and Huggins 1973, 142 and fig. 11). Apart from a handful of nails, only nine iron objects were recovered from Buildings 1 and 2 during Phases 4 and 5, when smithing was most prevalent. These include a whittle-tang knife, a pair of shears and two horseshoes, none of which were necessarily made on the premises. Such evidence could therefore imply that the smiths were largely concerned with the repairing of iron objects or that waste from their manufacture or repair was thoroughly recycled. Scrap iron can be recycled by forge-welding pieces together to form billets and drawn down into bars and re-forged into new artefacts (Sim 1993, 288–9). A total of six horseshoes were recovered from the two tenements, two of which were found in Phase 4 deposits associated with Room 1 of Building 2, though only one horse-

shoe nail was recovered from the building. Although this does not offer convincing evidence for shoeing, horses seem to have been kept within the property during Phase 3 (see above). Furthermore, horse remains were also found in deposits associated with Building 4 (Tenement A) during Phase 5, which may have been under the ownership of the Mareschal family during that time.

The workings of a medieval blacksmith workshop are ornately illustrated in the early 14th-century Gorleston Psalter (British Library Add MS 49622). Here, the smith is shown hammering into shape a heated horseshoe (held by pliers) on a raised platform that presumably supported the anvil (Fig. 6.2). His servant is showing holding bellows with which he is blowing air into a raised hearth or furnace constructed in stone, with a chimney or louver pot on top. Where not completely robbed, only the base of the hearths at Magdalen College survived and would have held the charcoal that fuelled them. As depicted in the manuscript, the opening into the hearth was located at waist height to allow for the most efficient operation. There is some evidence from the earliest phase of Building 1 for a more sophisticated hearth arrangement where a possible flue (7254) connected the robbed remains of two large and robbed hearths (7252 and 7261; Fig. 2.15). Similarly, a later hearth (7832/7833; Fig. 2.26) seems also to have had a flue (tuyère hole) at ground level on its east side. Located immediately adjacent to the flue were two sets of stakeholes that could have formed part of a timber structure that held posts that supported the bellows that pumped air into the opening. Such an arrangement is shown on an early 15th-century illustration from *The House Books of the Nuremberg Twelve Brothers Foundation* (Fig. 6.3). Here the named blacksmith, Hans Smid ('Blacksmith'), is shown working in a similar manner to the smith in the Gorleston Psalter manuscript, next to a square hearth of comparable size to hearth 7832/7833. The illustration also shows the height of the hearth structure as exceeding that of the blacksmith, perhaps reaching *c* 3m tall. A small hole is shown near the top of the structure letting out smoke. The bellows appear to be blowing air from the rear side and there is an opening on the front for the fire-bed, on which there is a grate holding hot embers. The anvil is shown in front of the hearth, supported on a raised cylindrical structure, probably a heavy tree trunk. The trunk would have been placed directly on the floor and would therefore leave little trace within the building, unless shallow circular 'hearth base' 7673 in Building 1 marked the position of the trunk and simply represents an area of flooring protected from wear (Fig. 2.25). Alternatively, the anvil could have been placed on a built platform, and this may have been the purpose of rectangular stone structure 8735, which was placed in the corner of Room 2 of Building 2 (Fig. 2.35). Similarly, water for quenching is likely to have been held in a barrel placed on the floor and must have been required in copious quantities. This may have necessitated the need for a drain (8077) to supply water from well 4073, located in the yard to the north of Building 1.



Fig. 6.3 Blacksmith depicted in The House Books of the Nuremberg Twelve Brothers Foundation, *1426 (Stadtbibliothek im Bildungscampus Nürnberg, Amb. 317.2°. Folio 47 recto. 98)*

The size and nature of the hearths in Building 1 suggest the requirement for high-temperature working for the forging of the iron into tools and objects, despite the lack of such objects in the artefactual assemblage. For example, the forging of nails would have required a high temperature and considerable amount of hammering, and experimental archaeology has estimated it would have taken about two minutes to produce a small nail (Sim 1993, 290). In contrast, some of the hearths in Building 2 within Tenement B were smaller, particularly during Phase 5, and were probably open at ground level, perhaps with a raised grate above. This implies less heat was required and therefore these hearths must have been used for secondary smithing such as the finishing or repairing of objects. This implies, especially if both tenements were under the same ownerships at this time, a degree of organisation of the smithies into areas for object production (Tenement A) and finishing/repair (Tenement B). It seems that the scale of the production of iron objects increased during the 14th century within Tenement A, as large amounts of bulk slag, mainly smithing hearth bottoms, were

found in deposits associated with hearths in Building 4 and within Pit Group 14, located immediately to its west. Clearly the smithies remained successful and presumably with an increased workforce that may have resided in Buildings 4 and 5. However, by the time of the reconstruction of the houses in the late 15th century, the smithies had closed, though much of the debris was recycled for use as makeup and foundation material (see below). Perhaps a contributing factor to their closure was the introduction of waterpower to drive the bellows and hammers, which required larger premises and access to flowing water (Historic England 2018, 4).

Diet and status

Tenements A and B, which produced the overwhelming majority of the animal bones and therefore where useful comparison can be made, demonstrate a considerable increase in the consumption of fowl, mainly chicken with lesser quantities of geese and duck together with smaller quantities of wild birds such as passerines and waders, including snipe. The greatest increase occurred within Tenement A, at least during the 13th century (Phase 4), which, unlike Tenement B, also saw significant increases in the consumption of cattle and pig. Such marked increase in consumption of fowl and wild birds, together with pig, can be an indicator of higher status occupation and perhaps reflects the growing fortunes of the occupants in Tenement A in comparison to Tenement B. There appears to be a drop-off in the proportions of these higher status markers during the 14th century (Phase 5), perhaps reflecting the changing fortunes of Oxford more broadly, particularly following the Black Death. Nonetheless, rabbit bones, usually associated with higher status sites, were recovered from Building 1 during the 14th century. Exceptionally, a swan femur was recovered from a pit (3901) in Tenement B associated with a fallow deer bone, a good deal of 14th-century pottery and a bone tuning peg from a musical instrument. The consumption of swan is particularly associated with high-status and ecclesiastical sites. The food and finds from this pit would suggest the occupants of the tenement were able to afford expensive meat, at least for special occasions, and enjoyed music, which would be a cut above the average inhabitant of the town. Although there is a marked increase in the consumption in fish across the tenements from the 13th century, the range of species is not particularly diverse and conforms to other typical lower-status sites within Oxford and, like the earlier phases of this site, is dominated by herring and eel (Nicholson, Chapter 4). Much of the fish could have been purchased from local markets, and there is little evidence for access to more expensive freshwater fish that would been available to the more wealthy and ecclesiastical sites, which were able to source from fishponds on their estates. Similarly, there are no discernible differences between the three tenements in the foodstuffs (cereals and legumes such as vetches, peas and beans) that were identified from the plant remains, all of which were probably brought into the site fully processed. However, much of this may have been used for animal fodder, particularly as there is evidence for the keeping of horses within the tenements. Wild fruits and nuts such as raspberry, blackberry, elderberry and hazelnuts would have been available to gather in hedgerows and fields locally, whereas the few fig seeds present, particularly in Tenement B, suggest the purchase of more expensive dried fruit. Taken together, the range of food remains is unremarkable and is similar to contemporary assemblages from within the walled city at Lincoln College and in the extramural suburbs at the Ashmolean Museum Extension and Brewer Street (Teague and Ford 2020a; 2020b; Teague *et al*. forthcoming a).

The occupants of Tenement A are likely to have kept horses, given the carcass that that had been dumped in a midden below Building 4. There was no evidence that the horse had been butchered, but the recovery of a mount/bridle boss and a possible mount, together with horseshoes, offers convincing evidence that horses were kept within this tenement during the 13th and 14th centuries. The horses may have been working animals, perhaps used to transport raw materials (such as iron stock and fuel) for use in the smithy. They were presumably stabled within one of the ancillary buildings to the rear of the tenement, perhaps Structure 7, which would have offered convenient access to the side street.

Most of the dress items were obtained from Tenement B, with a notable assemblage of four buckles and a copper alloy mount together with two buttons obtained from largely 14th-century deposits within Building 2. These items suggest a degree of good dress attire of the inhabitants and therefore some wealth. The evidence for literacy provided by the three writing leads found in Buildings 2 and 6 is appropriate for a property whose occupants included an exemplar and a notary. Fewer such items were obtained from Tenement A and none within Building 1, the only notable item being a decorated bone gaming counter (Fig. 3.29, no. 9) which suggests time was set aside for leisure activities. The assemblage of amber and jet beads from Building 1 probably represents a paternoster prayer bead string and would have been loosely strung on a woollen cord or silk thread and worn like a necklace. They were used as a form of prayer and it is thought that the exact number of beads used reflects the type of devotion. The findspot within a drain suggests an accidental loss, although recent studies have highlighted the practice of deliberate deposition of significant or unusual objects within medieval households for reasons related to belief, magic and health (Dempsey 2023; Gilchrist 2020, 9–11). Whatever the circumstances of its deposition, the

use of semi-precious amber and jet for the beads rather than the less expensive wood and bone would imply that it belonged to an individual of higher rank or wealth (Elgawly 2017).

THE REBUILDING OF THE TENEMENTS (1478–87) AND LATER DEVELOPMENTS

All the hospital property passed to Magdalen College on its foundation, and changes took place under new ownership. The rentals between 1478 and 1487 assert that all the houses within the 14 tenements between Magdalen College and Longwall Street were demolished and rebuilt. By 1487 the four tenements closest to the college were converted into Magdalen Hall (grammar school). The remaining ten were then reduced to seven and these were known in 1519 as the 'Newe Rewe' (Salter 1914, 146–7, and see Chapter 1). While the rentals continue, there are no leases for these properties until the beginning of 16th century, after which they survive in detail up to their demolition by the mid-19th century (Salter 1914, 151–6). What is clear is the predominantly domestic nature of the site compared to the earlier medieval period, the frontage buildings at least comprising houses and, in the case of Tenement A, the site of an inn, with the same mix of tenants (including horse trades and smithing) of earlier years. It is possible that some of the material used to rebuild the tenements was sourced from the demolished remains of the second hospital. Hayward (Chapter 3) identifies two pieces of decorative moulded stonework – one from a mid-15th to mid-16th century pit and another from a modern context – as potentially deriving from the hospital, though overall there is very little building stone of interest in these later phases of the site. The small assemblage of decorated floor tile includes an example with a design previously recorded at the hospital (Smith, Chapter 3). It is also possible that some of the stone mortars were acquired from the hospital site (Shaffrey, Chapter 3).

Diet and status in the late 15th and mid-16th centuries

The food remains highlight differences in the consumption of meat and fowl, particularly between Tenements A and B during Phase 6. In contrast to Tenement B, within Tenement A mutton/lamb formed a significantly lower proportion of the meat that was consumed which overall were largely from aged animals likely to have been reared for wool production. Conversely, cattle were slaughtered at a much younger age than during the previous phases, and this reflects trends seen at other urban centres and appears to relate to an increasing availability of veal, and the rise of dairying (Smith, Chapter 4). The abundance of bird bones from the floors of Building 2 (Tenement B), particularly geese, ducks, passerines and waders, suggest a degree of wealth. In contrast to the other bird bones, the chickens were predominantly immature, suggesting that they may have been reared on the site. The rabbits that appear to have been butchered and consumed in Building 7 represent a meat that was once the preserve of wealthier or high-status sites but which became more widely available during the late medieval period (Bailey 1988, 1–2).

Although abundant during Phase 6, particularly from the floors of Building 1 (Tenement A), Buildings 2 and 7 (Tenement B) and Building 3 (Tenement C), the fish remains do not stand out and are akin to typical lower-status non-college sites of this period. They lack the larger and mature fresh-water fish which would have been more expensive. The sea fish, as in the earlier phases, is likely to have been largely purchased from local markets as preserved salted fish and lacks the more expensive species such as sea bream and sturgeon, although conger eel and a large pike were found in Tenement B. The great majority of the shellfish from the site was recovered from the upper fill of latrine Structure 11 in Tenement B and probably represented a rapidly dumped deposit, perhaps from a single banquet. The shells, largely comprising oyster with some cockles and mussels, the former with opening notches on their valves, indicating that they were alive when opened with a knife and were therefore purchased fresh from the local market.

The plant remains, largely recovered from the floors of the frontage buildings, particularly Building 2, confirm the domestic nature of rhe rebuilt frontage buildings where the food preparation and consumption was occurring. During Phase 6, the food remains mainly comprise charred broad beans and peas, together with hazelnuts and mineralised hedgerow fruits such as blackberry and sloe. Fig seeds found in latrine Structure 11 in Tenement B suggest the occasional consumption of more exotic fruit likely to have been purchased from local markets.

The Greyhound (Tenement A)

By 1526, Tenement A was known as the Cardinal's Hat and was under the tenancy of Thomas Hewest, baker, and in 1556 it was leased to Christian Hewster (sic), widow. It is first referred to as the Greyhound in 1565, when it was leased to Guy Pennington, innholder, and it was later leased during the 1580s to Adrian Pennington, presumably his son. In 1591 it was leased to three individuals, namely Thomas G Drope, Bachelor of Divinity, Robert Parratt of Northleighe, gentleman, and Richard Smoote, vintner. The tenement had a frontage width of 11 yards (10.1m), which corresponds with that of Tenement A, though it extended for 64 yards (58.5m) along Longwall Street, a length just exceeding the northern extent of the excavated area and into the site of the former cemetery. By the time of Agas's map (1578), the tenement extended further north up to The Grove, and this remained unchanged on the later maps of Loggan (1675) and Taylor (1750).

Building 1 appears to have been rebuilt sometime in the later 15th century, reusing the exterior foundations. The walls of the new building were about half the width of those of its predecessor, suggesting that they represented sleeper walls supporting a timber superstructure, particularly if the new building was more than one storey in height. Modern truncation had removed much of the internal layout, though it appears to have been divided into several rooms with a hearth placed close to its south-east corner, perhaps the site of the chimney for a domestic fireplace. The new building is likely have been a domestic residence and was served by a stone-built latrine attached to the rear wall. No evidence for smithing was found apart from in the westernmost room, a small area of which was exposed separated by a substantial wall foundation (7207; Figs 2.50 and 2.51). This wall was a later addition that was apparently abutted by a slag-rich deposit on its west side, though it is alternatively possible that the deposit was associated with the earlier building or was filling an otherwise undefined foundation trench. Roofing tile from the foundation trench on the east side of the wall suggests that it was not constructed prior to the 16th or 17th centuries.

The evidence of the 1682 inventory of the Greyhound suggests that it was rebuilt by the Bobart lessees before 1682 (Chapter 1). Some information can be gleaned concerning the appearance of the new building from notes written by John Chessell Buckler in 1823 regarding the architectural history of the Magdalen College. A transcript that is held in the college archives (ref. MC:P371/MS1/1, fols 111–12), states that:

> *…at least two houses only a very few years less ancient than the College itself, namely the one at the very angle* [the Greyhound Inn?], *the other just beyond. The first was constructed of timber; but sometime in the 17th century it was cut down to the ground floor and re-erected in two stories over the basement and was no doubt at that period considered to be a comfortable and even a handsome dwelling. The rooms were lofty and light, the windows most regular and distinctly defined and the timber beams and uprights were less cumbrous than those before employed*.

The slender foundations of the rebuilt Building 1 do not conform to the building depicted on Buckler's drawings as a tall, three-storey house with further rooms in the loft space above (Fig. 6.4). Loggan's map of 1675 and Agas' earlier map of 1578 both depict a more modest building, so perhaps the supposed reconstruction occurred after the late 17th century. Wall 7207 may have therefore formed part of the purported 17th-century rebuild, or levels and features dated to the 17th century and later did not survive.

Buckler's drawings and Loggan's map depict the area behind the inn as a courtyard flanked by buildings on the east and west sides, which was entered via an archway leading from Gravel Walk. It is possible that the 14th-century Building 5 may have been retained during the rebuilding of the tenement during 1478–87, though this could not be confirmed due to lack of survival of post-medieval levels. Indeed, the buildings depicted by Buckler do not look Tudor in style, so perhaps they were rebuilt during the purported late 17th-century rebuilding. Building 12, constructed sometime between the mid-17th and early 18th century, corresponds with a structure shown on Taylor's map of 1750 that occupied the east side of the courtyard. It is also likely to have been the same building depicted on Buckler's drawing of 1827, which shows a two-storey house with skylights in the loft space (Fig. 6.4a). The building was cellared and appears to have been adorned with pale green window glass with lead came. A cellar/basement window or light well on the north side of the building is depicted on Buckler's drawing adjacent to what appears to be a pump, presumably used to draw water from adjacent well 6135/3313. Both Buckler and William Turner drew the interior of the inn courtyard from different directions, giving an overall view of the buildings at the rear.

There is artefactual evidence for the inn from the tankards and wine bottles found within the demolition deposits of Building 12, potentially used as a wine/beer cellar, and the infill of adjacent well 3313, which seems to have been shared with Tenement B. The earliest drinking vessels, German stoneware mugs dating from the mid- to late 16th century (Fig. 3.8, nos 57 and 58), would have been contemporary with the earliest known use of the inn. However, most of the vessels date from its final decades and include inscribed English stoneware tankards (Fig. 3.12, nos 75 and 77) recovered from the well, including a vessel with a two-line inscription of 'F…e' and 'G…nd'. A further mid-18th-century English stoneware tankard with the inn's name and keeper, '…White at…' '…y-hound' (Fig. 3.11, no. 70), was found in a modern topsoil towards the rear of the tenement. This is likely to have been the Mr White listed in the survey of 1772 as occupying the property on the corner with Longwall Street and adjacent to the college Grove (Salter 1923, 65). A wine bottle seal (Fig. 3.24, no. 11) from the Three Tuns tavern, located further west along the High Street, could suggest that the Greyhound sourced wine from this tavern during the early to mid-18th century. The demolition deposits of Building 12 also contained a metal tap and handle from a barrel or other vessel (Fig. 3.36, nos 49–50).

The tenements of William Bryce and Nicholas Kyrke (Tenement B)

The earliest lease for this tenement, after it was supposedly rebuilt in the late 15th century, is dated to 1526 and refers to two houses which Salter places between the later Magdalen College stables to the

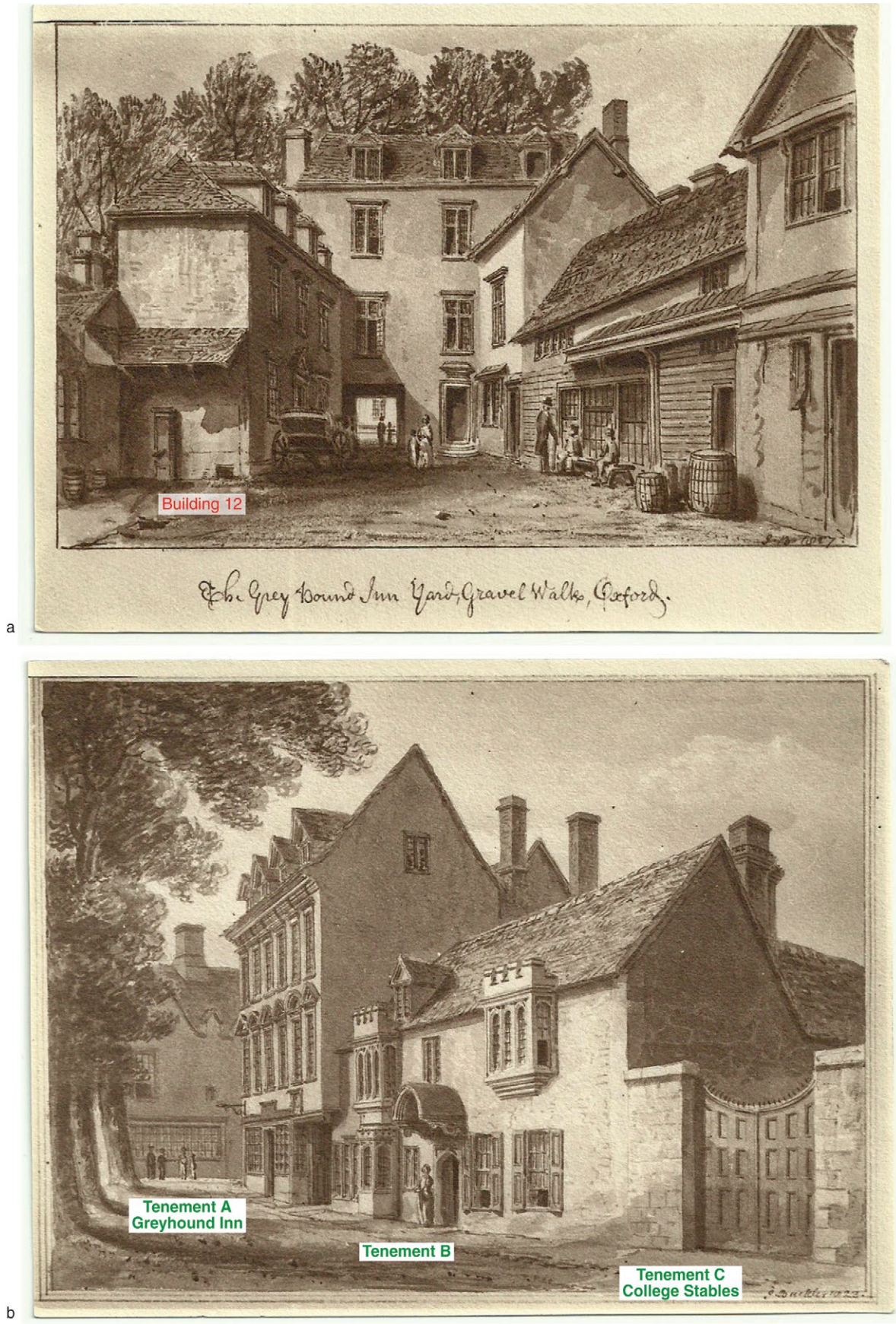


Fig. 6.4 John Buckler, views of Greyhound Inn yard looking south, 1827 (a) and Gravel Walk looking west, 1822 (b) (Bodleian Library, Buckler: MS.Don.a.2, 55 and 56)

east (Tenement C) and the Greyhound (Tenement A) to the west (Salter 1914, 152–4). The lease states:

> *...a lease to Mag. William Bryce, bachelor of dyvynytie, of a tenement with stable and garden in the parish of St. Peter in the East, on the west part of the Cardinall's Hat* [later known as the Greyhound] *in the tenure of Thomas Hewest, baker, and on the east part of the tenement in the tenure of Nicholas Kyrke ; for 20 years ; rent 20s* [each].

It seems to have reverted to a single residence in 1554 when it was leased for 20 years from the college:

> *William Gilman, gent., 'bedell of art', of two tenements with gardens, late in the tenure of Henry Milwarde and Nicholas Gilney…, rent 38s.*

The survey of 1772 suggests that at this time it was once again under two separate tenancies, the western part (Mr Broughton, see below) of which measured 19ft 4in and the eastern (Mr Musgrave) 26ft 6ins (Salter 1923, 67). The combined width of 45ft 10in (14.0m) closely matches that of the estimated frontage width of Tenement B during the late 15th century (14.4m), which seemingly contained two separate buildings at this time (Buildings 2 and 6).

As with Tenement A, the two frontage buildings within Tenement B were also rebuilt sometime in the 15th century and therefore also concord with evidence obtained from the cartulary (Salter 1914, 146–7). The western building (Building 2) is known to have been occupied by William Bryce in 1526 (ibid., 147, fn 1). In plan the building closely resembles that of the rebuilt frontage Building 1 in Tenement A, which also had narrow and shallow foundations, suggesting a relatively slender structure with a timber superstructure. The width of this building was 8.1m (26ft 7ins), somewhat larger than the adjacent Building 6 which was 5.8m (19ft), both of which correspond almost exactly with widths of the two houses given in in the 1772 survey (26ft 6ins and 19.3ft; Salter 1912, 67). However, the survey lists the larger house on the east side of the tenement so this may have been a mistake on the part of the surveyor. Both buildings would appear to have been domestic in nature and probably represented the houses that the tenants resided in. A stable was mentioned in the lease of 1526 within the

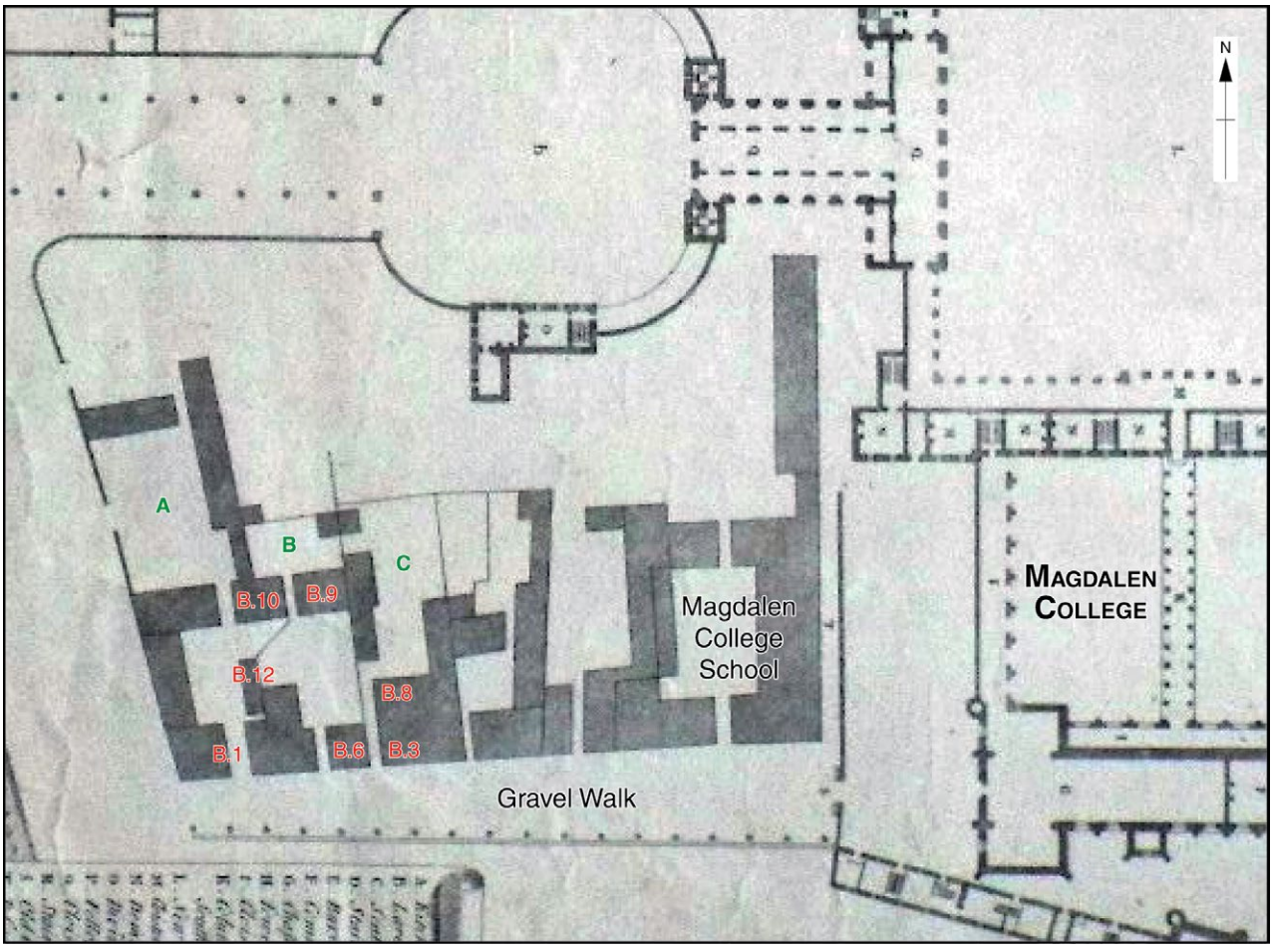


Fig. 6.5 Extract of Edward Holdsworth's c *1728 plan for the proposed rebuilding of Magdalen College, showing detail of the existing tenements on Gravel Walk (Magdalen College Archive, MC: FA14/2AD/1)*

western part of William Bryce's tenement, perhaps referring to the 14th-century Building 7, which may have been still standing, at least in part.

The tenement of Edward Combes and William Shaw (Tenement B)

Much of the post-medieval evidence survives towards the rear of the tenement and dates from the mid- to late 17th century, when a series of new buildings (Buildings 9 and 10) were constructed together with a cellar (Building 11) that was attached to the rear of Building 2 or its successor. Perhaps these new buildings formed part of Buckler's supposition concerning the rebuilding of the houses on the site sometime during the 17th century (see also Chapter 1). If frontage Buildings 2 and 6 were rebuilt at this time, then no evidence for this survived. Edward Holdsworth's plan of *c* 1728 (Fig. 6.5) clearly shows two separate structures that correspond to the two earlier buildings, though by this time Building 7 had gone. In contrast to the Greyhound Inn, the presumed 17th-century building depicted on Buckler's drawing (Fig. 6.4b) shows a single and rather less ostentatious two-storey building occupying the full width of Tenement B. It appears at this time to have been a single residence, given the presence of a single, centrally placed and quite elaborate front door with a side door towards the west side as depicted on William Turner's watercolour of 1844, shortly before its demolition (Fig. 6.6). This would agree with the leases after 1720, when it was under a single tenancy which included Digby Cote (clerk, Principal of St Mary Magdalen Hall), John Broughton (barber) in 1748 and 1762, and Elizabeth Broughton (spinster, probably his daughter) in 1776. Before this, in 1685, there was a joint lease acquired by Edward Combes, mercer, and William Shaw, innkeeper, suggesting that two residences existed at this time (Salter 1914, 153–4). It is possible that cellared Building 11 was constructed around this time and would have provided a useful and safe storage for the goods of both tenants. William Shaw presumably resided in his inn, though earlier or subsequent deeds do not suggest that a second inn ever existed on the site. Nonetheless, it is possible that cellared Building 11, which may have been constructed around this time, provided both accommodation and storage for produce such as wine and beer. Alternatively, if the inn existed, then the range of buildings to the rear (Buildings 9 and 10) could have also provided for the needs of the inn. These buildings may have been partially shared with the



Fig. 6.6 William Turner of Oxford, Perspective view of the Greyhound Inn, after 1844 (Magdalen College Archive, MC: FA1/9/4P/1 fol.29 No. 1)

Greyhound Inn, which seems to have acquired at least cellared Building 10 given the presence of boundary wall 3312, which joined its south-east corner to the north-east corner of Building 12. The boundary wall is clearly shown on both Edward Holdsworth's plan (Fig. 6.5) and Taylor's map of 1750. Edward Combes, mercer, who also occupied the tenement at this time, presumably plied his trade from a shop on the frontage, possibly Building 6. This is shown on Holdsworth's plan as a small, square structure separated from Building 2 by an alley that accessed Buildings 9 and 10 (part of Shaw's inn?).

The tenement of John Broughton (Tenement B)

The excavations have revealed a direct correlation with later occupant John Broughton, an eminent barber and peruke (wig) maker, who acquired the whole of the tenement in 1748 and held it until 1776 when Elizabeth Broughton, spinster (probably his widow) acquired the lease (Salter 1914, 154; Chapter 1). The unique discovery of over 3600 wig curlers within a demolition deposit of Building 9 in association with a Magdalen College wine bottle seal bearing the date 1769 (Fig. 3.23, no. 9) and clay tobacco pipe fragments dating from *c* 1750–90 offer a direct link to the occupancy of John Broughton. Wig curlers remained in common use until hair powder (used to revitalise the wigs) was taxed in 1795, after which their use rapidly declined (Museum of Cambridge 2021). The method of use of the curlers is described in Chapter 3, and involved boiling the hair and curlers in water and then baking them in a protective pastry layer. Room 2 of Building 9, given the thick deposit of charcoal present on its floor, may have once contained the hearth and oven used to heat the water and bake the pastry, with water conveniently supplied by wells located close to the north of the structure.

As wigs are normally associated with the wealthier or more important members of the population it seems likely that John Boughton's clients included members of Magdalen College, particularly given the presence of the wine bottle fragment bearing the stamp of college's Senior Common Room. It is possible that Dr Martin Routh, who was elected to a demyship at Magdalen College in 1771 and in 1791 went on to become president of the college, was a customer. Dr Routh is said to have been the last man in England to wear a wig (other than judges and the clergy), and his petrified wig is preserved by the college. Whether Broughton's widow, Elizabeth, who acquired the lease in 1776, continued the business is unknown though she is recorded as obtaining a lease two years later at Tanner's Yard (19 and 20 Kings Street) with her ?mother Elizabeth Broughton, widow (presumably of John). This lease had formerly been held by her late husband from 1764 (Salter 1914, 241).

The tenement of Thomas Cooper (Tenement C)

The earliest surviving deed after the rebuilding of the tenements in the late 15th century dates to 1562 when Thomas Cooper MA acquired the whole lease, which he had formerly held jointly (ie two tenements) with the late Henry Yemansson, porter of Magdalen College (Salter 1914, 151–2). Cooper was Dean of Christ Church when he renewed his lease in 1568 and went on to become Chancellor of Oxford University in 1571. The terms of the earlier lease state:

…reserving to the college the little chamber over the study of Simon Parret, and a parcel of the backside extending from the kitchen of the said Simon to the garden of the said Thomas, measuring 17 ½ yards x 5 ½ yards.

In 1577 the lease passed to Thomas Frier, secretary to Thomas, Bishop of Winchester, after which between 1608 and 1626 it was held by Christopher Anderton, yeoman, when the property was described as 'a tenement and garden wherein he dwells'. It appears to have reverted back to two tenants according to the lease of 1683, when it was held jointly with William Taylor, apothecary, and John Hooper, yeoman. The tenement was finally leased in 1724 to Robert Woods, gentlemen, after which by *c* 1764 it was occupied by the newly built stables of Magdalen College (Salter 1914, 151, fn 1). The excavations lay within the courtyard of the stables entered through a large, gated entrance which is depicted on Buckler's 1827 engraving (Fig. 6.4b).

In contrast to the structures in Tenements A and B, Building 3 within Tenement C was reconstructed on substantial foundations and was seemingly extended northwards as Building 8 or was possibly a separate structure altogether. On Edward Holdsworth's plan (Fig. 6.5), both buildings correspond with a large structure that is shown with a frontage width of *c* 12.0m, with a narrow alley on its west side, together occupying the full width of the tenement. By Buckler's time the building would have been long demolished to make way for the college stables, so it may have not been rebuilt in the 17th century as he suggested for the houses in Tenements A and B. Certainly, the substantial nature of the foundations of the rebuilt Building 3 suggest a house of some pretention that would have been a suitable residence for a person of the standing of Thomas Cooper. It is possible that the latest surviving levels of Building 3 date from his tenure around the middle of the 16th century. Sherds of imported Andalusian lustreware (Fig. 3.7, no. 52) dumped on the street immediately outside the building offer tantalising evidence of the affluence of the inhabitants around this time.

CONCLUSIONS

The excavation demonstrated that substantial archaeological remains had survived the truncation

caused by the construction of Magdalen College School Hall in the 19th century and the development of Longwall Quad during the 1930s, and was able to contribute significantly to our understanding of the development of the town's eastern suburb.

Integration of documentary evidence for the occupants of the tenements from the late medieval period onward has proved particularly valuable, and the possibility of a link between the excavated smithy and the setting for Chaucer's *Miller's Tale* is intriguing.

Very little evidence was found that related to the inherited prehistoric and Roman landscape in which the burh was established, which Radford (2020, 6–8) has advanced as an important research theme for the city's archaeology. It thus remains moot whether the east–west route to the crossing point of the River Cherwell has an earlier, perhaps even prehistoric origin as has been proposed for the north–south route that crosses the Thames at Folly Bridge (Dodd 2003, 12–13). The earliest features uncovered do, however, contribute significantly to research on the layout of the immediate hinterland of the burh, confirming the existence of a trackway contemporary with that at Queen's College and indicating that it was associated with contemporary boundaries that divided the landscape between the burh and the Cherwell. Excavations by OA that are currently ongoing at Oriel College appear to corroborate the two-stage model for the evolution of the burh, in which case this trackway would have been entirely external to the primary defended area, extending from the vicinity of the north-eastern corner towards the crossing of the Cherwell on an alignment that was completely unrelated to the internal street grid. Within studies of the early development and topography of the city, one of the significant questions pertains to whether the burh was constructed *de novo* on virgin ground or whether there was a pre-existing settlement here of some proto-urban form before the defences were built; the dating evidence for the landscape investigated at the New Library and at Queen's College is broad enough that it does not preclude either model.

The recently published volume *The Archaeology of Oxford in the 21st Century* (Dodd *et al.* 2020) included few sites located within the city's medieval suburbs, but there are a number of excavations in these areas awaiting publication, which represent a rapid increase in our knowledge of these extramural areas. These include excavations at the former Cooper Callas Building on Paradise Street in the western suburb (OA 2021a), the Westgate Centre and Brewer Street in the southern suburb (Teague *et al.* forthcoming a), Balliol College to the north (Teague *et al.* forthcoming b) and Greyfriars and Blackfriars to the south of the walled town (Teague *et al.* forthcoming a). In the case of the eastern suburb, the excavation at the New Library is by far the most substantial excavation that has taken place, the only previous intervention of any size between the east gate and the Cherwell being Durham's 1987 excavation at the college kitchen (Durham 1991). In addition to its relevance to the history of the eastern suburb, the uncovering of part of the cemetery of the first Hospital of St John is significant to the wider context of the influence of religious houses on the development of the medieval town, along with recent excavations of the priories of the Greyfriars and Blackfriars to the south of the walled town.

Bibliography

PRIMARY SOURCES

Magdalen College archives

Rentals of properties outside the East Gate on the north side of the High Street, from 1478, 1480, 1481, 1482, 1484 and 1487: ref. EP/48/6; EP/48/2; EP/48/3; EP/48/4; EP/48/7; EP/48/5; EP/47/7; EP/47/8; EP/47/9; EP/48/11

Transcript of notes written by John Chessell Buckler regarding the architectural history of the Magdalen College, 1823: ref. MC:P371/MS1/1, fols 111–12

Oxford University archives

OU Archives, Bodl. Mfilm 100/6, f.27–32
OU Archives, Bodl. Mfilm 100/6, f.110–11

Published medieval sources

Cal Pat Rolls 1232–47 Calendar of the Patent Rolls preserved in the Public Record Office. Henry III AD 1232–1247 (London, 1901)

REFERENCES

ACBMG, 2007 *Ceramic building material, minimum standards for recovery, curation, analysis and publication*, Archaeological Ceramic Building Materials Group

Agarwal, S C, 2016 Bone morphologies and histories: life course approaches in bioarchaeology, *American J Physical Anthropol* **159 S61**, 130–49

Allen, L, 2003 The defences: finds from 24A St Michaels Street and Corpus Christi Bastion 21, in Dodd (ed.) 2003, 304–5

Allen, L, 2019 Metalwork and worked-bone objects, in Munby *et al*. 2019, 260–73

Allen, L, 2020 Metalwork and worked bone, in Teague and Ford 2020b, 382–8

Allen, L, forthcoming Metalwork and worked bone, in Teague *et al*. forthcoming a

Allen, L, and Durham, B, 2003 Finds from the excavations at 89–91 St Aldate's (the Trill Mill Stream), in Dodd (ed.) 2003, 271–6

Allen, M, Teague, S, and Lawrence, S, 2023 *Road to the manor: excavations at Graven Hill, Oxfordshire, 2015–16*, OA Monogr **35**, Oxford

Anastasiadou, K, Silva, M, Booth, T, Speidel, L, Audsley, T, Barrington, C, Buckberry, J, Fernandes, D, Ford, B, Gibson, M, Gilardet, A, Glocke, I, Keefe, K, Kelly, M, Masters, M, McCabe, J, McIntyre, L, Ponce, P, Rowland, S, Ventura, J R, Swali, P, Tait, F, Walker, D, Webb, H, Williams, M, Witkin, A, Holst, M, Loe, L, Armit, I, Schulting, R, and Skoglund, P, 2024 Detection of chromosomal aneuploidy in ancient genomes, *Communications Biology* **7**, 14, https://doi.org/10.1038/s42003-023-05642-z

Anderson, A, 2022 Skeletal indicators of early life stress: insights into cribra orbitalia and porotic hyperostosis in a living subsistence population, PhD Diss, Univ. California

Anderson, S, 2010 Human skeletal remains, in Atkins and Popescu 2010, 242–9

Andrews, P, Biddulph, E, Hardy, A, and Brown, R, 2011a *Settling the Ebbsfleet Valley: High Speed I excavations at Springhead and Northfleet, Kent. The late Iron Age, Roman, Saxon, and medieval landscape, vol 1: the sites*, Oxford Wessex Archaeol Monogr, Oxford and Salisbury

Andrews, P, Mepham, L, Schuster, J, and Stevens, C J, 2011b *Settling the Ebbsfleet Valley: High Speed I excavations at Springhead and Northfleet, Kent. The late Iron Age, Roman, Saxon, and medieval landscape, vol 4: Saxon and later finds and environmental reports,* Oxford Wessex Archaeol Monogr, Oxford and Salisbury

Andrews, P, Booth, P, Fitzpatrick, A P, and Welsh, K, 2015 *Digging at the gateway: archaeological landscapes of south Thanet. The archaeology of East Kent Access (phase II), vol 2: the finds and environmental reports*, Oxford Wessex Archaeol Monogr **8**, Oxford and Salisbury

Angelini, I, Artioli, G, and Nicosia, C, 2017 Metals and metalworking residues, in Nicosia and Stoops 2017, 213–22

Angseesing, J, Jones, J A, Reid, C, Roberts, C R, and Rollinson, H R, 1994 Limestone roofing slates of the Cotswolds, *Proc Cotteswold Naturalists' Field Club* **42 (3)**, 228–36

Archaeological Surveys, 2011 Longwall Quad, Magdalen College, Oxford: a report on a magnetometer survey, Earth resistance survey and ground penetrating radar survey, unpubl.

Arkell, W J, 1947a *Oxford stone*, London

Arkell, W J, 1947b *Geology of Oxford*, Oxford
Arneborg, J, Heinemeier, J, Lynnerup, N, Nielsen, H, Rud, N, and Sveinbjörnsdóttir, Á, 1999 Change of diet of the Greenland Vikings determined from stable carbon isotope analysis and 14C dating of their bones, *Radiocarbon* **41 (2)**, 157–68
Atherton, K, and Mitchell, N, 2001 Ceramic building material, in Poore and Wilkinson 2001, 69–74
Atkins, R, and Popescu, E, 2010 Excavations at the Hospital of St Mary Magdalen, Partney, Lincolnshire, 2003, *Medieval Archaeol* **54**, 204–70
Atkins, S, 1986 Other objects from the smithy, in The excavation of an outer court building, perhaps the Woolhouse, at Fountains Abbey, North Yorkshire (G Coppack), *Medieval Archaeol* **30**, 80–2
Atkinson, D, and Oswald, A, 1969 London clay tobacco pipes, *J Brit Archaeol Ass* **32**, 171–227
Atkinson, M, and Preston, S J, 2015 Heybridge, a late Iron Age and Roman settlement: excavations at Elms Farm 1993–5, *Internet Archaeol* **40**, http://dx.doi.org/10.11141/ia.40.1.major3
Aufderheide, A C, and Rodríguez-Martín, C, 1998 *The Cambridge encyclopedia of human paleopathology*, Cambridge

Bailey, M, 1988 The rabbit and the medieval East Anglian economy, *Agricultural Hist Rev* **36 (1)**, 1–20
Banks, F, 1997 *Wine drinking in Oxford 1640–1850*, BAR Brit Ser **257**, Oxford
Barber, L, 2010 The geological material, in Barber and Sibun 2010, ADS Supplement report
Barber, L, and Sibun, L, 2010 The medieval hospital of St Nicholas, Lewes, East Sussex: excavations 1994, *Sussex Archaeol Collect* **148,** 79–109 and ADS Supplement, https://doi.org/10.5284/1085944
Barberis, I, Bragazzi, N L, Galluzzo, L, and Martini, M, 2017 The history of tuberculosis: from the first historical records to the isolation of Koch's bacillus, *J Prev Med Hyg* **58 (1)**, E9–E12
Barclay, K, and Biddle, M, 1990 Stone and pottery lamps, in Biddle 1990, 983–1000
Bashford, R, Dodd, A, and Poore, D, 2014 Medieval and post-medieval remains from excavations on the site of the new auditorium, Corpus Christi College, Oxford, 2008, *Oxoniensia* **79**, 173–209
Beckley, R, and Radford, D, 2012a *Oxford archaeological resource assessment 2011: Anglo-Saxon and Viking*, https://www.oxford.gov.uk/downloads/file/703/saxon-and-viking-oxford-410-1066-
Beckley, R, and Radford, D, 2012b *Oxford archaeological resource assessment 2011: post-medieval (1540–1800)*, https://www.oxford.gov.uk/downloads/file/698/post-medieval-oxford-1540-1800-
Bekar, C T, and Reed, C, 2009 *Risk, asset markets and inequality: evidence from medieval England*, Discussion Papers in Economic and Social History **79**, https://www.nuff.ox.ac.uk/economics/history/Paper79/Bekar and Reed 79.pdf [accessed 24 September 2025]
Bennett, J A W, 1974 *Chaucer at Oxford and Cambridge*, Oxford
Berna, F, Behar, A, Shahack-Gross, R, Berg, J, Boaretto, E, Gilboa, A, Sharon, I, Shalev, S, Shilstein, S, Yahalom-Mack, N, Zorn, J R, and Weiner, S, 2007 Sediments exposed to high temperatures: reconstructing pyrotechnological processes in late Bronze Age and Iron Age strata at Tel Dor (Israel), *J Archaeol Sci* **34 (3)**, 358–73
BGS, n.d. *BGS geology viewer,* British Geological Survey, https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/
Biddle, M, 1990 *Object and economy in medieval Winchester: artefacts from medieval Winchester*, Winchester Studies **7.ii**, Oxford
Biddle, M, and Smith, D, 1990 Mortars, in Biddle 1990, 89–108
Bishop, M W, 1983 Burials from the cemetery of the Hospital of St Leonard, Newark, Nottinghamshire, *Trans Thoroton Soc Nottinghamshire* **87**, 23–35
Blair, J, 1994 *Anglo-Saxon Oxfordshire*, Oxford and Stroud
Blezzard, J, 1979 The Wells musical slates, *The Musical Times* **120 (1631)**, 26–30
Blinkhorn, P, 2000 The pottery, in Blinkhorn and Pugh 2000, 19–24
Blinkhorn, P, 2002a The pottery, in Kamash *et al*. 2002, 234–40
Blinkhorn, P, 2002b Pottery, in Taylor and Hull 2002, 318–43
Blinkhorn, P, 2003a The pottery, in Hardy *et al*. 2003, 159–206
Blinkhorn, P, 2003b The pottery, in A medieval tenement at Deene End, Weldon, Northamptonshire (A Thorne), *Northamptonshire Archaeol* **31**, 116–19
Blinkhorn, P, 2006 Pottery, in Poore *et al*. 2006, 258–78
Blinkhorn, P, 2012 Pottery, in Chadwick *et al*. (eds) 2012, 112–41
Blinkhorn, P, 2021 Pottery, in Brown 2021, 152–91
Blinkhorn, P, 2023 Post-Roman pottery, in OA 2023, 72–8
Blinkhorn, P, and Pugh, G, 2000 *Excavation of the medieval waterfront at King Stable Street, Eton, Berkshire*, OAU Occas Pap **7**, Oxford
Blinkhorn, P, Cramp, L, Prior, P, Glass, G, and Horton, M, 2017 Fiat Lux: functional analysis of three Saxo-Norman pottery lamps from Berkeley, Gloucestershire, *Medieval Archaeol* **61**, 104–16
Bliss, A J, 1965 The inscribed slates at Smarmore, *Proc Royal Irish Acad C* **64**, 33–60
Blows, J, and Worssam, B, 2011 Geology of the stones used in building the cathedral, in Schofield 2011, 284–90
Boardman, S, 2020a Plant remains, in Teague and Ford 2020a, 236–7
Boardman, S, 2020b Wood charcoal, in Teague and Ford 2020a, 237–8
Boardman, S, 2020c Wood charcoal and charred plant remains, in Teague and Brown 2020, 197–9
Boardman, S, forthcoming Wood charcoal, in Teague *et al*. forthcoming a

Boessneck, J, 1969 Osteological differences between sheep (*Ovis aries* Linné) and goat (*Capra hircus* Linné), in *Science in archaeology: a comprehensive survey of progress and research* (eds D R Brothwell and E S Higgs), London, 331–58

Bond, J, Dodd, A, Hind, J, and Rowley, T, 2019 *The Thames through time: the archaeology of the gravel terraces of the Upper and Middle Thames, vol 4: the Thames Valley in the medieval and post-medieval periods, AD 1000–2000*, https://knowledge.oxfordarchaeology.com/12700

Bonney, H, 2017 *Filling in the gap: dental disease in past populations*, blogs from the Natural History Museum, https://naturalhistorymuseum.blog/2017/05/31/filling-in-the-gap-dental-disease-in-past-populations/ [accessed 31 August 2022]

Booth, P, 2021 The Oxford area in the Roman period, in Crossley 2021, 5–6

Boulter, S, Robertson, D, and Start, H, 1998 The Newcastle Infirmary at the Forth, Newcastle Upon Tyne. Vol 2: the osteology: people, disease and surgery, ARCUS unpubl.

Bovy, K M, 2002 Differential avian skeletal part distribution: explaining the abundance of wings, *J Archaeol Sci* **29 (9)**, 965–78

Boylston, A, 2008 Other pathological conditions, in Magilton *et al*. (eds) 2008, 252–9

Boylston, A, 2012 Charnel deposits from St Bartlemas' Chapel excavation, Oxford 2011. Discussion of the palaeopathology and its implications, Archaeology of East Oxford Project unpubl.

Brickley, M, 2004 Guidance on recording age at death in juvenile skeletons, in Brickley and McKinley (eds) 2004, 21–2

Brickley, M B, 2018 Cribra orbitalia and porotic hyperostosis: a biological approach to diagnosis, *American J Biological Anthropol* **167 (4)**, 1–7, https://doi.org/10.1002/ajpa.23701

Brickley, M, and Ives, R, 2008 *The bioarchaeology of metabolic bone disease*, Oxford, London, San Diego and Burlington

Brickley, M, and McKinley, J I (eds), 2004 *Guidelines to the standards for recording human remains,* IFA Paper No. **7**, Southampton and Reading

Brickley, M, and Smith, M, 2006 Culturally determined patterns of violence: biological anthropological investigations at a historic urban cemetery, *American Anthropol* **108**, 163–77

Bridge, G, 1999 The medieval hospitals of St John the Baptist at Oxford and St Bartholomew of London from foundation to 1300, MA thesis, Univ Victoria, Canada, https://docslib.org/doc/8008310/the-medieval-hospitals-of-st-john-the-baptist-at-oxford-and-st-bartholomew-of-london-from-foundation-to-1300 [accessed 30 November 2022]

Brockliss, L W B (ed.), 2008 *Magdalen College Oxford: a history*, Oxford

Broderick, L, 2016 Animal bone, in Corpus Christi College, Oxford, New Sub-Main Works, archaeological watching brief report, https://knowledge.oxfordarchaeology.com/3527 [accessed 27 August 2025]

Bronk Ramsey, C, 2009 Bayesian analysis of radiocarbon dates, *Radiocarbon* **51 (1)**, 337–60

Brönnimann, D, Pümpin, C, Ismail-Meyer, K, Rentzel, P, and Égüez, N, 2017 Excrements of omnivores and carnivores, in Nicosia and Stoops, 67–81

Brothwell, D R, 1960 A possible case of mongolism in a Saxon population, *Annals of Human Genetics* **24**, 141–50

Brothwell, D R, and Browne, S, 1994 Pathology, in Lilley *et al*. 1994, 457–94

Brown, D, 1990 Dice, a games board, and playing pieces, in Biddle 1990, 692–706

Brown, D, 2002 *Pottery in medieval Southampton c 1066–1510*, Southampton Archaeol Monogr **8**, CBA Res Rep **133**, York

Brown, D, and Anthony, D, 1998 Bit wear, horseback riding and the Botai Site in Kazakstan, *J Archaeol Sci* **25 (4)**, 331–47

Brown, J, 2021 *Living opposite to the Hospital of St John: excavations in medieval Northampton 2014*, Oxford

Brown, R, and Hardy, A, 2011 *Trade and prosperity, war and poverty: an archaeological and historical investigation into Southampton's French Quarter*, OA Monogr **15**, Oxford

Browne, S, 2010 Human remains, in Barber and Sibun 2010, 101–7

Buck, C, Cavanagh, W, and Litton, C, 1996 *Bayesian approach to interpreting archaeological data*, Chichester

Burdill, R, Coxag, M, Nicholson, A, and Ponsford, M, 1987 Excavations in Bristol in 1985–6, *Bristol and Avon Archaeol* **6**, 11–30

Burt, N M, 2013 Stable isotope ratio analysis of breastfeeding and weaning practices of children from medieval Fishergate House, York, UK, *American J Physical Anthropol* **152 (3)**, 407–16

Campbell, B M S, Galloway, J A, Keene, D, Murphy, M, 1993 *A medieval capital and its grain supply. Agrarian production and distribution in the London region c. 1300*, Hist Geography Res **30**, London

Cannon, P, 2002 Wig curlers, in Taylor and Hull 2002, 351

Carnes-McNaughton, L, and Wilde-Ramsing, M U, 2008 Preliminary glassware and bottle analysis from shipwreck 31CR314, *Queen Anne's Revenge site*, Queen Anne's Revenge Shipwreck Project research report and bulletin series QAR-R-08-02, https://www.qaronline.org/media/30/open [accessed May 2022]

Carruthers, W J, and Hunter Dowse, K L, 2019 *A review of macroscopic plant remains from the Midland counties*, Historic England Res Rep **47**, https://historicengland.org.uk/research/results/reports/47-2019 [accessed 24 September 2025]

Case, H, 1958 Notes and news, *Oxoniensia* **23**, 136

Cessford, C, 2015 The St John's Hospital cemetery and environs, Cambridge: contextualizing the medieval urban dead, *Archaeol J* **172 (1)**, 52–120

Chadwick, A M, Gilbert, D R, and Moore, J (eds), 2012 *'…Quadrangles where wisdom honours herself': archaeological investigations at Tom Quad, Peckwater Quad and Blue Boar Quad, Christ Church, Oxford*, John Moore Heritage Services Monogr **1**, Oxford

Challinor, D, 2002 The wood charcoal, in Kamash *et al*. 2002, 271–4

Challinor, D, 2008 The wood charcoal, in Norton and Cockin 2008, 193–4

Challinor, D, 2010 The wood charcoal, in Norton and Mumford 2010, 214–16

Challinor, D, 2019 The wood charcoal from Oxford Castle, in Munby *et al*. 2019, 425–8

Clark, A (ed.), 1891 *The life and times of Anthony Wood, vol 1*, Oxford Hist Soc **19**, Oxford

Clark, A (ed.), 1892 *The life and times of Anthony Wood, vol II*, Oxford Hist Soc **21**, Oxford

Clark, J, 1995 *The medieval horse and its equipment*, Medieval Finds from Excavations in London **5**, London

Clarke, H, and Carter, A, 1977 *Excavations in Kings Lynn 1963–1970, vol 2*, Soc Medieval Archaeol Monogr **7**, London

Cobb, H S (ed.), 1990 *The overseas trade of London. Exchequer customs accounts 1480–1*, London Record Society **21**

Cocroft, W D, 1985 Two post-medieval pottery kilns and associated products from Prosser's Yard, Brill, Buckinghamshire, *Rec Buckinghamshire* **27**, 72–93

Connell, B, 2012 Comparison between St Mary Spital and other London cemeteries, in Connell *et al*. 2012a, 232–44

Connell, B, Gray Jones, A, Redfern, R, and Walker, D, 2012a *A bioarchaeological study of medieval burials on the site of St Mary Spital. Excavations at Spitalfields Market, London E1, 1991–2007*, MOLA Monogr **60**, London

Connell, B, Gray Jones, A, Redfern, R, and Walker, D, 2012b Infectious disease, in Connell *et al*. 2012a, 109–18

Coombe, P C, Grew, F, Hayward, K M J, and Henig, M, 2015 *Roman sculpture from London and the south-east*, Corpus Signorum Imperii Romani. Great Britain **1.10**, Oxford

Cotter, J, 2006 Ceramic building materials, in Poore *et al*. 2006, 292–305

Cotter, J, 2007 Medieval and post-medieval pottery, in *From studium to station. Rewley Abbey and Rewley Road Station, Oxford* (J Munby, A Simmonds, R Tyler and D Wilkinson), Oxford Archaeology Occasional Paper **16**, 33–42

Cotter, J, 2014 Ceramic building material, in Bashford *et al*. 2014, 193–5

Cotter, J, 2015 Ceramic building material, in Teague *et al*. 2015, 172–6

Cotter, J, 2019 Ceramic building material, in Munby *et al*. 2019, 278–85

Covey, H C, 1998 *Social perceptions of people with disabilities in history*, Springfield, IL

Cox, M, 2000 Ageing adults from the skeleton, in *Human osteology in archaeology and forensic science* (M Cox and S Mays), London, 61–81

Coy, J, 1989 The provision of fowls and fish for towns, in Serjeantson and Waldron (eds) 1989, 25–40

Craig-Atkins, E, Towers, J, and Beaumont, J, 2018 The role of infant life histories in the construction of identities in death: an incremental isotope study of dietary and physiological status among children afforded differential burial, *American J Physical Anthropol* **167 (3)**, 644–55

Crossley, A (ed.), 1979 *A history of the county of Oxford, vol 4: the city of Oxford*, Victoria County History, London

Crossley, A (ed.), 2021 *Oxford*, British Historic Town Atlas, vol **7**, Oxford

Cunliffe, B, 2013 *The Roman villa at Brading, Isle of Wight: the excavations of 2008–10*, Oxford Univ School Archaeol Monogr **77**, Oxford

Currie, C K, 1993 The archaeology of the flowerpot in England and Wales *c* 1650–1950, *Garden History* **21 (2)**, 227–46

Davey, P (ed.), 1981 *The archaeology of the clay tobacco pipe, vol 6: pipes and kilns in the London region*, BAR Brit Ser **97**, Oxford

Dempsey, K, 2023 Making a house a home: odd deposits in ordinary households in later medieval Ireland 1200–1600 AD, in *Household goods in the European medieval and early modern countryside* (eds C Tente and C Theune), Ruralia **14**, Sidestone, 91–102

Denham, V, 1985 The pottery, in Williams *et al*. 1985, 46–64

De Raedt, I, Janssens, K, and Veeckman, J, 1999 Compositional distinctions between 16th century 'façon-de-Venise' and Venetian glass vessels excavated in Antwerp, Belgium, *J Analytical Atomic Spectrometry* **14**, 493–8

de Turberville, A, 2019 Architectural stone, in OA, New Library Extension, Magdalen College, Oxford, Oxfordshire: post-excavation assessment and updated project design, 113–15

Dittman, K, and Grupe, G, 2000 Biochemical and palaeopathological investigations on weaning and infant mortality in the early Middle Ages, *Anthropol Anz* **58 (4)**, 345–55, https://pubmed.ncbi.nlm.nih.gov/11190928/ [accessed 1 August 2022], PMID: 11190928

Dittmar, J M, Mitchell, P D, Inskip, S A, Cessford, C, Robb, J E, 2023 Tuberculosis before and after the Black Death (1346–1353 CE) in the Hospital of St John the Evangelist in Cambridge, England, *Tuberculosis* **143**, 102401, https://doi.org/10.1016/j.tube.2023.102401

Dodd, A (ed.), 2003 *Oxford before the university: the late Saxon and Norman archaeology of the Thames crossing, the defences and the town*, OA Thames Valley Landscapes Monogr **17**, Oxford

Dodd, A, Mileson, S, and Webley, L (eds), 2020 *The archaeology of Oxford in the 21st century: investigations in the city by Oxford Archaeology, 2006–16*, Oxford Archaeol Hist Soc Occas Pap **1**, Oxford
Dodwell, N, 2015 The cemetery population, in Cessford 2015, 84–106
Douglas, A, 2015 *Medieval craft-working in Oxford: excavations at 15–17 Clarendon Centre*, Pre-Construct Archaeol Monogr **18**, Epsom
Druce, D, 2022 Archaeobotanical remains, in OA 2022, 28–32
Dumbrell, R, 1983 *Understanding antique wine bottles*, Woodbridge
Duncan, D, 1988 Brick and tile, in Scull 1988, 45–9
Dunning, G C, 1966 A medieval pottery louver from Great Easton, Essex, *Medieval Archaeol* **10**, 74–80
Dunning, G C, 1977 Mortars, in Clarke and Carter 1977, 320–47
Durham, B, 1977 Archaeological investigations in St Aldates, Oxford, *Oxoniensia* **42**, 83–203
Durham, B, 1991 The infirmary and hall of the medieval Hospital of St John the Baptist at Oxford, *Oxoniensia* **56**, 17–75
Dyer, C, 1988 The consumption of freshwater fish in medieval England, in *Medieval fish, fisheries and fishponds in England* (ed. M Aston), BAR Brit Ser **182 (ii)**, Oxford, 27–38
Dyer, C, 1989 *Standards of living in the later Middle Ages*, Cambridge
Dyson, T, and O Grada, C, 2002 *Famine demography: perspectives from the past and present*, Oxford

Egan, G, 1989a Bone, ivory and antler objects from Church Street (Site A), in Hassall *et al*. 1989, 231
Egan, G, 1989b Stone objects from Church Street, in Hassall *et al*. 1989, 236–8
Egan, G, 1998 *The medieval household daily living c.1150–c.1450*, Medieval Finds from Excavations in London **6**, London
Egan, G, and Pritchard, F, 1991 *Dress accessories c.1150–c.1450*, Medieval Finds from Excavations in London **3**, London
Elgawly, M, 2017 *Rosary*, Fordham Univ, https://medievallondon.ace.fordham.edu/exhibits/show/medieval-london-objects/rosary [accessed 24 September 2025]
Evans, D H, and Tomlinson, D G, 1992 *Excavations at 33–35 Eastgate, Beverley 1983–86*, Sheffield Excavations Rep **3**, Beverley

Falys, C G, and Lewis, M E, 2011 Proposing a way forward: a review of standardisation in the use of age categories and ageing techniques in osteological analysis (2004–2009), *Int J Osteoarchaeol* **21 (6)**, 704–16
Farley, M, 1979 Pottery and pottery kilns of the post-medieval period at Brill, *Post-Medieval Archaeol* **13**, 127–53
Farley, M, 1982 A medieval pottery industry at Boarstall, Buckinghamshire, *Rec Buckinghamshire* **24**, 107–17
Farley, M, and Hurman, B, 2015 Buckinghamshire pots, potters and potteries, *c* 1200–1910, *Rec Buckinghamshire* **55**, 161–234
Fiorato, V, Boylston, A, and Knüsel, C, 2000 *Blood red roses*, Oxford
Foch, J, 1966 Metrische Untersuchungen an Metapodien einiger europäischer Rinderrassen, PhD thesis, Univ München
Folk, R L, 1959 Practical petrographic classification of limestones, *American Ass Petroleum Geologists Bull* **43**, 1–38
Folk, R L, 1962 Spectral subdivision of limestone types, in Ham 1962, 62–84
Ford, B, Brady, K, and Teague, S, 2017 *From bridgehead to brewery: the medieval and post-medieval archaeological remains from Finzel's Reach, Bristol*, OA Monogr **27**, Oxford
Foreman, M, 1992 Stone objects, in Evans and Tomlinson 1992, 122–32
Fothergill, B, 2014 The husbandry, perception and improvement of turkeys in Britain, 1500–1900, *Post-Medieval Archaeol* **48,** 207–28

Gadd, D, and Dyson, T, 1981 Bridewell Palace: excavations at 9–11 Bridewell Place and 1–3 Tudor Street, City of London, 1978, *Post-Medieval Archaeol* **15**, 1–81
Gale, R, 2003 Wood-based industrial fuels and their environmental impact in lowland Britain, in *The environmental archaeology of industry* (P Murphy and P Wiltshire), Symposia of the Association for Environmental Archaeology No. **20**, Oxford, 30–47
Galke, L J, 2018 Tressed for success: male hair care and wig hair curlers at George Washington's childhood home, *Winterthur Portfolio* **52 (2/3)**, 85–135
Galofré-Vilá, G, Hinde, A, and Guntupalli, A, 2017 *Heights across the last 2000 years in England*, Discussion Papers in Economic and Social History **151**, Oxford
Gardiner, R, 2003 *The story of Magdalen College Oxford*, Oxford
Gidney, L, 2000 Economic trends, craft specialisation and social status: bone assemblages from Leicester, in Rowley-Conwy (ed.) 2000, 170–8
Gilchrist, R, 2012 *Medieval life: archaeology and the life course*, Woodbridge
Gilchrist, R, 2020 *Sacred heritage: monastic archaeology, identities, beliefs*, Cambridge
Gilchrist, R, and Sloane, B, 2005 *Requiem: the medieval monastic cemetery in Britain*, MoLAS, London
Giorgi, J, 1999 The plant remains, in Queen Street/St Ebbe's Street, Oxford: an archaeological evaluation (D Freke), RPS Group unpubl.
Giorgi, J, 2015 Plant remains, in Teague *et al*. 2015, 179–85
Giorgi, J, 2020a Charred plant remains, in Anglo-Saxon to post-medieval occupation and evidence for the medieval Jewry at Nos 114–119 St Aldates and Nos 4–5 Queen Street (S Teague,

E Biddulph and C Champness), in Dodd *et al*. (eds) 2020, 119–22
Giorgi, J, 2020b Plant remains, in Medieval and later activity at St Alban's Quad and Patey's Quad, Merton College (S Teague and B Ford), in Dodd *et al*. (eds) 2020, 254–5
Goldberg, J M, 1995 *Women in England c. 1275–1525*, Manchester Medieval Stud, Manchester
Goldberg, P, Macphail, R I, Carey, C, and Zhuang, Y, 2022 *Practical and theoretical geoarchaeology*, 2nd edn, Chichester
Gomes, R A M P, Petit, J, Dutour, O, and Santos, A L, 2022 Frequency and co-occurrence of porous skeletal lesions in identified non-adults from Portugal (19th to 20th centuries) and its association with respiratory infections as a cause of death, *Int J Osteoarchaeol* **32**, 1061–72
Good, L, 1998 Stone, in Price with Ponsford 1998, 164–6
Goodall, I H, 1983 Iron objects, in Halpin 1983, 65
Goodall, I H, 1990 Knives, in Biddle 1990, 835–60
Goodall, I H, 2011 *Ironwork in medieval Britain: an archaeological study*, Soc Medieval Archaeol Monogr **31**, London
Goodman, A H, and Rose, J C, 1990 Assessment of systemic physiological perturbations from dental enamel hypoplasias and associated histological structures, *Yearbook of Physical Anthropol* **33**, 59–110
Gottschall, A, 2008 Prayer bead production and use in medieval England, *Rosetta* **4,** 1–14
Gottschall, A, 2014 The Pater Noster and the laity in England *c*. 700–1560, PhD thesis, Univ Birmingham
Graham, M, 2023 *Minutes of the Oxford paving comissioners,* Oxford Hist Soc New Ser **49**, Oxford
Grainger, I, Hawkins, D, Cowal, L, and Mikulski, R, 2008 *The Black Death cemetery, East Smithfield, London*, MOLAS Monogr **43**, London
Grant, A, 1984 Medieval animal husbandry, in *Animals and archaeology* (eds C Grigson and J Clutton-Brock), BAR Int Ser **227**, 179–86
Grau-Sologestoa, I, and Albarella, U, 2019 The 'long' sixteenth century: a key period of animal husbandry change in England, *Archaeol Anthropol Sci* **11,** 2781–803, https://doi.org/10.1007/s12520-018-0723-6
Grauer, A L, Patterns of life and death: the palaeodemography of medieval York, in *Health in past societies. Biocultural interpretations of human skeletal remains in archaeological contexts* (eds H Bush and M Zvelebil), BAR Int Ser **567**, Oxford, 67–80
Gray Jones, A, Redfern, R, and Walker, D, 2012 Nutritional and metabolic disease, in Connell *et al*. 2012a, 118–27
Green, F J, 1984 The archaeological and documentary evidence for plants from the medieval period in England, in *Plants and ancient man* (eds W van Zeist and W A Casparie), Rotterdam, 99–114
Greig, J, 1988 Plant resources, in *The countryside of medieval England* (eds G Astill and A Grant), Oxford, 108–27
Greig, J, 1991 The British Isles, in *Progress in Old World palaeoethnobotany* (eds W van Zeist, K Wasylikowa and K Behre), Rotterdam, 299–334
Griffiths, D, and Harrison, J, 2020 *The archaeology of east Oxford*, Oxford
Griffiths, N, 1989 *Shield-shaped mounts*, Finds Res Group Datasheet **12**
Grigson, C, 1976 The craniology and relationships of four species of *Bos* 3. Basic craniology: *Bos taurus* L. Sagittal profiles and other non-measurable characters, *J Archaeol Sci* **3**, 115–36
Grigson, C, 1982 Sex and age determination of some bones and teeth of domestic cattle: a review of the literature, in *Ageing and sexing animal bones from archaeological sites* (eds B Wilson, C Grigson and S Payne), BAR Brit Ser **109**, Oxford, 7–27
GSB, 2015 Magdalen College, Grove Buildings: geophysical survey report, GSB Prospection unpubl.
Gwynn, J, 1772 A plan and section for a sewer under the Long Walk and the High Street, to fall into the Cherwell near Magdalen Bridge, Oxford, undated manuscript plan in British Library (King George III's Library), ref Maps K.Top.34.33.3.b. Online image at http://george3.splrarebooks.com/collection/view/A-plan-and-section-for-a-sewer-under-the-Long-Walk-and-the-High-Street-to-f [accessed 28 March 2024]

Haberly, L, 1937 *Mediaeval English pavingtiles*, Oxford
Hagen, A, 1994 *A handbook of Anglo-Saxon food processing and consumption*, Pinner
Hajdukiewicz, M, 2014 *Breed focus: Boreray sheep*, Pocket Farm Magazine, http://www.pocket-farm.co.uk/breed-focus-boreray-sheep/ [accessed 5 August 2025]
Halpin, C, 1983 Late Saxon evidence and excavation of Hinxey Hall, Queen Street, Oxford, *Oxoniensia* **48**, 67
Halstead, P, 1985 A study of the mandibular teeth from Romano-British contexts at Maxey, in *The Fenland Project 1: archaeology and environment in the Lower Welland Valley, vol 1* (F Pryor, C French, D R Crowther, D Gurney, G Simpson and M Taylor), EAA **27**, Gressenhall, 219–24
Halstead, P, 1992 Dhimini and the 'DMP': faunal remains and animal exploitation in late Neolithic Thessaly, *Annual of the British School at Athens* **87**, 29–59
Halstead, P, Collins, P, and Isaakidou, V, 2002 Sorting the sheep from goats: morphological distinctions between the mandibles and mandibular teeth of adult *Ovis* and *Capra*, *J Archaeol Sci* **29 (5)**, 545–53
Ham, W E (ed.), 1962 Classification of carbonate rocks according to depositional texture, *American Ass Petroleum Geologists Memoir* **1**

Hammond, P W, 1995 *Food and feast in medieval England*, Stroud
Hanf, M, 1983 *The arable weeds of Europe*, Ludwigshafen
Hardy, A, and Andrews, P, 2011 Saxon, medieval, and post-medieval landscape, in Andrews *et al*. 2011a, 249–305
Hardy, A, Dodd, A, and Keevill, G D, 2003 *Aelfric's Abbey: excavations at Eynsham Abbey, Oxfordshire, 1989–92*, OA Thames Valley Landscapes Monogr **16**, Oxford
Harley, L S, 1974 A typology of brick, with numerical coding of brick characteristics, *J Brit Archaeol Ass*, **37** 3rd ser, 63–87
Harman, M, 1985 The human remains, in Lambrick 1985, 188–90
Harward, C, Holder, N, Phillpotts, C, and Thomas, C, 2019 *The medieval priory and hospital of St Mary Spital and the Bishopsgate suburb: excavations at Spitalfields Market, London E1, 1991–2007*, MOLA Monogr **59**, London
Haslam, J, 1969 Oxford taverns and the cellars of All Souls in the 17th and 18th centuries, *Oxoniensia* **34**, 45–78
Haslam, J, 1987 Market and fortress in England in the reign of Offa, *World Archaeol* **19 (1)**, 76–93
Haslam, J, 2010 The two Anglo-Saxon burhs of Oxford, *Oxoniensia* **75**, 15–34
Haslam, J, 2021 The wall tenements of Oxford in Domesday Book, and the process of burghal formation, *Oxoniensia* **86**, 47–62
Hassall, T G, 1976 Excavations at Oxford Castle, 1965–1973, *Oxoniensia* **41**, 232–308
Hassall, T, 1977 The Oxford Archaeological Unit 1976, *CBA Group 9 Newsletter* **6**, 55–78
Hassall, T G, Halpin, C E, and Mellor, M, 1984 Excavations in St Ebbe's, Oxford 1967–1976. Part II: post-medieval domestic tenements and the post-Dissolution site of the Greyfriars, *Oxoniensia* **49**, 153–275
Hassall, T G, Halpin, C E, and Mellor, M, 1989 Excavations in St Ebbe's, Oxford, 1967–1976. Part I: late Saxon and medieval domestic occupation and tenements, and the medieval Greyfriars, *Oxoniensia* **54**, 71–277
Hather, J, 2016 *The identification of northern European woods: a guide for archaeologists and conservators*, Abingdon
Hawkins, N, 2017 An archaeological investigation in the east wing of Somerset House, City of Westminster, *Trans London Middlesex Archaeol Soc* **67**, 133–82
Hayward, K M J, 2009 *Roman quarrying and stone supply on the periphery – southern England. A geological study of first century funerary monuments and monumental architecture*, BAR Brit Ser **500**, Oxford
Hayward, K M J, 2013 The stone roofing material, in Cunliffe 2013, 139–43
Hayward, K M J, 2015a Building material, in Douglas 2015, 57–64
Hayward, K M J, 2015b Types and sources of stone, in Coombe *et al. 2015*, xxxiv–xlvi
Hayward, K M J, 2017 The medieval and Tudor architectural stonework, in Hawkins 2017, 157–73
Hayward, K M J, 2019a Worked stone, in Ridgeway *et al*. 2019, 361–71
Hayward, K M J, 2019b Resources for castle construction in medieval Prussia and Livonia, in Pluskowski (ed.) 2019, 35–58
Hayward, K M J, forthcoming a The petrography and form of the stone roofing from the Franciscan Greyfriars precinct, in Teague *et al*. forthcoming a
Hayward, K M J, forthcoming b The petrography of the architectural freestone, paving and rubblestone from the Franciscan Greyfriars precinct, in Teague *et al*. forthcoming a
Hayward, K M J, forthcoming c Medieval stone types, in *Bermondsey Square. Prehistoric and Roman settlement, medieval abbey and post-medieval mansion excavations 1998–2018, vol 2* (A Douglas), Pre-Construct Archaeol monogr
Heaton, T, Köhler, P, Butzin, M, Bard, E, Reimer, R, Austin, W, Bronk Ramsey, C, Grootes, P, Hughen, K, Kromer, B, Reimer, P, Adkins, J, Burke, A, Cook, M, Olsen, J, and Skinner, L, 2020 Marine20 – the marine radiocarbon age calibration curve (0–55,000 cal BP), *Radiocarbon* **62 (4)**, 779–820
Henig, M, 1976 Stone objects, in Hassall 1976, 266–7
Henig, M, 1977 Objects of bone, antler and shell, in Durham 1977, 160–6
Henig, M, 1985 Small finds, in Early domestic sites in Oxford: excavations in Cornmarket and Queen Street, 1959–62 (D Sturdy and J Munby), *Oxoniensia* **50**, 57 (47–94)
Higgins, D A, 2009 The clay tobacco pipes, in Patrick and Rátkai 2009, 189–226
Higgins, D A, 2020a Clay tobacco pipes, in Teague and Brown 2020, 172–8
Higgins, D A, 2020b Clay tobacco pipes, in An early ditch, medieval boundary and post-medieval quarrying at the President's Garden, St John's College (S Teague, J Munby, A Simmonds and C Champness), in Dodd *et al*. (eds) 2020, 300–14
Higgins, D, 2021 Clay tobacco pipes, in OA 2021a, 34–46 and Appendix C
Hillson, S, 1996 *Dental anthropology*, 3rd edn, Cambridge
Hillson, S, 2005 *Teeth*, 2nd edn, Cambridge
Hinton, P (ed.), 1988 *Excavations in Southwark 1973–76 and Lambeth 1973–79*, MoLAS and DGLA Joint Publication **3**, London
Historic England, 1999 *Medieval fishpond complex and associated features at North Kelsey Grange*, https://historicengland.org.uk/listing/the-list/list-entry/1020354?section=official-list-entry [accessed 3 November 2022]
Historic England, 2017 Strategic stone study: a building stone atlas of Oxfordshire, English

Heritage, http://www.oxfordshiregeologytrust.org.uk/wp-content/uploads/2017/03/oxfordshire_building_stones_atlas.pdf [accessed 24 September 2025]
Historic England, 2018 *Pre-industrial ironworks: introductions to heritage assets*, Swindon
Hobson, M G, 1939 *Oxford Council Acts 1665–1701*, Oxford Hist Soc New Ser **2**, Oxford
Hohler, C, 1941–42 Medieval paving tiles in Buckinghamshire, *Rec Buckinghamshire* **14 (1, 2)**, 1–49, 99–131
Holmes, M, 2018 Southern England: a review of animal remains from Saxon, medieval and post-medieval archaeological sites, Historic England Res Rep **08/2017**
Hookway, E, and Squires, K, 2020 A biocultural approach to understanding the presence of children from medieval hospitals in England: what can we learn from archaeological investigations?, *Childhood in the past* **13 (1)**, 38–59
Horsfield, W, Dane, D M, Dunlop, L, Fuller, W, and Marchant, R, 2013 The building stones of Oxfordshire villages, *Oxoniensia* **78**, 115–26
Horton, A, Sumbler, M G, Cox, B M, and Ambrose, K, 1995 *Geology of the country around Thame: memoir of the British Geological Survey sheet 237 (England and Wales)*, London
Horsey, I P, 1992 *Excavations in Poole 1973–1983*, Dorset Natur Hist Archaeol Soc Monogr **10**, Dorchester
Howsam, C, 2014 Book fastenings and furnishings: an archaeology of late medieval books, PhD thesis, Univ Sheffield
Hübener, W, 1972 *Gleicharmige Bügelfibeln der Merowingerzeit in Westeuropa, Madriger Mitteilungen*, Deutsches Archäologisches Institut
Huggins, P J, and Huggins, R M, 1973 Excavation of monastic forge and Saxo-Norman enclosure, Waltham Abbey, 1972–3, *Trans Essex Archaeol Soc* **5**, 127–84
Hunter, R, 2001 *Ceramics in America 2001*, Ceramics in America Annual **1**

Ingram, J, 1834 *Memorials of Oxford, vol 2*, https://archive.org/details/memorialsoxford00keuxgoog/page/n36/mode/2up?ref=ol&view=theater [accessed 11 July 2022]
Inskip, S, Scheib, C L, Wilder Wohns, A, Ge, X, Kivisild, T, and Robb, J, 2018 Evaluating macroscopic sex estimation methods using genetically sexed archaeological material: the medieval skeletal collection from St John's Divinity School, Cambridge, *American J Physical Anthropol* **168**, 340–51
Inskip, S, Cessford, C, Dittmar, J, Rose A K, Mulder, B, O'Connell, T, Mitchell, P D, Scheib, C, Hui, R, Kivisild, T, Price, M E, Stock, J, Robb, J, 2023 Pathways to the medieval hospital: collective osteobiographies of poverty and charity, *Antiquity* **97 (396)**, 1581–97
Jaine, T, 1971 The building of Magdalen Bridge, 1772–1790, *Oxoniensia* **36**, 59–72
James, A, 2013 Fishing for clues: investigating diet of sub-adults at the medieval Hospital of St John (Magdalen College, Oxford), MSc diss, Oxford Univ
Jervis, B, 2022 Mortars, medicine and knowledge in medieval England, *Revue d'Histoire Nordique* **29**, 43–67
Jervis, B, 2023 Confronting commerce: whetstones, economy and ecologies of interdependence in medieval England, *Norwegian Archaeological Review* **56 (1)**, 38–70
Jones, G G, 2006 Tooth eruption and wear observed in live sheep, in *Recent advances in ageing and sexing animal bones. Proceedings of the 9th ICAZ Conference, Durham, 2002* (ed. R Ruscillo), Oxford, 155–78
Jope, E M, 1951 The development of pottery ridge tiles in the Oxford region, *Oxoniensia* **16**, 86–8
Jope, E M, 1956 The archaeology of Wheatley stone, WO Hassall (ed.) *Wheatley Records 956–1956*, 37–8, 17–26
Jope, E M, 1958 The Clarendon Hotel, Oxford. Part I. The site, *Oxoniensia* **23**, 1–83
Jones, E D, 1950 Inscribed slates from Strata Florida, *Ceredigion* **1 (1)**, 103–4
Judd, M, 2008 Trauma, in Magilton *et al*. (eds) 2008, 229–38
Jurmain, R D, 1999 *Stories from the skeleton: behavioural reconstruction in human osteology*, Netherlands

Kamash, Z, Wilkinson, D R P, Ford, B M, and Hiller, J, 2002 Late Saxon and medieval occupation: evidence from excavations at Lincoln College, Oxford 1997–2000, *Oxoniensia* **67**, 199–286
Keevill Heritage, 2017 The Church of St Mary, Chalgrove, Oxfordshire, https://facultyonline.churchofengland.org/FAS/Download.aspx?fileid=57540&uploadtype=2&title=St%20Mary [accessed 21 November 2022]
Kelley, M A, and Micozzi, M S, 1984 Rib lesions in chronic pulmonary tuberculosis, *American J Biological Anthropol* **65 (4)**, 381–6
Keys, L, 2020 Iron slag and related high-temperature debris, in Teague and Brown 2020, 185–6
Kilmurry, K, 1980 *The pottery industry of Stamford, Lincs. c. AD 850–1250*, BAR Brit Ser **84**, Oxford
Ktalav, I, 2016 There and back again: a tale of a pilgrim badge during the Crusader period, in *Bones and identity: zooarchaeological approaches to reconstructing social and cultural landscapes in southwest Asia* (eds N Marom, R Yeshurun, L Weissbrod, and G Bar-Oz), Oxford, 323–38, https://doi.org/10.2307/j.ctvh1drw5.21
Kuuliala, J, 2011 Sons of demons? Children's impairment and the belief in changelings in medieval Europe (*c* 1150–1400), in *The dark side of childhood in Late Antiquity and the Middle Ages* (eds K Mustakallio and C Laes), Oxford, 79–94

Lambrick, G, 1985 Further excavations on the second site of the Dominican priory, Oxford, *Oxoniensia* **50**, 131–208
Lambrick, G, 2013 Prehistoric Oxford, *Oxoniensia* **78**, 1–48
Lambrick, G, and Woods, H, 1976 Excavations on the second site of the Dominican priory, Oxford, *Oxoniensia* **41**, 168–231
Larsen, C S, 1997 *Bioarchaeology: interpreting behaviour from the modern skeleton*, Cambridge
Lauwerier, R C G M, 1988 Animals in Roman times in the Dutch eastern river area, PhD thesis, Rijksuniversiteit, Groningen
Leary, E, 1989 *The building limestones of the British Isles*, London
Le Cheminant, R, 1978 The development of the pipeclay hair curler – a preliminary study, *London Archaeol* **3 (7)**, 187–91
Le Cheminant, R, 1981 Clay tobacco pipes from London and the south-east, in Davey 1981, 127–72
Lee, F, and Boylston, A, 2008a Infection: tuberculosis and other infectious diseases, in Magilton *et al*. (eds) 2008, 218–27
Lee, F, and Boylston, A, 2008b Other pathological conditions, in Magilton *et al*. (eds) 2008, 252–9
Lee, F, and Magilton, J, 1989 The cemetery of the Hospital of St James and St Mary Magdalene, Chichester – a case study, *World Archaeol* **21 (2)**, 273–82
Lee, F, and Magilton, J, 2008 Physical anthropology, in Magilton *et al*. (eds) 2008, 150–6
Leeds, E T, 1923 Oxford tradesmen's tokens, in Salter 1923, 355–453
Leeds, E T, 1938 Glass vessels of the XVI century and later from the site of the Bodleian Extension in Broad Street, Oxford, *Oxoniensia* **3**, 153–61
Levick, P, 2012 Human bone assessment, Archaeology of East Oxford Project unpubl.
Lewis, M, 2008 The children, in Magilton *et al*. (eds) 2008, 174–87
Lewis, M, 2013 Children of the Golden Minster: St Oswald's Priory and the impact of industrialisation on child health, *J Anthropol* **2013**, https://www.hindawi.com/journals/janthro/2013/959472/ [accessed 1 August 2022]
Lewis, M, 2016a Work and the adolescent in medieval England (AD 900–1550): the osteological evidence, *Medieval Archaeol* **60 (1)**, 138–71
Lewis, M E, 2016b Childcare in the past: the contribution of palaeopathology, in *Care in the past. Archaeological and interdisciplinary perspectives* (L Powell, W Southwell-Wright and R Gowland), Oxford, 23–37
Leyser, H, 1995 *Medieval women: a social history of women in England 450–1500*, London
Lieverse, A R, 1999 Diet and the aetiology of dental calculus, *Int J Osteoarchaeol* **9 (4)**, 219–32
Lilley, J M, Stroud, G, Brothwell, D R, and Williamson, M H, 1994 *The Jewish burial ground at Jewbury*, The Archaeology of York **12/3**, York
Liston, M, and Rotroff, S, 2013 Babies in the well: archaeological evidence for newborn disposal in Hellenistic Greece, in *The Oxford handbook of childhood and education in the classical world* (eds J Evans Grubbs, T Parkin and R Bell), 62–83, Oxford
Lobel, M D, and Salter, H E (eds), 1954 *A history of the county of Oxford, vol 3: the University of Oxford*, Victoria County History, London
Locker, A M, 2001 *The role of stored fish in England 900–1750 AD: the evidence from historical and archaeological data*, Sofia, Bulgaria
Loe, L, Boyle, A, Webb, H, and Score, D, 2014 *'Given to the ground': a Viking age mass grave on Ridgeway Hill, Weymouth*, Dorset Nat Hist Archaeol Soc Monogr **22**, Dorchester
Loe, L, Dean, B, Farber, E, Gibson, M, Rose, A, and Webb, H, 2020 The human skeletal remains: an overview of the osteology and palaeopathology, in *Excavations at Stoke Quay, Ipswich: southern* Gipeswic *and the parish of St Augustine* (R Brown, S Teague, L Loe, B Sudds and E Popescu), EAA Rep **172**, 273–339
Loe, L, Webb, H, Simmonds, A, and Poore, D, 2022 *The patients' story: Dr Radcliffe's legacy in the Age of Hospitals. Excavations at the 18th–19th century Radcliffe Infirmary Burial Ground, Oxford*, OA Monogr **32**, Oxford
Lovegrove, R, 2007 *Silent fields: the long decline of a nation's wildlife*, Oxford
Lumby, J R (ed.), 1882 *Polychronicon Ranulphi Higden, monachi Cestrensis,* vol 8, Rolls Ser **41**, London

McCarthy, M R, and Brooks, C M, 1988 *Medieval pottery in Britain AD 900–1600*, Leicester
MacDonald, D, and Barrett, P, 1993 *Mammals of Britain and Europe*, London
MacGregor, A, 1985 *Bone, antler, ivory and horn: the technology of skeletal materials since the Roman period*, London
MacGregor, A, and Bolick, E, 1993 *Ashmolean Museum: a summary catalogue of the Anglo-Saxon collections (non-ferrous metals)*, BAR Brit Ser **230**, Oxford
Macphail, R I, 2022 Privies and latrines, in *Encyclopedia of geoarchaeology* (A S Gilbert, P Goldberg, R D Mandel and V Aldeias), Dordrecht, https://doi.org/10.1007/978-3-030-44600-0_138-1
Macphail, R I, and Crowther, J, 2009 Castle Lane, Bedford: soil micromorphology, chemistry and magnetic susceptibility, report for Albion Archaeology
Macphail, R I, and Crowther, J, 2011 Experimental pig husbandry: soil studies from West Stow Anglo-Saxon village, Suffolk, UK, *Antiquity* **85 (330)**, *1–4*
Madden, F (ed.), 1866 *Matthaei Parisiensis Historia Minor,* vol 2, Rolls Series **44**, London
Magilton, J, Lee, F, and Boylston, A (eds), 2008 *'Lepers outside the gate'. Excavations at the cemetery of the Hospital of St James and St Mary Magdalene, Chichester, 1986–87 and 1993*, Chichester Excavations **10**, CBA Res Rep **158**, York

Major, H, 2012 Worked stone, in Wilson *et al*. 2012, 145–7
Manco, J, 2004 *Feeding the hungry*, Heritage of mercy, https://www.buildinghistory.org/articles/heritagemercy5.shtml [accessed 31 August 2022]
Manix, P, 2014 *Beneath our feet: Oxford's medieval Jewish cemetery*, 3rd edn, Woodstock
Margerison, B J, and Knüsel, C J, 2002 Paleodemographic comparison of a catastrophic and an attritional death assemblage, *American J Physical Anthropol* **119 (2)**, 134–43
Margeson, S, 1993 *Norwich households: the medieval and post-medieval finds from Norwich Survey excavations 1971–1978*, EAA **58**, Norwich
Martin, M, 2000 Wigs in the wardrobe: public life will survive without them, *The Guardian*, 25 October 2000, https://www.theguardian.com/politics/2000/oct/25/speaker2000.parliament [accessed 24 September 2025]
Matos, V, and Santos, L, 2006 On the trail of pulmonary tuberculosis based on rib lesions: results from the Human Identified Skeletal Collection from the Museu Bocage (Lisbon, Portugal), *American J Physical Anthropol* **130**, 190–200
May, E, 1985 Widerristhöhe und Langknochenmasse bei Pferden – ein immer noch aktuelles Problem, *Zeitschrift fur Saugetierkunde* **50**, 368–82
Mays, S, 2007 The human remains, in *Wharram: a study of settlement on the Yorkshire Wolds XI. The churchyard* (S Mays, C Harding and C Heighway), York Univ Archaeol Pub **13**, York, 77–192
Mays, S, 2021 *The archaeology of human bones*, 3rd edn, Abingdon
Meen, J, 2021a Wood charcoal, in OA 2021a, 85–9
Meen, J, 2021b Environmental samples, in A further sequence of medieval and early post-medieval deposits at Jesus College, Oxford (A Simmonds, R Bashford and G Thacker), *Oxoniensia* **86**, 376–9
Meen, J, forthcoming Wood charcoal, in Teague *et al*. forthcoming a
Meen, J, and Cook, S, forthcoming Charred plant remains, in Teague *et al*. forthcoming a
Mellor, M, 1991a The pottery, in Durham 1991, 49–54
Mellor, M, 1991b The tiles, in Durham 1991, 57–8
Mellor, M, 1994 Oxford pottery: a synthesis of middle and late Saxon, medieval and early post-medieval pottery in the Oxford region, *Oxoniensia* **59**, 17–217
Mellor, M, 1996 Pottery, in Roberts 1996, 201–9
Mellor, M, 1997 *Pots and people that have shaped the heritage of medieval and later England*, Oxford
Mellor, M, 2003a The Saxon and medieval ceramic finds from the town sites, in Dodd (ed.) 2003, 326–46
Mellor, M, 2003b The ceramic finds from sites on the defences, in Dodd (ed.) 2003, 307–26
Mellor, M, and Oakley, G, 1984 A summary of the key assemblages. A study of the pottery, clay pipes, glass and other finds from fourteen pits dating from the 16th to the mid-19th century, in Hassall *et al*. 1984, 181–219
Mellow, M, and Powell, P, 1983 Stone objects, in Halpin 1983, 41–69
Miller, G L, and Hunter, R, 2001 How creamware got the blues: the origins of China glaze and pearlware, in Hunter 2001, 135–61
Mitchell, P D, and Brickley, M (eds), 2017 *Updated guidelines to the standards for recording human remains*, Chartered Institute for Archaeologists and BABAO
Moffett, L, 2006 The archaeology of medieval plant foods, in Woolgar *et al*. 2006, 41–55
MOLA, 2017 Fellow's Common Room and the Old Picture Store, Magdalen College, High Street, Oxford: archaeological standing building recording report, Museum of London Archaeology unpubl.
Molnar, P, 2011 Extramasticatory dental wear reflecting habitual behavior and health in past populations, *Clin Oral Invest* **15**, 681–9
Morgan, R A, 1988 *Tree-ring studies in the Somerset Levels: the Meare Heath Track 1984–85*, English Heritage Ancient Monuments Laboratory Report 114/1988, https://historicengland.org.uk/research/results/reports/114-1988 [accessed 24 September 2025]
Moore, J, 2001 Archaeological excavations at Oxford Science Park, Littlemore, Oxford, *Oxoniensia* **66**, 163–219
Morris, R K, 1992 An English glossary of medieval mouldings: with an introduction to mouldings *c*. 1040–1240, *Architect Hist* **35**, 1–17
MPRG, 1998 *A guide to the classification of medieval ceramic forms*, Medieval Pottery Research Group Occas Pap **1**, https://medievalpottery.org.uk/wp-content/uploads/2019/12/a_guide_to_the_classification_of_medieval_ceramic_forms.pdf [accessed 24 September 2025]
MPRG, 2001 *Minimum standards for the processing, recording, analysis and publication of post-Roman ceramics*, Medieval Pottery Research Group Occas Pap **2**
Munby, J, 2003 12th and 13th-century houses, in Dodd (ed.) 2003, 60–1
Munby, J, Norton, A, Poore, D, and Dodd, A, 2019 *Excavations at Oxford Castle 1999–2009*, OA Thames Valley Landscapes Monogr **44**, Oxford
Munson, P, and Garniewicz, R C, 2003 Age-mediated survivorship of ungulate mandibles in canid-ravaged faunal assemblages, *J Archaeol Sci* **30 (4)**, 405–16
Museum of Cambridge, 2021 A bad hair day? The history of British wigs and wig-curlers, https://www.museumofcambridge.org.uk/2021/06/a-bad-hair-day-the-history-of-british-wigs-and-wig-curlers/ [accessed 10 January 2023]

Nicholson, R A, 2006 Fish remains, in Poore *et al*. 2006, 306–11
Nicholson, R A, 2010 Fish bones, in Norton and Mumford 2010, 210–14

Nicholson, R A, 2019 Fish remains from excavations at Oxford Castle, in Munby *et al*. 2019, 391–4
Nicholson, R A, 2020, Fish remains, in Teague and Ford 2020b, 394–6
Nicosia, C, and Stoops, G (eds), 2017 *Archaeological soil and sediment micromorphology*, Chichester
Norton, A, 2006 Excavations at 67–69 St Thomas' Street, Oxford, *Oxoniensia* **71**, 347–92
Norton, A, and Cockin, G, 2008 Excavations at The Classics Centre, 65–67 St Giles, Oxford, *Oxoniensia* **73**, 161–94
Norton, A, and Mumford, J, 2010 Anglo-Saxon pits and a medieval kitchen at The Queen's College, Oxford, *Oxoniensia* **75**, 165–217

OA, 2006a Magdalen College School, Oxford: archaeological evaluation report, https://knowledge.oxfordarchaeology.com/1305
OA, 2006b Excavations at the Litten medieval cemetery, Newbury, West Berkshire: archaeo logical excavation report, https://knowledge.oxfordarchaeology.com/559
OA, 2009 Magdalen College, Old Bursary opening up works: archaeological watching brief report, https://knowledge.oxfordarchaeology.com/1813
OA, 2011a Magdalen College, Library Extension: archaeological evaluation report, https://knowledge.oxfordarchaeology.com/12921
OA, 2011b Library Extension, Magdalen College, Oxford, Oxfordshire: archaeological watching brief report, https://knowledge.oxfordarchaeology.com/12921
OA, 2012 New Library Extension, Magdalen College, Oxford, Oxfordshire: written scheme of investigation for an archaeological excavation and historic building recording (incl. reporting, archive and outreach), Oxford Archaeology unpubl.
OA, 2013 2nd addendum to the Magdalen College, Library Extension: archaeological evaluation report, https://knowledge.oxfordarchaeology.com/12921
OA, 2018 New Library Extension, Magdalen College, Oxford: historic building recording, https://knowledge.oxfordarchaeology.com/12921
OA, 2019 Magdalen College, Oxford, Winter Common Room: archaeological watching brief report, https://knowledge.oxfordarchaeology.com/6120
OA, 2021a Former Cooper Callas Building, 15 Paradise Street, Oxford: excavation report, https://knowledge.oxfordarchaeology.com/12282
OA, 2021b Lower Thames crossing: archaeological evaluation report for trial trenching of Land Parcels 76–77 – Shorne Ifield Road, Gravesend, Essex, OA unpubl.
OA, 2022 Mitre Inn, Turl Street, Oxford: excavation and watching brief report, https://knowledge.oxfordarchaeology.com/6304
OA, 2023 The Levine Building, Trinity College, Parks Road, Oxford: excavation report, https://knowledge.oxfordarchaeology.com/6288/
OAU, 1991 Magdalen College Grove: archaeological evaluation, https://knowledge.oxfordarchaeology.com/2178
O'Connell, L, 2004 Guidance on recording age at death in adults, in Brickley and McKinley (eds) 2004, 18–20
O'Connor, T, and Sykes, T (eds), 2010 in *Extinctions and invasions: a social history of British fauna*, Oxford
O'Donnell, L, Hill, E C, Anderson, A S, and Edgar, H J H, 2020 Cribra orbitalia and porotic hyperostosis are associated with respiratory infections in a contemporary mortality sample from New Mexico, *American J Physical Anthropol* **173**, 721–33
Ogden, A, and Lee, F, 2008 Dental health and disease, in Magilton *et al*. (eds) 2008, 188–97
Orme, N, and Webster, M, 1995 *The English hospital: 1070–1570*, New Haven and London
Ortner, D J, 2003 *Identification of pathological conditions in human skeletal remains*, 2nd edn, London
Orton, C, 1988, Post-Roman pottery, in Hinton 1988, 295–364
Orton, C, 1998–9 Minimum standards in statistics and sampling, *Medieval Ceramics* **22–23**, 135–8
Oswald, A, 1975 *Clay pipes for the archaeologist*, BAR Brit Ser **14**, Oxford
Oswald, A, 1984 Clay pipes, in Hassall *et al*. 1984, 251–62
Ottaway, P, 2017 *Winchester: an archaeological assessment: St Swithun's 'city of happiness and good fortune'*, Oxford
Ottaway, P, and Qualmann, K, 2018 *Winchester's Anglo-Saxon, medieval and later suburbs: excavations 1971–86*, Winchester
Ottaway, P, and Rogers, N, 2002 *Craft, industry and everyday life: finds from medieval York*, The Archaeology of York **17 (15)**, York

Page, W (ed.), 1907 *A history of the county of Oxford, vol 2*, Victoria County History, London
Palmer, N, 1980 A Beaker burial and medieval tenements in The Hamel, Oxford, *Oxoniensia* **45**, 124–225
Palmer, T, and Shaffrey, R, 2019 The stonework of the reredos at All Souls College Oxford, in *The reredos at All Souls College Oxford* (ed. P Horden), London, 44–53
Patrick, C, and Rátkai, S, 2009 *The bull ring uncovered: excavations at Edgbaston Street, Moor Street, Park Street and The Row, Birmingham city centre, 1997–2001*, Oxford
Payne, S, 1972 Partial recovery and sample bias: the results of some sieving experiments, in *Papers in economic prehistory* (ed. E S Higgs), Cambridge, 49–64
Payne, S, 1973 Kill of patterns in sheep and goats: the mandibles from Asvan Kale, *Anatolian Studies* **23**, 281–303
Pearce, J, 1988 *Border wares*, London
Pelling, R, 2006 Charred and waterlogged plant remains, in Poore *et al*. 2006, 322–38

Pelling, R, 2019 The charred, mineralised and waterlogged plant remains from Oxford Castle, in Munby *et al*. 2019, 396–425
Pelling, R, and Robinson, M, 2001 Emmer wheat from the Upper and Middle Thames Valley, England, *Environmental Archaeol* **5**, 117–19
Penney, S, 1987 A 12th-century stone cresset lamp from Oxford, *Oxoniensia* **52**, 196–8
Penny-Mason, B, 2015 Grave secrets: the children of the Reformation, *Current Archaeol* **301**, 21–7
Perkins, J M, Subramanian, S V, Davey Smith, G, and Özaltin, E, 2016 Adult height, nutrition and population health, *Nutrition Reviews* **74 (3)**, 149–65, PMID: 26928678
Pluskowski, A (ed.), 2019 *Ecologies of crusading, colonization, and religion in the medieval Baltic. Terra Sacra II*, Environmental Histories of the North Atlantic World **3**, Turnhout
Ponsford, M, 1998 Pottery, in Price with Ponsford 1998, 136–55
Poole, C, 2011a Ceramic building material and fired clay, in Andrews *et al*. 2011b, 313–50
Poole, C, 2011b Structural and fired clay, in Brown and Hardy 2011, 143–6
Poole, C, 2015 Fired clay and briquetage, in Andrews *et al*. 2015, 289–323
Poole, C, 2019 Fired clay, in Munby *et al*. 2019, 285–9
Poole, C, 2024 Fired clay, in *Early Thame: archaeological investigations at Oxford Road, Thame, Oxfordshire, 2015, vol 2: The Roman and Saxon periods* (C Ellis and A Davies), OCA Monogr **2**, Oxford and Cirencester, 162–5
Poole, C, forthcoming Fired clay, in *The archaeology of the Bexhill to Hastings Link Road, vol. 5: from the Roman period to the present day* (M Allen, E Biddulph and T Young), ADS
Poole, C, and Smith, K, forthcoming Ceramic building material, in Teague *et al*. forthcoming a
Poole, W, 2021 What could it be? An eighteenth-century wig-curler, *New College Notes* **15 (9)**, 1–2
Poore, D, and Wilkinson, D R P, 2001 *Beaumont Palace and the Whitefriars: excavations at the Sackler Library, Beaumont St, Oxford*, OAU Occasional Paper **9**, Oxford
Poore, D, Score, D, and Dodd, A, 2006 Excavations at No. 4A Merton Street, Merton College, Oxford: the evolution of a medieval stone house and tenement and an early college property, *Oxoniensia* **71**, 211–341
Powell, A, 2023 Animal bone, in OA 2023, 81–96 and Appendix D
Powell, P, 2005 *The geology of Oxfordshire*, Wimborne
Price, R, with Ponsford, M, 1998 *St Bartholomew's Hospital, Bristol: the excavation of a medieval hospital: 1976–8*, CBA Res Rep **110**, York
Prior, M, 2011 *Fisher Row: fishermen, bargemen and canal boatmen in Oxford 1500–1900*, Andover
Pryor, S, and Blockley, K, 1978 A seventeenth-century kiln site at Woolwich, *Post-Medieval Archaeol* **12**, 30–85
Radford, D, 2020 The archaeology of Oxford: current knowledge and future prospects, in Dodd *et al*. (eds) 2020, 3–24
Rawcliffe, C, 1999 *Medicine for the soul: the life, death and resurrection of an English medieval hospital*, Stroud
Redfern, R, 2012a Impairment and disability, in Connell *et al*. 2012a, 187–94
Redfern, R, 2012b Congenital and developmental abnormalities, in Connell *et al*. 2012a, 132–46
Redfern, R, 2012c Adult stature, in Connell *et al*. 2012a, 36–7
Redfern, R, 2012d St Mary Spital in a national and European perspective, in Connell *et al*. 2012a, 245–70
Reilly, S, Reid, J, Skeat, J, Cahir, P, Mei, C, and Bunik, M, 2013 ABM clinical protocol #18: guidelines for breastfeeding infants with cleft lip, cleft palate, or cleft lip and palate, revised 2013, *Breastfeeding Medicine* **8 (4)**, 349–53
Reitz, E J, and Wing, E S, 1999 *Zooarchaeology*, Cambridge
Richardson, L, Arkell, W J, and Dines, H G, 1946 *Geology of the country around Witney: explanation of sheet 236 memoirs of the Geological Survey of Great Britain (England and Wales)*, London
Rickett, R, 2021 *Post-Roman and medieval drying kilns: foundations of archaeological research*, Access Archaeology, https://ora.ox.ac.uk/objects/uuid:3d229c70-611a-4f28-b0f8-0d2673b06444/files/s9019s340p [accessed 16 November 2022]
Ridgeway, V, Taylor, J, and Biddulph, E, 2019 *A bath house, settlement, and industry on Roman Southwark's North Island: excavations along the route of Thameslink Borough Viaduct and at London Bridge Station*, Thameslink Monogr Ser **1**
Rielly, K, 2010 The black rat, in O'Connor and Sykes (eds) 2010, 134–45
Rixson, D, 1988 Butchery evidence on animal bones, *Circaea* **6 (1)**, 49–62
Roberts, C A, 1987 Leprosy and tuberculosis in Britain: diagnosis and treatment in antiquity, *MASCA Journal* **4 (4)**, 166–71
Roberts, C A, Boylston, A, Buckley, L, Chamberlain, A C, and Murphy, E M, 1998 Rib lesions and tuberculosis: the palaeopathological evidence, *Tubercle and Lung Disease* **79 (1)**, 55–60
Roberts, C, and Cox, M, 2003 *Health and disease in Britain from prehistory to the present day*, Stroud
Roberts, M R, 1996 A tenement of Roger of Cumnor and other archaeological investigations in medieval North Osney, Oxford, *Oxoniensia* **61**, 181–224
Roberts, M R, 1999 Archaeological investigations at Longwall Quad, Magdalen College, Oxford, *Oxoniensia* **64**, 275–84
Robinson, M, 1983 Plant and invertebrate remains, in Halpin 1983, 69
Robinson, M, 1984 33 St Aldates: agricultural debris against the Norman bridge, in The Thames crossing at Oxford: archaeological studies 1979–82 (B Durham), *Oxoniensia* **49**, 78–9

Robinson, M, 2003 Environmental evidence from All Saints Church, in Dodd (ed.) 2003, 388–9
Robinson, S, 1980 The tile, in Palmer 1980, microfiche 2.D09-D14
Roe, R, 2000 Worked stone, in Walker and King 2000, 425–6
Rogerson, A, and Dallas, C, 1984 *Excavations in Thetford 1948–1959 and 1973–1980*, EAA **22**, Dereham
Röpke, A, and Dietl, C, 2017 Burnt soils and sediments, in Nicosia and Stoops 2017, 173–9
Roth, C, 1951 *The Jews of medieval Oxford*, Oxford Hist Soc New Ser **9**, Oxford
Rowley-Conwy, P (ed.), 2000 *Animal bones, human societies*, Oxford

Safford, P L, and Safford, E J, 1996 *A history of childhood and disability*, New York and London
Salisbury, E J, and Jane, F W, 1940 Charcoals from Maiden Castle and their significance in relation to the vegetation and climatic conditions in prehistoric times, *J Ecology* **28(2)**, 310–25
Salter, H E, 1912 *Survey of Oxford in 1772*, Oxford
Salter, H E (ed.), 1914 C*artulary of the Hospital of St John the Baptist, vol. I*, Oxford Hist Soc **66**, Oxford
Salter, H E (ed.), 1915 C*artulary of the Hospital of St John the Baptist, vol. II*, Oxford Hist Soc **68**, Oxford
Salter, H E (ed.), 1917 C*artulary of the Hospital of St John the Baptist, vol. III*, Oxford Hist Soc **69**, Oxford
Salter, H E (ed.), 1923 *Surveys and tokens*, Oxford Hist Soc **75**, Oxford
Salter, H E, 1960 1968, *Survey of Oxford I and II*, Oxford Hist Soc New Ser **14** and **20**, Oxford
Santos, A L, and Roberts, C, 2006 Anatomy of a serial killer: differential diagnosis of tuberculosis based on rib lesions of adult individuals from the Coimbra Identified Skeletal Collection, Portugal, *American J Physical Anthropol* **130**, 38–49
Saunders, A, 1978 A stone lamp from Launceston Castle, Cornwall, *Antiq J* **58**, 366–7
Sawyer, P, 2024 *The electronic Sawyer: online catalogue of Anglo-Saxon charters*, https://esawyer.lib.cam.ac.uk/about/index.html [accessed 23 April 2024]
Schofield, J, 2011 *St Paul's Cathedral before Wren*, Swindon
Schweingruber, F, 1990 *Microscopic wood anatomy*, 3rd edn, Birmensdorf
Score, V, 2010 Excavation on the site of the Hospital of St John the Baptist, Mill Farm, Lutterworth, Leicestershire, *Trans Leicestershire Archaeol Hist Soc* **84**, 165–87
Scott, G R, and Jolie, R B, 2008 Tooth-tool use and yarn production in Norse Greenland, *Alaska J Anthropol* **6 (1)**, 253–64
Scull, C, 1988 Excavations in the cloister of St Frideswide's Priory, 1985, *Oxoniensia* **53**, 21–73
Serjeantson, D, 2000 Good to eat *and* good to think with: classifying animals from complex sites, in Rowley-Conwy (ed.) 2000, 179–89
Serjeantson, D, 2009 *Birds*, Cambridge
Serjeantson, D, and Waldron, T (eds), 1989 *Diet and crafts in towns*, BAR Brit Ser **199**, Oxford
Shaffrey, R, 2013 Worked stone, in St Cross College, Western Quad, Oxford: archaeological evaluation report https://knowledge.oxfordarchaeology.com/3091/
Shaffrey, R, 2017 Stone artefacts, in Ford *et al*. 2017, 222–6
Shaffrey, R, 2020 Worked stone objects, in Teague and Brown 2020, 186–8
Shaffrey, R, 2022 *Medieval and post-medieval writing slates and pencils*, Finds Research Group Datasheet **46**
Shaffrey, R, 2025 Roofing stone and stone objects, in St Ebbe's Church, Oxford: archaeological watching brief report, Oxford Archaeology, https://knowledge.oxfordarchaeology.com/library/13378
Shaffrey, R, forthcoming, Worked stone, in Teague *et al*. forthcoming a
Shaffrey, R, and Allum, C, 2011 Worked stone, in Brown and Hardy 2011, 207–14
Shaffrey, R, and Grant, R, 2006 The worked stone, in Norton 2006, 373–74
Shaffrey, R, with Hayward, K, 2023 Worked stone, in Allen *et al*. 2023, 123–8
Shaffrey, R, Harward, C, Dunne, J, Gillard, T, and Evershed, R P, 2022 A stone cresset from Dulverton House, Gloucester, *Medieval Archaeol* **66**, 431–43
Shapland, F, Lewis, M, and Watts, R, 2015 The lives and deaths of young medieval women: the osteological evidence, *Medieval Archaeol* **59 (1)**, 272–89
Sim, D, 1993 Experience and experiment: a blacksmith's comments on the ironworking, in *A medieval industrial complex and its landscape: the metalworking watermills and workshops of Bordesley Abbey* (G G Astill), CBA Res Rep **92**, York
Smith, G H, 1979 The excavation of the hospital of St Mary of Ospringe, commonly called Maison Dieu, *Archaeol Cantiana* **95**, 81–184
Smith, I, 2008 Mammal, bird and amphibian remains, in *25, Bridge Street 2001*: *two thousand years of urban life in microcosm* (ed. D Garner, D Backhouse and DA Higgins), Chester City Council Archaeological Service, Excavation and Survey Report **14**, Chester, 332–80
Smith, I, forthcoming a Mammal and bird bones, in Teague *et al*. forthcoming a
Smith, I, forthcoming b Animal bones, in Teague and Ford forthcoming
Smith, W, 2014 Charred and waterlogged plant remains, in Bashford *et al*. 2014, 206–8
Snell, M, 2020 *Surviving infancy in the Middle Ages*, https://www.thoughtco.com/medieval-child-surviving-infancy-1789124 [accessed 22 August 2022]
Spenbrooke, T, 2020 Excavations at the Old Radcliffe Infirmary, Oxford: prehistoric to medieval landscapes, *Oxoniensia* **85**, 125–82

Stace, C, 2005 *New flora of the British Isles*, 2nd edn, Cambridge
Stanier, P, 2000 *Stone quarry landscapes: the archaeology of quarrying in England*, Stroud
Stanier, R S, 1958 *Magdalen School*, 2nd edn, Oxford
Stansbie, D, Brown, R, Allen, T, and Hardy, A, 2013 The excavation of Iron Age ditches and a medieval farmstead at Allcourt Farm, Little London, Lechlade, 1999, *Trans Bristol Gloucestershire Archaeol Soc* **131**, 25–92
Steane, J, 1996 *Oxfordshire*, London
Steane, J, 1998 The grounds of Magdalen College 1480–1880, *Oxoniensia* **63**, 91–104
Steane, J, 2004 *The archaeology of the medieval English monarchy*, London and New York, https://docplayer.net/40445337-The-archaeology-of-the-medieval-english-monarchy.html [accessed 1 August 2022]
Steckel, R H, Kjellström, A, Rose, J, Larsen, C S, Walker, P L, Blondiaux, J, Grupe, G, and Maat, G, 2009 Summary measurement of health and wellbeing: the health index, *American J Physical Anthropol* Supplement **48**, 247
Stewart, C P, Iannotti, L, Dewey, K G, Michaelsen, K F, and Onyango, A W, 2013 Contextualising complementary feeding in a broader framework for stunting prevention, *Maternal and Child Nutrition* **9** (Suppl 2), 27–45, PMID: 24074316, PMCID: PMC6860787
Stone, D J, 2006 The consumption of field crops in late medieval England, in Woolgar *et al.* 2006, 11–26
Stratascan, 2005 Geophysical survey report: Magdalen College, Oxford, https://doi.org/10.5284/1001268
Strid, L, 2014 Animal bone, in Eleventh-century, later-medieval and early post-medieval evidence from investigations at Jesus College and Market Street, Oxford (R Bashford and B M Ford), *Oxoniensia* **79**, 229–31
Strid, L, 2020 Animal bone, in Teague and Ford 2020b, 389–93
Strid, L, forthcoming Animal bone, in Teague *et al*. forthcoming a
Strongman, S, 2018 Assessment of human remains from Mews Lane, in Ottaway and Qualmann 2018, 239–41
Stroud, G, 1998 Human bone, in Price with Ponsford 1998, 175–81
Sturdy, D, 1965 Topography of medieval Oxford, B Litt thesis, Univ Oxford
Sumbler, M G, Barron, A J M, and Morigi, A N, 2000 *Geology of the Cirencester district: memoir of the British Geological Survey sheet 235 (England and Wales)*, London
Sutherland, D S, 2003 *Northamptonshire stone*, Wimborne
Sweetinburgh, S, 2004 *The role of the hospital in medieval England: gift-giving and the spiritual economy*, Dublin
Sykes, N, 2010 European fallow deer, in O'Connor and Sykes (eds) 2010, 51–8
Sykes, N, and Curl, J, 2010 The rabbit, in O'Connor and Sykes (eds) 2010, 116–26

Taylor, K, and Hull, G, 2002 Excavation of post-medieval features and a dump of late eighteenth-century artefacts from 5/6–7 Market Street, Oxford, *Oxoniensia* **67**, 313–57
Teague, S, and Brown, R, 2020 Anglo-Saxon to post-medieval occupation at the Provost's Garden, The Queen's College, in Dodd *et al*. (eds) 2020, 139–200
Teague, S, and Ford, B M, 2020a Medieval and post-medieval tenements at the Garden Building, Lincoln College, in Dodd *et al*. (eds) 2020, 201–38
Teague, S, and Ford, B M, 2020b Medieval and post-medieval tenements at the Ashmolean Museum Extension Site, in Dodd *et al*. (eds) 2020, 325–400
Teague, S, and Ford, B M, forthcoming The late Saxon defensive rampart, Kitchen Yard, New College, Oxford, OA Thames Valley Landscapes Monogr
Teague, S, Norton, A, and Dodd, A, 2015 Late Saxon, medieval and post-medieval archaeology at the Nun's Garden, The Queen's College, Oxford, *Oxoniensia* **80**, 143–85
Teague, S, Munby, J, and Ford, B M, forthcoming a Oxford's south-west quarter: landscape and extramural settlement development. Archaeological evidence for prehistoric, late Saxon, medieval including the Greyfriars friary, post-Dissolution and modern periods from the Westgate, Paradise Square and Brewer Street excavations between 2010 and 2019, OA Monogr
Teague, S, Simmonds, A, and Ford, B M, forthcoming b Balliol College Recreation Ground, Jowett Walk, Oxford, in OA Thames Valley Landscapes Monogr
Teichert, M, 1975 Osteometrische Untersuchungen zur Berechnung der Widerristhöhe bei Schafen, in *Archaeological studies* (A T Clason), Amsterdam
Thompson, R H, and Dickinson, M J, 1993 *The Norweb Collection of tokens of the British Isles 1575–1750, part 4: Norfolk to Somerset*, Sylloge of Coins of the British Isles **44**
Thörle, S, 2001 *Gleicharmige Bügelfibeln des Frühen Mittelalters*, Universitätsforschungen zur Prähistorischen Archäologie
Tomek, T, and Bocheński, Z M, 2009 *A key for the identification of domestic bird bones in Europe: Galliformes and Columbiformes*, Kraków
Townley, S (ed.), 2016 *A history of the county of Oxford, vol 18: Ewelme Hundred*, Victoria County History, Oxford
Trow-Smith, R, 1957 *A history of British livestock husbandry to 1700*, London
Tucker, D G, 1972 Millstone making at Penallt, Monmouthshire, *Industrial Archaeol* **8**, 229–36
Tyler, K, Betts, I, and Stephenson, R, 2008 London's Delftware industry. The tin-glazed pottery of

Southwark and Lambeth, MoLAS Monogr **40**, London

Univ Southampton, 2003 *Animal bone metrical archive project (ABMAP)*, https://doi.org/10.5284/1000350

Vince, A, 1981 Summary finds report, in Gadd and Dyson 1981, 74–5
Vince, A G, 1985 The Saxon and medieval pottery of London: a review, *Medieval Archaeol* **29**, 25–93

Waldron, T, 1994 *Counting the dead: the epidemiology of skeletal populations*, Chichester
Walker, D, 2012a Medieval London, in Connell *et al*. 2012a, 149–94
Walker, D, 2012b Trauma, in Connell *et al*. 2012a, 88–108
Walker, G, and King, K, 2000 Early medieval and later tenements at 113–119 High Street, Oxford: excavations in 1993–1995, *Oxoniensia* **65**, 381–440
Wallis, S, 2014 *The Oxford henge and late Saxon massacre: with medieval and later occupation at St John's College, Oxford*, Thames Valley Archaeol Services Monogr **17**, Reading
Walter, B S, and DeWitte, S N, 2017 Urban and rural mortality and survival in medieval England, *Annals of human biology* **44 (4)**, 338–48, https://doi.org/10.1080/03014460.2016.1275792
Watson, P, 1994 Dental pathology, in Lilley *et al*. 1994, 495–507
Webb, H, and Norton, A, 2010 The medieval and post-medieval graveyard of St Peter-le-Bailey at Bonn Square, Oxford, *Oxoniensia* **74**, 137–79
Weetch, R, 2014 Brooches in late Anglo-Saxon England within a northwest European context: a study of social identities between the eighth and eleventh centuries, PhD thesis, Univ Reading
White, E, 1993 The measure of the meat, in *Food for the community. Special diets for special groups* (ed. A Wilson), Edinburgh, 5–42
WHO, 2009 *Infant and young child feeding: model chapter for textbooks for medical students and allied health professionals*, Geneva
Williams, J H, Shaw, M, and Denham, V, 1985 *Middle Saxon palaces at Northampton*, Northampton Development Corporation Monogr **4**, Northampton
Willmott, H, 2002 *Early post-medieval vessel glass in England c. 1500–1670*, CBA Res Rep **132**, York
Wilson, B, 1984 Medieval and post-medieval animal bones and marine shells, in Hassall *et al*. 1984, 265–8
Wilson, C A, 1991 *Food and drink in Britain*, London
Wilson, P, and King, M, 2003 *Arable plants: a field guide*, Old Basing
Wilson, B, Locker, A, and Marples, B, 1989 Medieval animal bones and marine shells from Church Street and other sites in St Ebbe's, Oxford, in Hassall *et al*. 1989, 258–68 [and Wilson and Locker microfiche]
Wilson, T, Cater, D, Clay, C, and Moore, R, 2012 *Bacton to King's Lynn gas pipeline, vol 1: prehistoric, Roman and medieval archaeology*, EAA **145**, Lincoln
Witkin, A, 2006 Human skeletal remains, in OA 2006b, 13–33
Woolgar, C M, Serjeantson, D, and Waldron, T (eds), 2006 *Food in medieval England: diet and nutrition*, Oxford
Worley, F, and Evans, E J, 2006 Animal bone, in Poore *et al*. 2006, 311–21

Yalden, D, 1999 *The history of British mammals*, London
Yeoman, P A, 1988 Excavation of an early post-medieval kiln at Temple Street, Brill, 1983, *Rec Buckinghamshire* **30**, 123–55

Zdilla, M J, Nestor, N S, Rothschild, B M, and Lambert, H W, 2021 Cribra orbitalia is correlated with the meningo-orbital foramen and is vascular and developmental in nature, *The Anatomical Record* **305 (7)**, 1629–71, https://doi.org/10.1002/ar.24825
Zeder, M A, and Lapham, H A, 2010 Assessing the reliability of criteria used to identify postcranial bones in sheep, *Ovis*, and goats, *Capra*, *J Archaeol Sci* **37 (11)**, 2887–905
Zeepvat, R, 2009 Rose Cottage, Tylers Green: excavation of a 15th to 17th century tilery, *Rec Buckinghamshire* **49**, 189–218

Index

Abbott, Benjamin, 185, 188
animal bones, 24–5, 27–9, 31–2, 35, 44, 46–7, 55, 58, 63, 73, 278–9, 282
  amphibians, 194, 197–200, 209
  black rats, 199, 209
  butchery, 193, 203–5, 207–8, 210–2, 283
  cat, 194–6, 198–9, 203, 205–6, 209
  cattle, 27–8, 31–2, 42–4, 46–7, 55, 63, 151, 193–211, 258, 282, 290–1
  dog, 206
  fallow deer, 52, 56, 63, 68, 195–6, 199, 202, 206–7, 209–11, 290
  hare, 74, 81, 194–6, 203, 206–7, 209–10
  horse, 27, 31–2, 44, 193–7, 201–7, 209, 211, 220, 281, 283, 288–90
  house mouse, 197–200, 203, 206–7, 209–10
  pig, 28, 31–2, 42–4, 55, 63, 193–211, 243, 282, 290
  rabbit, 71, 81, 193–203, 206–7, 209–10, 261, 290–1
  red deer, 204
  roe deer, 29, 194, 197, 203, 282
  sheep/goat, 24, 27–8, 31–2, 42–4, 46–7, 193–211, 282
Ashmole, Elias, 11

Bartlemas Chapel, 249–50, 258
Bayesian model, 20, 37, 245–6
bird bones
  chicken, 44, 60, 71, 193–200, 203, 205–11, 290–1
  duck, 194–200, 203, 205, 207–10, 282, 290–1
  goose, 28, 43, 47, 193–200, 203, 205–11, 282, 290–1
  lark, 196, 198–200, 207, 210
  passerines, 205, 208, 210, 290–1
  snipe, 196, 198, 200, 205, 209, 290
  swan, 11, 63, 195, 207, 290
  thrush, 196, 198–200, 207
  turkey, 197, 210
  waders, 196, 198, 200, 205, 290–1
  wild birds, 203, 205, 210–1, 261, 290
  woodcock, 29, 282
Black Death, 127, 250, 254, 290
Blackfriars (Dominican) friary, 249, 297
blacksmiths. See smithing
Boterel, Peter, 6, 278, 280, 284
brewing, 33, 115, 119, 220–1, 236, 274, 287
Buckler, John Chessell, 6, 10, 11, 12, 13, 292, 295, 296
buildings. See also structures
  Building 1, 29, 38, 49
  Building 2, 46, 131
  Building 3, 33, 47, 49, 63, 131
  Building 4, 44, 55
  Building 5, 52–3, 83, 170
  Building 6, 59–60, 168
  Building 7, 55, 59–60
  Building 8, 78, 131
  Building 9, 296
  Building 10, 296
  Building 11, 44, 84
  Building 12, 81
burh, 2, 5, 20, 113, 277–9, 280, 297
burials,
  adolescents, 36–7, 249, 252, 254, 270–72
  adults, 249, 252–3, 257, 260, 272–5
  children, 36–7, 163, 253–6, 262–3, 272, 274, 284–5
  head niche, 38, 284
infants, 33, 36–8, 251–4, 265, 272, 281, 283–4
  neonates, 1, 32–3, 36–7, 246–7, 249, 252–4, 256, 283
  zonation, 253, 274

cellar, 74, 86, 177–8
cemetery, 6–7, 12–13, 20, 25, 29, 31, 34–8, 49, 77, 130, 165, 244–7, 253–4, 277–8, 283–5
  Jewish cemetery, 5, 12, 13, 246, 250, 283–5
  population, 259, 284–5
ceramic building material
  bricks, 83, 85, 120, 122–4, 129, 277
  crested ridge tile, 68, 78, 83, 122, 124–7, 130–2
  finial, 163, 174–5
  medieval floor tiles, 127–8
  pantiles, 124, 126
  peg tiles, 73, 120, 122, 124, 126, 131
  ridge tile, 122, 124–6, 131
  roof tile, 68, 74, 77, 120, 122–4, 126, 130–1
cesspit, 56, 123, 131, 184, 215–16, 243
Chaplain's Quad, 13, 283, 285
charcoal, 27, 29, 31–3, 42, 44, 46–7, 49, 73–4, 77, 83, 155, 236–9, 241, 243, 279–80
  ash, 42, 44, 49, 55, 71, 73, 77, 212, 214, 237–9, 243
  beech, 33, 42, 44, 52, 55, 71, 73, 77, 237–9, 241–2
  blackthorn/cherry, 44
  elm, 42, 44, 55, 71, 73, 77, 237–9
  field maple, 42, 44, 52, 55, 237–9
  hawthorn-type, 33, 42, 237–8, 241
  hazel, 21, 33, 42, 44, 46, 55, 71, 73, 218, 237–9, 241
  heartwood, 44, 237–8, 241

holly, 55, 71, 77, 237–9
oak, 21, 52, 55, 61, 71, 73, 77, 129, 237–9, 241
willow/poplar, 42
Charles I, 78, 116
Chaucer, Thomas
'Miller's Tale', 9, 297
Christ Church, 116, 146, 296
cisterns, 90, 101, 115
Civil War, 7, 116, 163
crop processing, 119, 219–20, 222, 227, 236

de Malaunay, Hugh, 6
de Malauney, Hugo, 6
diet, 244, 246, 256, 261–3, 265, 268–70, 276, 282, 290–1
Domesday Book, 139, 279
drain, 44, 52–3, 68, 72–3, 81, 84, 124, 127, 139, 141, 160, 214–15, 289–90

Edward I, 5, 7, 47, 56,

fired clay/daub
building daub, 118
furnace lining, 119
wattle impressions, 18, 21, 33, 118–19, 237, 278–9
fish bones, 21, 25, 27, 29, 31, 33, 44, 60, 63, 71–4, 76–7, 212, 214–16
bleak, 27, 56, 212, 214–15, 282
bream, 216, 268
bullhead, 25, 27, 212, 214, 216, 282
burbot, 25, 27, 212–14, 216, 282
chub, 27
cod, 73, 213–17
conger eel, 73
cyprinids, 213–16
dab, 25, 212, 214–16
dace, 27, 212, 214, 216, 282
eel, 25, 27, 44, 56, 212, 214–17, 268, 282, 290
elasmobranch, 214
grey mullet, 213, 216–17
gudgeon, 27, 56, 212, 214–15, 282
gurnards, 213–17
haddock, 56, 213–17
hake, 213, 217
herring, 27
ling, 213, 216–17
loach, 27
mackerel, 56, 213–16
minnow, 27, 56, 212, 214–16, 282
perch, 8, 25, 212–16, 268, 280
pike, 25, 27, 212, 214–16, 282, 291
plaice, 213–17
pollack, 213–15
ray(s), 56, 212, 214–15
roach, 27, 56, 212, 214–16, 268, 282
ruffe, 27, 213–14, 216, 282
saithe, 215–16
salmon, 214, 217
sardine, 29, 33, 44, 212, 214, 217
scad, 213, 217
sea trout, 214–16
stickleback, 215–16, 282
stockfish, 215–17
tench, 212, 215–16, 268
Folly Bridge, 220, 224, 297
fuel, 31, 33, 46–7, 52, 56, 219–20, 222–3, 227, 229, 234, 236, 238–9, 241

glass
beads, 52, 153, 159–60, 162, 290–1
bottle seals, 84–5, 156, 159, 296
glass beaker or goblet, 86
vessel, 78
window glass, 154
wine bottle, 85, 155–6
Gorleston Psalter, 288–9
Gravel Walk, 10
Great Quad, 5, 6, 12, 284
Greyfriars (Franciscan) friary, 132, 133–6, 137–9, 141, 221, 241, 297
Greyhound Inn, 5, 10–12, 20, 78, 81, 117, 176, 186, 190, 292–3, 295–6
The Grove, 10, 36
Grove Buildings, 6, 12, 279, 283–4

hearths
domestic, 241, 283, 287
smithing hearths. See smithing hearth bottoms
Henry II, 161, 255, 272
Henry III, 5, 6, 13, 53, 68, 114, 161, 256, 259
hospital, 1, 5–10, 12–13, 115–16, 144, 250–1, 255–6, 258–9, 262, 264, 266–70, 272, 274, 276, 279–80, 283–8, 291
Hospital of St Bartholomew, 258, 267
Hospital of St Cross, 285
Hospital of St John the Baptist, 1, 8, 12, 20, 116, 128, 131, 132, 134, 141, 144, 255, 262, 272, 274, 279, 280, 283–7, 297
first site of, 5, 6–7, 141, 256, 284–5, 297
second site of, 5, 6–7, 13, 127, 131, 141, 255–6, 283–5, 291
Hospital of St John, Cambridge, 273, 285–6
human bone
achondroplasia, 249, 270–1, 285
anaemia, 265
bone inflammation, 249, 254, 256–8, 265
calculus, 263, 266, 268
caries, 263, 266, 268–70
childbirth, 256, 259, 276, 283
cleft palate, 249, 271–2, 276, 285
congenital, 249, 256, 270, 276
cribra orbitalia, 249, 259, 263, 265, 276, 285
demography, 251, 255, 286
dental enamel defects, 249
dental enamel hypoplasia, 263–4, 276, 285
dental modification, 249, 272–3
dental wear, 269
developmental, 249, 256, 270–1
diet, 254, 265
dysplasia, 249
enamel chipping, 270
endocranial lesions, 257
fractures, 273–5
infection, 249, 258–60, 265, 274

inflammation, 249
interpersonal violence, 256
isotopes, 254, 263
Klinefelter, 249, 253
leprosy, 258
life course, 286
maternity, 256
maxillary sinus, 257–8
mortality profile, 252, 254, 274
obstetric, 256
occupation, 272
orphan, 256, 276, 285–6
osteomyelitis, 259
periosteal new bone formation, 257–8, 262
physiological stress, 264–5, 276
Pott's disease, 258, 260
protein, 220, 262, 268, 276
respiratory infection, 259
rib lesions, 258–9, 262
rickets, 263, 265
scurvy, 249, 263, 265–6, 276
specific infection, 265
stature, 264–5, 276
trauma, 20, 254, 256, 272–4
tuberculosis, 249, 258–60, 262, 276, 285
weaning, 254

industrial activity
antler working, 42, 55
horn working, 193, 206
ironworking, 21, 49, 64, 114, 140, 179, 181, 183, 243, 280–1, 288–90
infirmary, 5, 12, 144, 284

Jewish community
Cemetery. See cemetery
expulsion of, 7, 285
mikveh, 12

kilns, 21, 33, 117–19, 185, 279, 287

lamps, 43, 46–7, 55, 90–4, 96–7, 110, 113–15, 141, 151–15, 282
latrine, 67–8, 78, 81, 83, 103, 105–6, 142, 144, 171, 173, 232, 234, 291–2
Longwall Quad, 1, 6, 12, 13–14, 16, 284, 297

Magdalen Bridge, 1, 10, 216, 274, 282
Magdalen Hall (Grammar School), 6, 9–12, 291
Malaunay, Hugh, 6, 284–5
Medieval suburb, 19, 163, 279–83, 290, 297
eastern, 1, 7, 20, 279, 284
northern, 163, 279
southern, 241, 279, 281
western, 279
metal objects
bar mount, 162, 164–5, 167, 173
brooch
annular, 43
equal-arm or ansate, 32, 162, 164–5
buckle plate, 32, 63, 164–5, 167
coins, 2, 160–2, 312
copper alloy bar mount, 44
dress buckle, 55
dress fittings, 32
ear scoop, 171
finger ring, 162
horse gear, 43, 162, 165, 171, 174
horseshoes, 44, 74, 77, 162–3, 165–7, 171, 288, 290
iron buckle, 67
iron padlock key, 78
iron scale-tang knife, 170
iron shears, 58
jettons, 160
knives, 44, 162–3, 171, 174, 304
lace tags, 64, 74, 162–3, 167, 170–1, 174
lock plate, 84, 175
loop fasteners, 162–3, 170–1
pocket-knife, 83, 163, 175
scale-tang knife, 33, 171, 174
spoon, 74, 162–3, 171, 173, 176, 178
tools, 44, 49, 141–2, 162, 170–1, 175, 183, 243, 288–9
weapons, 162
whittle-tang knife, 42, 165, 174–8, 288
wire pins, 162, 168, 175

ovens
bread, 221
crop-processing, 21, 119, 278
Oxford Castle, 119, 166, 185, 219, 241
mill, 151

Paving Commission Survey (1772), 6, 7, 10, 292, 294
pit groups, 24–5, 27–9, 31–2, 43, 46–7, 55–6, 94, 100–102, 107–8, 125–7, 129–31, 154, 159, 165–7, 181–2, 203–4, 214, 221–3, 236, 282–3
plant remains
apple/pear, 221, 235
arable crops, 221–2, 224
barley, 33, 218, 220–1, 223, 235
beans, 220, 222, 224–5, 265, 270, 290
black-thorn/cherry, 33, 237
bread wheat, 218–19, 221
broad beans, 220–2, 224, 228, 234–5
cabbages and turnips, 234–5
free-threshing wheat, 21, 32, 42, 61, 218–19, 221–4, 226, 228–9, 232, 234–6, 283
fruit seeds, 31, 221, 236
fruit stones, 234
grassland plants, 223, 236
hazelnut shells, 29, 31–3, 42, 46–7, 60, 63, 218, 220, 222–4, 226, 228–9, 232, 234–5
hulled barley, 219–22, 224, 228–9
legumes, 42, 46–7, 49, 52, 55, 73, 77, 218–20, 222–5, 227–9, 233–5, 238
oats, 28, 33, 218–24, 228, 235, 287
peas, 220, 222, 224–5, 228, 234–5, 265, 290–91
rye, 21, 28, 33, 218, 226
stinking chamomile, 220–3, 226, 229, 234
vetches, 220, 224–5, 290
walnuts, 225, 235

weeds, 218, 220–3, 225–6, 229, 234–6
wheat, 119, 218–22, 226, 236, 287
wild fruits, 223, 290
pottery
Andalusian lustreware vessel, 116
aquamanile, 43, 97, 100, 115
Ashampstead-type ware, 88, 93, 96, 101, 114
Bartmann face jug, 81
Bellarmine jugs, 83
bowls, 87, 90–4, 96, 100–1, 103, 105–6, 108, 112–15, 145–6, 150, 171, 173, 183–8
Brill/Boarstall ware, 32–3, 37, 44, 52, 61, 63, 96–97, 101, 103, 115
bunghole jar, 67
cauldrons, 73–4, 90–1, 101–2, 115, 170–1
Cistercian ware, 106
cistern bungholes, 101, 103, 116
condiment dish, 73, 78, 101–2, 106, 115
Cotswold-type ware, 37, 93
cruet, 100, 115
dripping dishes, 83, 106
English tin-glazed ware, 88, 107, 110, 112
Frechen stoneware vessel, 78, 81, 88, 107–8, 116
German stoneware, 116
Horticultural earthenware, 88, 110
Iberian Merida-type costrel, 116
jugs, 46, 81, 90–4, 96–7, 101, 103, 106–7, 114–16, 154, 282
Kennet Valley ware, 21, 25, 28, 31–2, 88, 93–4, 96–7, 101–3, 114, 282
Langerwehe stoneware, 88, 103, 116
medieval Oxford ware, 21, 27–9, 31–3, 37, 43, 90, 92–3, 96–7, 101–3, 114, 279, 282
Michelmersh ware, 25
Minety ware, 114
North French greyware, 113
pipkin, 44
Rhenish greyware, 35
Saintonge polychrome, 96, 114
salt-pig, 96
sauceboats, 85, 112, 117
skillets, 55–6, 90–1, 94, 96, 101–3, 115, 170–1
South Netherlands maiolica, 103
Spanish green-glazed ware, 88, 96, 114
Staffordshire-type slipware, 108, 110
Stamford ware, 88, 93, 96, 101, 114
St Neots ware, 24–5, 88, 92–3, 96, 113–14, 277, 279
sugar/slop-bowls, 85, 109–10, 117
Surrey/Hampshire border ware, 106
tankards, 20, 85, 112, 117, 154, 292
tea bowl, 85, 110, 112
tripod pitcher, 93
Westerwald-type stoneware, 109
Worcester glazed sandy ware, 88, 93, 94, 96, 114

Queen's College, late Saxon trackway, 278, 297

Radcliffe Infirmary, 277
Reading Abbey, 139, 141
River Cherwell, 151, 216, 225, 277, 279, 280, 282, 297
Late Saxon bridge over, 277
River Thames, 185, 216, 217, 282
crossing, 279, 297
Rosary beads, 160

St Peter-in-the-east Church, 6, 7, 8, 284, 285
St Swithun's Quadrangle, 6, 8
Scott, Sir Giles Gilbert, 6, 12, 13
shells
avian eggshell, 242
cockle valves, 242
mussels, 74, 242, 291
oyster, 58, 239, 242
small finds
amber beads, 73, 160
bone objects
beads, 64, 71
brushes, 85–6, 163
button, 47, 166
gaming counter, 165
skate, 53, 55, 162, 166–7
tuning pegs, 63, 73, 162, 169, 171, 173, 290
pierced scallop shell, 38
spindle whorl, 28, 162–3, 282
styli, 163, 173
wig curlers, 17, 20, 188–90
smithing, 19, 42, 171, 286, 288–9
metalworking evidence
bloom, 179, 181, 280
debris, 19, 21, 165, 237, 239
hammerscale, 21, 24, 27, 32–3, 44, 46, 49, 64, 179–83, 237, 239, 243, 280–1
iron slag, 21, 31–2, 44, 47, 56, 68–9, 179
smithing workshop
bellows, 179, 289–90
forge, 8–9, 182, 281, 286, 288
furnace, 42, 47, 49, 52, 118–19, 181–2, 237, 280, 289
hearth bottoms, 21, 24, 28, 43, 53–6, 67–69, 179, 181–3, 280–1, 288–9
stoking pit, 52
stone
building stone
architectural stone, 31, 136–9, 284
cornice sections, 140
hearth moulds, 140
quoin, 139–41
stone roofing material, 132, 136
stone objects
counters, 141, 150–1, 165
grindstones, 42, 83, 141–3
millstone, 59–60, 151–2, 312
mortars, 56, 67, 77, 138, 145, 147–9, 291
querns, 59, 141–2, 144, 151
slate pencil, 151
stone lamps, 138–9, 151–2
whetstones, 28, 42, 47, 56, 60, 67–9, 74, 141–3, 181–3, 281–2
structures. See also buildings
Structure 1, 281
Structure 2, 31
Structure 2A, 31
Structure 3, 31–2
Structure 4, 33, 47

Structure 5, 33
Structure 6, 67
Structure 7, 43
Structure 8, 47
Structure 9, 47, 60
Structure 11, 78
Structure 12, 64
Structure 13, 68
Structure 14, 83, 86
Thames Valley, 220, 222
Third Crusade, 255
timber buildings, 29, 279–81
Turner, Willam, 10–11, 292, 295

Wallingford Castle, 279, 280
Waynflete, William, 5
wells, 16, 31, 43–4, 81, 85, 296

Oxford Archaeology
Thames Valley Landscapes
Monograph no. 47

Excavations were undertaken between 2011 and 2014 in relation to modifications to the New Library at Magdalen College, Oxford, which is situated outside the historic town between the town wall and a major crossing of the River Cherwell.

Part of a cemetery was uncovered that dated to the late 12th to early 13th century and was probably associated with the nearby Hospital of St John the Baptist. Osteological analysis of the burials recorded abundant indicators of disease and poor nutrition, which, along with the predominance of women and children, indicates that they are the burials of lay people who died while in the care of the institution rather than those of the brethren.

The investigations also uncovered important evidence for the development of the town's historic eastern extramural suburb, comprising three tenements that fronted onto the road that approached the town's east gate. The properties were established during the 12th century and were acquired by the Hospital during the 13th century, passing to the newly founded college after the Dissolution, and were leased out to private tenants, exhibiting an unbroken sequence of occupation until they were demolished for the construction of Magdalen College School Hall (now the library building) in 1849–51. There was copious evidence for the operation of two of the tenements as smithies during the medieval period, and from the 16th century one of the buildings became the Greyhound Inn. Other intriguing discoveries include a unique cache of over 3600 17th-century pipeclay wig curlers and a possible link to Chaucer's 'Miller's Tale'. The excavation results are supplemented by analysis of documentary evidence from the college archive for the occupational histories of each tenement.









ARCHAEOPRESS ARCHAEOLOGY
www.archaeopress.com

oxford archaeology

MAGDALEN COLLEGE