London Transport Museum, Covent Garden

An Archaeological Archive Report

Volume II - Appendices

Planning Application Number: TP/4144; RN: 03/08388/FULL

National Grid Reference Number: TQ 3042 8085

AOC Project no: 7308

Site Code: LTM03

Date: January 2009

AOC Archaeology Group

ARCHAEOLOGY | HERITAGE | CONSERVATION

London Transport Museum, Covent Garden

An Archaeological Archive Report

Volume II - Appendices

On Behalf of:	**Wates Group Ltd**
National Grid Reference (NGR):	**TQ 3042 8085**
AOC Project No:	**7308**
Prepared by:	**Tim Carew**
Illustration by:	**Jonathan Moller**
Date of Excavation:	**June – October 2005**
Date of Report:	**January 2009**

This document has been prepared in accordance with AOC standard operating procedures.

Author: Tim Carew	**Date: January 2009**
Approved by:	**Date:**
Draft/Final Report Stage:	**Date:**

Enquiries to: AOC Archaeology Group
Unit 7
St Margarets Business Centre
Moor Mead Road
Twickenham
TW1 1JS

Tel. 020 8843 7380
Fax. 020 8892 0549
e-mail. london@aocarchaeology.com

AOC Archaeology Group

www.aocarchaeology.com

Contents

Non-Technical Summary

Archaeological investigations were undertaken in advance of groundwork on an extension to the London Transport Museum, adding a basement to the western gallery of the museum. These investigations culminated in an excavation of the area within the basement between June and October 2005. Both the Saxon and post-medieval remains are independently of regional or national importance.

Initial work on the documentary archive and the finds was undertaken, and an assessment report on the results of this excavation was produced in June 2006, with assessments of the stratigraphy, the significance of the results, the archive, and the assessment reports for the different classes of finds recovered. Following the recommendations of that report, further analysis of the documentary and physical archive has been completed. The specialist reports for that work are presented in Volume II of this report.

Two papers have been written for publication on the remains from the site, and are presented in Volume I of this report. One is on the Saxon remains, and will be submitted to the 'Transactions of the London and Middlesex Archaeological Society', or to 'Medieval Archaeology'. The other is on the post-medieval remains, and will be submitted to 'Post-Medieval Archaeology'.

The archive is being prepared for deposition at the London Archaeological Archive Resource Centre. All the reports for the project will be available through the Archaeological Data Service (ADS) website.

Bibliography for the Appendices

Åberg, N, 1926, The *Anglo-Saxons in England during the early centuries after the invasion*, Arbeten utgivna med understöd av Vilhelm Ekmans Universitatsfond 33, Uppsala

Allen, M J, 2005, 'Radiocarbon dating', in Birbeck et al, 11–3

Amorosi, T, 1989 'A postcranial guide to domestic neo-natal and juvenile mammals' *BAR Int Ser* **533**, Oxford

Andrews, P (ed), 1988, *The coins and pottery from Hamwic*, Southampton Finds Vol 1, Southampton

Andrews, P, with Phillips, H, 1997 'The stone', in Andrews (ed), 240–1

Andrews, P (ed), 1997, *Excavations at Hamwic: Vol 2 Excavations at Six Dials*, Southampton Archaeol Monogr 7, CBA Res Rep 109, York

Annaert, R, and van Heesch, J, 2004, 'A Merovingian gold hoard at Broechem, (Ranst, prov. of Antwerp)' *Archaeology in Flanders VIII, 2001/2002*, 229–56, Brussels

AOC Archaeology Group 1999, *45-47 Floral Street / 51-54 Long Acre, City of Westminster, London WC2. An Archaeological Assessment*. Unpublished report.

AOC Archaeology Group, 2001, *45-47 Floral Street / 51-54 Long Acre, City of Westminster, London WC2. A Post-Excavation Assessment*. Unpublished report.

AOC Archaeology 2003, *An Archaeological Impact Assessment of London's Transport Museum, Covent Garden, City of Westminster*. Unpublished report.

AOC. 2006a, *London Transport Museum Covent Garden, City of Westminster. A post-excavation assessment report.* Unpublished report.

AOC. 2006b, *45-47 Floral Street / 51-54 Long Acre. Archaeological Excavation. Unpublished post-excavation archive report.* Unpublished report.

Armitage, P L, 1982, 'Developments in British cattle husbandry from the Romano-British period to early modern times' *The Ark*, **9**, 50-4

Arwidsson, G, and Berg, G, 1983, *The Mästermyr find: a Viking Age tool chest from Gotland*, Stockholm

Askey, D, 1998, *Stoneware bottles 1500–1949, from Bellarmines to ginger beers*, Loughborough

Aufderheide A C, & Rodríguez-Martín C., 1998, *The Cambridge Encyclopaedia of Human Paleopathology.* Cambridge University Press, Cambridge.

Austin, J C, 1994, *British delft at Williamsburg*, Colonial Williamsburg Foundation

Avent, R, 1975a, *Anglo-Saxon Garnet Inlaid Disc and Composite Brooches* Brit Archaeol Rep Brit Ser 11, Vol 1

Avent, R, 1975b, *Anglo-Saxon Garnet Inlaid Disc and Composite Brooches* Brit Archaeol Rep Brit Ser 11, Vol 2

Avent, R, and Leigh, D, 1977, 'A study of cross-hatched gold foils in Anglo-Saxon jewellery' *Medieval Archaeol* **21**, 1–46

Barnes, E, 1994, *Developmental Defects of the Axial Skeleton in Palaeopathology.* University Press of Colorado, Boulder.

Bass W M, 1995, *Human Osteology: A Laboratory and Field Manual.* Missouri Archaeological Society Inc, Missouri.

Berry A C, & Berry R J, 1967, 'Epigenetic variation in the human cranium' *Journal of Anatomy* **101**, 361-379.

Betts, I M 2006 'South terrace excavations, St Martin-in-the-Fields (SMD01): building material', unpub MoLAS report

BGS (2006), British Geological Survey. *England and Wales Sheet 256 North London bedrock and superficial deposits 1:50 000.* British Geological Survey 1:50 000 geology series. Keyworth, Nottingham, UK, British Geological Survey.

Bickerton, L M, 1993, *English Drinking glasses 1675–1825*, Shire Album 116, Princes Risborough

Birbeck, V, with Smith, R J C, Andrews, A, and Stoodley, N, 2005, *The origins of mid-Saxon Southampton; excavatios at the Friends Provident St Mary's Stadium 1998–2000*, Wessex Archaeology

Blackmore, L, 1988, 'The pottery' in Cowie and Whytehead, 81–110

Blackmore, L, 1988, 'The loomweights and spindlewhorls' in Cowie and Whytehead, 111–14

Blackmore, L, 1988, 'The worked bone and antler' in Cowie and Whytehead, 134–9
Blackmore, L, 1989, 'The pottery' in Whytehead and Cowie, 71–107
Blackmore, L, 1989, 'A key mould' in Whytehead and Cowie, 128–9
Blackmore, L, 1989, 'The worked bone' in Whytehead and Cowie, 131–2
Blackmore, L, 1993, 'La céramique du Vème au Xème siècles à Londres et dans la region londonienne' in Piton (ed), 129–50
Blackmore, L, 1999, 'Aspects of trade and exchange evidenced by recent work on Saxon and medieval pottery from London' *Trans London Middlesex Archaeol Soc* 50, 38–54
Blackmore, L, 2001, 'Pottery: trade and tradition', in Hill and Cowie (eds), 22–42
BLACKMORE (2002), L Blackmore 'The Origin and Growth of Lundenwic, a Mart of many Nations' in B Hàrdh & L Larsson (eds) *Central Places in the Migration and Merovingian Periods* Uppåkrastudier 6, Acta archaeologica Lundensia series 8, no. 39, 273-301 Stockholm
Blackmore, L, 2002, 'The registered finds from 51-54 Long Acre / 45-47 Floral Street, London WC2 (FLR00)', in AOC. 2006b
Blackmore, L, 2003, 'The pottery' in Malcolm and Bowsher, 225–41
Blackmore, L, 2003, 'Antler- and boneworking' in Malcolm and Bowsher, 170-5
Blackmore, L, 2003, 'Worked bone and antler objects and waste' in Malcolm and Bowsher, 302-15
Blackmore, L, 2003, 'Metalworking', in Malcolm and Bowsher, 175-80
Blackmore, L, 2003, 'The iron objects' in Malcolm and Bowsher, 251-64
Blackmore, L, 2003, 'The non-ferrous metalwork' in Malcolm and Bowsher, 264-71
Blackmore, L, in prep, 'The pottery' in Cowie and Blackmore
Blackmore, L, in prep, 'The pottery' in Cowie et al
Blackmore, L, with Dennis, M, 2003, 'Non-ferrous metalworking' in Malcolm, G, and Bowsher, D, with Cowie, R, *Middle Saxon London, excavations at the Royal Opera House 1989-99*, MoLAS Monograph 15, 271-5 *and passim*
Blackmore, L, and Williams, D, 1988, 'The stone' in Cowie and Whytehead, 132–4
Blackmore, L, and Vince, A, in prep, 'Local and regional pottery production' in Swift et al
Blackmore, L, and Vince, A, in prep, 'Pottery supply' in Cowie et al
Blackmore, L, and Vince, A, in prep, 'Pottery supply' in Cowie and Blackmore
Blackmore, L, Vince, A, and Cowie, R, 2004, 'The origins of Lundenwic? Excavations at 8-9 Long Acre/16 Garrick Street, WC2' *London Archaeol* **10 (11)**, 301-305
Blinkhorn, P, 1997, 'Habitus, social identity and Anglo-Saxon pottery' in Cumberpatch, C G, and Blinkhorn, P (eds) *Not so much a pot, more a way of life, current approaches to artefact analysis in archaeology*, Oxbow Monogr 83
Böhner, K, 1958, *Die fränkishen Altertümer des Trierer Landes*, Germanische Denkmäler der Völkerwanderungszeit Ser B, Berlin
Brears, P C D, 1971, *The English country pottery, its history and techniques*, Newton Abbot
Brears, P C D, 1974, *The collector's book of English country pottery*, Newton Abbot
Breuer, J, and Roosens, H, 1957, 'Le cimetière franc de Haillot' *Archaeologica Belgica* **34**
Brickley, M, & McKinley, J I, (eds) 2004. *Guidelines to the Standards for Recording Human Remains*. *Institute of Field Archaeologists Technical Paper No. 7.* BABAO/IFA, Reading.
Brickley, M, 2004, 'Determination of sex from archaeological skeletal material and assessment of parturition' in Brickley, M, McKinley, J, (eds.). *Guidance to standards for recording human skeletal remains IFA technical paper 7. BABAO/IFA,* Reading. 22-24
Bronk Ramsey, C, 2005, *OxCal v3.10*
Brooks, S, and Suchey, J M, 1990, 'Skeletal age determination based on the Os Pubis: A comparison of the Acsádi-Nemeskéri and Suchey-Brooks methods' *Human Evolution* **5** 227-238.
Brothwell, D R, 1981, *Digging Up Bones*. Third edition. Cornell University Press, New York.
Brothwell, D R, and Zakrzewski, S, 2004, 'Metric and non-metric studies of archaeological human bone' in Brickley, M, & McKinley, J I, (eds.) 26-32
Brown, D, 1977, 'The significance of the Londesborough ring brooch' *Antiq Journ* **57**, part I, 95–9

Brugmann, B, 1997, 'Typology and dating' in Parfitt, K, and Brugmann, B, *The Anglo-Saxon cemetery at Mill Hill, Deal*, Soc Medieval Archaeol Monogr 14, London, 31–94

Brugmann, B, 1997 'Die Perlen des angel-sächsishen Graberfeldes von Mill Hill, Deal, Kent' in von Freeden and Wieczorek, (eds) 125–32

Brugmann, B, 2004, *Glass beads from Early Anglo-Saxon graves*, Oxford

Buikstra, J, and Ubelaker, D H, 1994, *Standards for Data Collection from Human Skeletal Remains*. Arkansas Archaeological Survey Series Nr 44.

Butler, J, 2005, *Saxons, Templars and lawyers in the Inner Temple; archaeological excavations in Church Court & Hare Court*, PCA Monogr 4

Buro Happold, 2003, *London Transport Museum: The Covent Garden Project Stage D Geotechnical Report*. Unpublished report

Capon, L, 2006, 'Saxon activity at 15–17 Long Acre, City of Westminster' *London Archaeol* **11 (7)**, 171–6

Cannon, D Y, 1987, *Marine fish osteology: a manual for archaeologists*. Simon Fraser University Department of Archaeology publication no. 18

CAREW & LEONARD (in prep), T Carew & A Leonard, 'A Covent Garden 'Hummum' and (probable) Brothel: the Post-medieval Remains at the London Transport Museum'

Clapham, A, Tutin, T, and Moore, D, 1987, *Flora of the British Isles. 3rd edition.* Cambridge University Press.

Clark, J, (ed.) 1995, *The medieval horse and its equipment, c 1150–c 1450*. Medieval finds from excavations in London: 5, 169-174. HMSO & Museum of London

Cohen, A, & Serjeantson, D, 1996, *A manual for the identification of bird bones from archaeological sites* London. Archetype Publications Ltd.

Connell, B. & Rauxloh, P, 2003, *A Rapid Method for Recording Human Skeletal Data.* Unpublished recording manual for the Museum of London Specialist Services.

Cook, A M, 1985, 'The Anglo-Saxon cemetery' in Cook and Dacre, 21-109

Cook, A M, and Dacre, M W, 1985, *Excavations at Portway, Andover 1973-1975, Anglo-Saxon Cemetery, Bronze Age Barrow and Linear Ditch*, Oxford University Committee for Archaeology Monograph No.4

Copeland, R, 1999, *Spode's willow pattern and other designs after the Chinese*, (3rd Edn), London

Cowie, R, 1988, 'A Gazetteer of Middle Saxon sites and finds in the Strand / Westminster area' *Transactions of the London and Middlesex Archaeology Society* **39**

COWIE (2000), R Cowie 'Londinium to Lundenwic: Early and middle Saxon Archaeology in the London Region' in I Haynes, H Sheldon and L Hannigan (eds.) *London Under Ground: the Archaeology of a City*. Oxford, 175-205.

COWIE (2001a), R Cowie 'Mercian London' in M P Brown & C A Farr (eds.) *Mercia: an Anglo-Saxon Kingdom in Europe*. London / New York, pp. 188-203.

COWIE (2001b), 'London' in R Cowie, R L Kemp, A Morton & K Wade 'Appendix 1: Gazetteer of Known English Wics' in D Hill & R Cowie (eds) *Wics. The Early Medieval Trading Centres of Northern Europe*. Sheffield, 87-9.

Cowie, R, and Blackmore, L, *Early and Middle Saxon rural settlement in the London region*, for MoLAS Monograph series

Cowie, R, and Blackmore, L, with Davis, A, Keily, J, and Rielly, K, in prep *Lundenwic: excavations in Middle Saxon London, 1987–2000*, MoLAS Monogr Ser

Cowie, R, & Whytehead, R, 1989, 'Lundenwic: the archaeological evidence for middle Saxon London' *Antiquity* **63**, 706-18

Cowie, R, & Whytehead, R, with Blackmore, L, 1988, 'Two Middle Saxon Occupation Sites: Excavations at Jubilee Hall and 21-22 Maiden Lane' *Transactions of the London and Middlesex Archaeological Society* **39**, 47-163

Cox, A, 1989, 'Bricks to build a capital' in Hobhouse, H, & Saunders, A, (eds) Good *and proper materials: the fabric of London since the Great Fire*, London, 3-17

Cox, M, 2000, 'Assessment of parturition' in Cox, M, & Mays, S, (eds) *Human Osteology in Archaeology and Forensic Science.* Greenwich Medical Media Ltd, London. 131-142.

Crabtree, P J, 1989, 'West Stow, Suffolk: early Anglo-Saxon animal husbandry' *East Anglian Archaeology report* **47**

Crellin, J K, 1969, *A catalogue of the English and Dutch collections in the Museum of the Wellcome Institute of the History of Medicine*, London

Crummy, N, 1983, *The Roman small finds from excavations in Colchester 1971–9.* Colchester Archaeol Rep 2, Colchester

Davis, A, 2003, 'The plant remains' in Malcolm, and Bowsher, 289-302

Davis, A, & de Moulins, D, 1993, 'The plant remains' in Cowie, R, (ed) *Two middle Saxon sites: excavations at Jubilee Hall and 21-22 Maiden Lane. Trans. London and Middlesex Archaeol. Soc* **39**. (1988) 139-147

Dickinson, T M, 1974, 'Excavations at Standlake Down in 1954: the Anglo-Saxon graves' *Oxoniensia* **38**, 239-57

Driesch, A, von den & Boessneck, J, 1974, 'Kritische Anmerkungen zue Widerristhohenberechnung aus Langenmassen vor-und-fruhgeschichtlicher Tierknochen *Saugetierkundliche Mitteilungen* **22***, 325-348*

Driesch, A von den, 1976, *A guide to the measurement of animal bones from archaeological sites*. Peabody Museum Bulletin 1 Cambridge, Massachusetts

Drinkall, G, and Foreman, M, 1998, 'The Anglo-Saxon cemetery at Castledyke South, Barton-on-Humber' *Sheffield Excav Rep* **6**, Sheffield

Dumbrell, R, 1983, *Understanding antique wine bottles.* Woodbridge

East, K, 1985, 'A study of the cross-hatched gold foils from Sutton Hoo'. *Anglo-Saxon studies in Archaeol and Hist* **4**, 129–42

Egan, G, 1991, 'Buckles' in Egan, G, and Pritchard, F, *Medieval finds from excavations in London 3: Dress accessories c. 1150–c. 1450*. London 50–123

Ellis, S E, and Moore, D T, 1990, 'The hones' in Biddle, M, (ed) 1990, *Object and economy in medieval Winchester: artefacts from medieval Winchester.* Winchester Studies **7(2)** (2 vols), Oxford, 868–81

English Heritage, 1991, *Management of Archaeological Projects.* Historic Buildings and Monuments Commission for England, London.

English Heritage, 2002, *Centre for Archaeology Guidelines. Human Bones from Archaeological Sites. Guidelines for producing assessment documents and analytical reports.* English Heritage, Swindon.

van Es, W A, and Verwers, W J H, (eds) *Excavations at Dorestad: I, the harbour: Hoogstraat I*, Nederlandse Oudheden 9, Amersfoort 238–47

Every, R, 'Glass and amber beads' in Birbeck, 67–8

Evison, V I, 1965, *The fifth-century invasions south of the Thames*, London

Evison, V I, 1987, *Dover: The Buckland Cemetery*, Historic Buildings and Monuments Commission for England Report, 3, London

Evison, V I, 1988, 'The glass' in Cowie and Whytehead, 119–23

Evison, V I, 1989, 'The Saxon glass' in Whytehead and Cowie, 112–6

Evison, V I, 2000, 'Glass vessels in England, AD 400–1100' in Price, 47–104

Evison, 2005, 'The glass' in Butler, 60–1

Fenwick, V, (ed) 1978, *The Graveney boat: a tenth-century find from Kent*, Brit Archaeol Rep 53

Finnigan, M,1978, 'Non metric variation in the infra-cranial skeleton' *Journal of Anatomy* **125**, 23-37.

von Freeden, U, and Wieczorek, A, (eds) 1997, *Perlen, Archäologie, Techniken Analysen, Akten des Internationalen Perlensymposiums in Mannheim vom 11. bis 14. November 1994*, Bonn

Freshwater, T, 1996, 'A lava quern workshop in Late Saxon London' *London Archaeol*, **8 (2)**, 39–45

Geake, H, 1997, *The use of grave-goods in Conversion-period England* c *600–850*, BAR Brit Ser 261, Oxford

Godden, G A, 1992, *An illustrated encyclopaedia of British pottery and porcelain*, 2nd Edn, Leicester

Goffin, R, 1988, 'The Saxon daub' in Cowie, R, & Whytehead, R L, (eds) Excavations at Jubilee Hall and 21-22 Maiden Lane, *Tran London Middlesex Archaeol Soc* **39**, 114-119

Goffin, R, 2003, 'The loom weights' in Malcolm and Bowsher, 216–22

Goffin, R, 2003, 'The stone objects' in Malcolm and Bowsher, 197–209

Goodburn-Brown, D, with Slipper, I, and Bayley, J, 2005, 'The crucible residues' in Bulter, 61

Grant, A, 1982, 'The use of tooth wear as a guide to the age of domestic ungulates' in Wilson, B, Grigson, C, & Payne, S, (eds.) *Ageing and sexing animal bones from archaeological sites.* BAR Brit Ser 109, 91-108

Greater London Historic Buildings, Sites and Monuments Record. MLO22222. Accessed 2005.

Greater London Historic Buildings, Sites and Monuments Record MLO38072. Accessed 2005.

Green, C, 1999, *John Dwight's Fulham Pottery, excavations 1971–79*, English Heritage Archaeol Rep 6

Greig, J, 1991, 'The British Isles' in van Zeist, W, Wasylikowa, K, and Behre K (eds) *Progress in Old World Palaeoethnobotany. A retrospective view on the occasion of 20 years of the International Work Group for Palaeoethnobotany*. Balkema, Rotterdam, 299-334.

Guido, M, 1999, *The Glass Beads of Anglo-Saxon England c AD 400–700.* Reports of the Research Committee of the Society of Antiquaries 58, London

Gustafson, G, & Koch, G, 1974, 'Age estimation up to sixteen years of age based on dental development' *Odontologisk Revy* **25**, 297-306.

Hadley, D M, 2001, *Death in Medieval England: An archaeology.* Tempus Publishing Ltd, Stroud.

Hagen, A, 1995, *A second handbook of Anglo-Saxon food: production and distribution,* Norfolk.

Hamerow, H, 1993, *Excavations at Mucking: Vol 2, The Anglo-Saxon settlement*, Engl Heritage Archaeol Rep 21, London

Härke, H, 1989, 'Knives in Early Saxon burials: blade length and age at death' *Medieval Archaeol* **33**, 144-48

Härke, H, 1992, *Angelsächsische Waffengraber des 5 bis 7 Jahrhunderts, Zeitschrift fur Archäologie des Mittelalters Beiheft* 6, Cologne

Hather, J, 2000, *The Identification of the Northern European Woods: A guide for archaeologists and conservators*. London: Archetype.

Hawkins, D, Kain, A, and Wooldridge, K, 2002, 'Archaeological investigations at East Lane and South Lane, Kingston-upon-Thames, 1996–8' *Surrey Archaeol Collect* **89**, 185–210

Haynes, I, Sheldon, H, and Hannigan, L, (eds) 2000, *London Underground: The Archaeology of a City*

Hedges, J W, 1978, 'The loomweights' in Collis, J, *Winchester Excavations, Excavations in the suburbs and western parts of the town 1949–1960: volume II*. Winchester, 33-9

Henderson, A M, 1949, 'The small metal objects in metal, bone, glass etc' in Bushe-Fox, J P, *Fourth report on the excavations of the Roman fort at Richborough, Kent*, Soc Antiq Res Rep 66, 106–59

Hildyard, R J C, 1985, *Browne muggs: English brown stoneware*, Victoria and Albert Museum

Hillson, S, 1996, *Dental Anthropology.* Cambridge University Press, Cambridge.

Hinton, D A, 1996, *The gold, silver and other non-ferrous alloy objects from Hamwic, and the non-ferrous metal-working evidence*, Southampton Finds Vol 2, Stroud

Hinton, D A, 2000, *A smith in Lindsey, the Anglo-Saxon grave at Tattershall Thorpe, Lincolnshire.* Soc Medieval Archaeol Monogr 16

Hirst, S, 2000, 'An approach to the study of Anglo-Saxon glass beads' in Price, 121–30

Hodges, R, 1981, *The Hamwih pottery: the local and imported wares from 30 years' excavation at Middle Saxon Southampton and their European context*, CBA Res Rep 37, London

Holden, E W, 1976, 'Excavations at Old Erringham, Shoreham, West Sussex, Part 1: a Saxon weaving hut' *Sussex Archaeol Collect* **114**, 306–21

Hubert, F, 1963, 'Cimetière du parc de l'hôtel de ville de Tournai' *Archaeologica Belgica* **68**, 27–60

Huggett, J W, 1988, 'Imported grave goods and the Anglo-Saxon economy' *Medieval Archaeol* **32**, 63–96

Hughes, R, 2004, 'Wattle and daub: a technical and experimental study based on materials from the National Portrait Gallery' in Leary 115-140

Hunter, J R, and Heyworth, M, 1998, *The Hamwic glass*, Counc Brit Archaeol Rep 116

Hurst, J G, 1959, 'Middle Saxon Pottery' in Dunning, G C, Hurst, J G, Myres J N L, and Tischler F, Anglo-Saxon Pottery: a Symposium, *Medieval Archaeol* **3**, 13–31

İsçan, M Y, and Loth, S R, 1984,. 'Determination of age from sternal rib in white males: A test of the phase method' *Journal of Forensic Sciences* **31**, 122-132.

İşçan, M Y, Loth, S R, and Scheuerman, E H, 1985. 'Determination of age from the sternal rib in white females. A test of the phase method' *Journal of Forensic Sciences* **31**, 990-999.

Isings, C, 1957, *Roman glass from dated finds*, Groningen

Jarrett, C, 2004, 'The pottery' in Leary, 14–9

Jarrett, C, 2004, 'The pottery' in Brown and Rackham, 48–52

Jarrett, C, 2004, 'The pottery' in Leary and Wooldridge, 77–82

Jarrett, C, 2004, 'The pottery' in Pickard, 91–5

Jarrett, C, 2004, 'The loomweights' in Pickard, 95–7

Jarrett, C, 2005, 'The pottery' in Butler, 53–6

Jarrett, C, 2005, 'The loomweights' in Butler, 61–3

Kars, H, 1980, 'Early medieval Dorestad, an archaeo-petrological study' *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* (*BROB*) **30**, 393–422

Kearns, T, Martinón-Torres, M, and Rehren, T, in prep, 'Metal to mould: Alloy identification in experimental casting moulds by ED-XRF', *IAMS (Institute for Archaeo-Metallurgical Studies Journal)* (in press 2007)

Keepax, C, 1988, *Charcoal analysis with particular reference to archaeological sites in Britain*. Unpublished Ph.D. thesis submitted to the University of London.

Keily, J, 2003, 'The fired ceramic objects' in Harward, C, with Blackmore, L, Keily, L, and Whittingham, L, Saxo-Norman occupation at Beckenham, Kent? *London Archaeol* **10 (7)**, 174–6

Keily, J, in prep, 'Ceramic spindlewhorl and loom weights' in Cowie et al

Keily, J, in prep, 'The worked bone and antler objects' in Cowie et al

Kelley, M, Larsen, C S, (eds) 1991, *Advances in Dental Anthropology*. Alan R Liss, New York.

Kendrick, T D, 1933, 'Polychrome jewellery in Kent' *Antiquity* **7**, 429–52

Koch, U, 1977a, *Das Reihen Gräberfeld bei Schretzheim,* Römisch-Germanische Kommission Des Deutschen Archäologischen Instituts, Vol 1, Berlin

Koch, U, 1977b *Das Reihen Gräberfeld bei Schretzheim,* Römisch-Germanische Kommission Des Deutschen Archäologischen Instituts, Vol 2, Berlin

Koch, U, 1997, 'Polychrome Perlen in Württembeg / Nordbaden' in von Freeden and Wieczorek, (eds) 143–8

Koch, U, 2001, *Das alamannisch-fränkische Gräberfeld bei Pleidelsheim*, Forschungen und Berichte zur Vor- und Frühgeschichte Baden-Württemberg 60, Stuttgart

Laidlaw, M, 2004, 'The small finds' in Leary and Wooldridge, 83–4

Larsen, C S, 1999, *Bioarchaeology: Interpreting Behaviour from the Human Skeleton.* Cambridge University Press, Cambridge.

Leahy, K, 2003, *Anglo-Saxon crafts*, Stroud

Leary, J, 1999, *Phased summary and assessment document of an archaeological excavation at 28-30 James Street, Covent Garden, City of Westminster, SW1.* Pre-Construct Archaeology, unpublished report. Greater London Historic Buildings, Sites and Monuments Record MLO75811, accessed 2005.

LEARY (2004a), J Leary 'Life and death in the heart of the settlement: excavations at 28–31 James Street' in Leary 2004b, 6–39

LEARY (2004b), J Leary, with G Brown, J Rackham, C Pickard & R Hughes *Tatberht's Lundenwic: Archaeological Excavations in Middle Saxon London*. Pre-Construct Archaeology Monograph 2.

Leary, J, and Wooldridge, K, 2004, 'Maiden Lane revisited: excavations at 21–24 Maiden Lane and 6–7 Exchange Court' in Leary, 73–86

Leeds, E T, 1936, *Early Anglo-Saxon Art and Archaeology*, Oxford

Leeds, E T, 1957, 'Notes on Jutish art in Kent between 450 and 575' *Medieval Archaeol* **1**, 5–26

Leigh, D, 1984, 'The Kentish keystone-garnet disc brooches' *Anglo-Saxon Archaeol Hist* **3**, 67–76

Lethbridge, T C, 1931, *Recent excavations in Anglo-Saxon cemeteries in Cambridgeshire and Suffolk*, Cambs Antiq Soc Qto Pub, New Ser 3, Cambridge

Lloyd, N, 1925, *A history of English brickwork* (reprinted by Antique Collectors Club 1983), Woodbridge

Lovejoy, C O, Meindl, R S, Pryzbeck, T R, & Mensforth, R P, 1985, 'Chronological metamorphosis of the auricular surface of the ilium: A new method for the determination of adult skeletal age at death'. *American Journal of Physical Anthropology* **68**, 15-28.

Loveluck, C P, 1998, 'A high-status Anglo-Saxon settlement at Flixborough, Lincolnshire' *Antiquity* **72**, 146–61

Loader, E, 2005, 'Grave goods from the inhumation burials' in Birbeck, 53–75

Lucy, S, 2000, *The Anglo-Saxon Way of Death*. Sutton Publishing Ltd, Stroud.

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, Oxford: a summary catalogue of the Anglo-Saxon collections (non-ferrous metals)*, BAR Brit Ser 230, Oxford

MacGregor, A, Mainman, A J, and Rogers, N S H, 1999, *Bone, antler, ivory and horn from Anglo-Scandinavian and Medieval York*. The Archaeology of York, The Small Finds, 17/12

Malcolm G, 1991, *67-68 Long Acre. Archaeological excavation and watching brief carried out by Department of Greater London Archaeology.* Greater London Historic Buildings, Sites and Monuments Record MLO58051. Unpublished, accessed 2005.

MALCOLM & BOWSHER (2003), G Malcolm & D Bowsher with R Cowie *Middle Saxon London, Excavations at the Royal Opera House 1989-99*, MoLAS Monograph 15.

Malcolm, G, and Bowsher, D, with Cowie, R, 2003, *Middle Saxon London: excavations at the Royal Opera House 1989–99*, MoLAS Monogr Ser 15, London

Mainman, A J, and Rogers, N S H, 2000, *Finds from Anglo-Scandinavian York*. The Archaeology of York, 17/14

Maloney, J, 1996, 'Archaeology and History of the Royal Opera House' AOC Archaeology, unpublished report

Mann, R W & Hunt, D R, 2005, *Photographic Regional Atlas of Bone Disease. A Guide to Pathologic and Normal Variation in the Human Skeleton.* Charles C Thomas, Springfield.

Martin, M, 1989 'Bemerkungen zu den chronologischen Gliederung der fruhen Merowingerzeit' *Germania* **67**, 12-41

Martinón-Torres, M, 2007, 'A note on the crucible and mould fragments from London Transport Museum', unpublished report

Massey, R, Pearce, J, and Howard, R, 2003, *Isleworth pottery and porcelain: recent discoveries*, Exhibition Catalogue 5–13 June 2003.

Marzinzik, S, 2003, *Early Anglo-Saxon belt buckles (late fifth to early eighth centuries AD): their classification and context*, British Archaeol Rep 357, Oxford

McKinley, J, 1989, 'Spong Hill: Anglo-Saxon cremation cemetery' in Roberts, C A, Lee, F, Bintliff, J, (eds) *Burial archaeology, current research, methods, developments*. British Archaeological Reports British Series 211, 241-248

McKinley, J, 1994, 'The Anglo-Saxon cemetery at Spong Hill, North Elmham Part VIII: The Cremations' *East Anglian* Archaeology **69**, 6-109.

McKinley, J, 2000, 'The analysis of cremated bone' in Cox, M, and Mays, S, (eds) *Human Osteology in Archaeology and Forensic Science*. Greenwich Medical Media Ltd, London. 403-421.

McKinley, J, 2003, 'The Early Saxon cemetery at Park Lane, Croydon' *Surrey Archaeol Collect* **90**, 1–116

McKinley, J, 2004, 'Compiling a skeletal inventory: cremated human bone' in Brickley M, & McKinley J, (eds) *Guidelines to the Standards for Recording Human Remains*. *Institute of Field Archaeologists Technical Paper No. 7.* BABAO/IFA, Reading. 9-12.

Meaney, A L, 1981, *Anglo-Saxon Amulets and Curing stones*, BAR Brit Ser 96, Oxford

Meeks, N D, and Holmes, R, 1985, 'The Sutton Hoo garnet jewellery: an examination of some gold backing foils and a study of their possible manufacturing techniques' *Anglo-Saxon studies in Archaeol and Hist* **4**, 143–57

Meindl, R S, Lovejoy, C O, Mensforth, R P, and Walker, R A, 1985, 'A revised method of age determination using the os pubis, with a review and tests of accuracy of other current methods of pubic symphyseal ageing' *American Journal of Physical Anthropology* **68**, 29-45.

Mepham, L, 2003, 'Pottery' in McKinley, J I, The Early Saxon cemetery at Park Lane, Croydon, *Surrey Archaeol Collect* **90**, 89-90

Mepham, L, 2005, 'Pottery' in Bibeck, 23-7

Moorees, C F A, Fanning, E A, and Hunt, E E, 1963, 'Formation and resorption of three deciduous teeth in children' *American Journal of Physical Anthropology* **21**, 205-213.

Morris, C A, 2000 *Wood and woodworking in Anglo-Scandinavian and medieval York*, The Archaeology of York 17/13

Myres, J N L, and Green, B, 1973, *The Anglo-Saxon cemeteries of Caistor-by-Norwich and Markshall, Norfolk*, Soc Antiq London Res Rep 30

Museum of London, 1994, *Archaeological Site Manual* (3rd ed).

Museum of London, 2002, *A Research Framework for London Archaeology*

Neale, G, 2005, *Encyclopedia of British transfer-printed pottery patterns 1790–1930*, London

Noel Hume, I, 1970, *Guide to artifacts of Colonial America*, New York

Noël Hume, I, 1977, *Early English delftware from London and Virginia*, Colonial Williamsburg: Occasional Papers in Archaeology 2

O'Connell, L, 2004, 'Guidance on recording age at death in adults'. In: Brickley M, McKinley J, (eds) *Guidance to Standards for Recording Human Skeletal Remains.* IFA technical paper 7. BABAO/IFA, Reading. 17-19.

OCS, 2003, *The world in blue and white*, Oriental Ceramic Society Exhibition Catalogue

Ortner, D J, 2003, *Identification of Pathological Conditions in Human Skeletal Remains.* Smithsonian Institution Press, Washington DC.

Ottaway, P, 1992, *Anglo-Scandinavian ironwork from 16–22 Coppergate*, The Archaeology of York 17/6

Owen-Crocker, G R, 2004, 1986, *Dress in Anglo-Saxon England*, rev edn, Manchester

Page, F J T, 1971, *Field guide to British deer*. Blackwell Scientific Publications, Oxford

Panter, I, 2000, 'Jet and amber' in Mainman and Rogers, 2469–74

Parfitt, K, and Brugmann, B, 1997, *The Anglo-Saxon cemetery at Mill Hill, Deal*, Soc Med Archaeol Monogr 14, London

Parkhouse, J, 1976, The Dorestad Quernstones, *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* **26**, 181–8

Payne, S, 1973, 'Kill-off patterns in sheep and goats: the mandibles from Asvan Kale' *Anatolian Studies* **23**, 281-303

Peacock, D P S, 1980, 'The Roman millstone trade: a petrological sketch' *World Archaeology* **12**, 43–53

Peers, C R, and Radford, C A R, 1943, 'The Saxon monastery at Whitby' *Archaeologia* **89**, 27–88

Perring, D, 1991, *Roman London*, The Archaeology of London series, Seaby, London

Phenice, T W, 1969, 'A newly developed visual method of sexing the os pubis' *American Journal of Physical Anthropology* **30**, 297-302.

Piton, D, (ed) 1993, *La céramique du Ve au Xe siècle dans l'Europe du haut Moyen Age: travaux du Groupe de Recherches et d'Etudes sur la Céramique dans le Nord-Pas-de Calais. Actes du Colloque d'Outreau (10–12 avril 1992)* (ed D Piton), Nord-Ouest Archéologie 'Hors-série', Arras

Plunkett, S, 1999, 'The Anglo-Saxon loom from Grimstone End, Pakenham, Suffolk' *Proc Suffolk Inst Archaeol Hist* **39**, 277–98

Popper, V S, 1989, 'Selecting quantitative measurements in palaeoethnobotany.' in Hastorf, C A, and Popper, V S, (eds) *Current Palaeoethnobotany*. University of Chicago Press, Chicago 53-71

Poulton, R, 1987, 'Saxon Surrey' in Bird J and Bird D G (eds) *The archaeology of Surrey to 1540*, Guildford, 197–222

Powers, N, 2006, *Assessment of human remains excavated from St. Martin-in-the-Fields, Westminster.* Museum of London Archaeology Service, unpublished report HUM/ASS/11/06

Powers, N, 2007, 'Recent and current excavations: St. Martins-in-the-Fields, Westminster (SMD01)' in *British Association of Biological Anthropology and Osteoarchaeology Annual Review* **8**, 29.

Powers, N, 2007, *A Rapid Method for Recording Human Skeletal Data. Second edition*. Unpublished recording manual for the Museum of London Specialist Services.

Price, J, (ed) 2000, *Glass in Britain and Ireland AD 350–1100*, Brit Mus Occ Pap **127**

Pritchard, F, 1984, 'Late Saxon textiles from the City of London' *Medieval Archaeol* **28**, 46–76

PROCTOR (2000), J Proctor 'Medieval and post-medieval waterfronts at Arundel House / Fitzalan House, 13-15 Arundel Street, City of Westminster' *Transactions of the London and Middlesex Archaeological Society* 51,45-80.

Quast, D, and Schussler, U, 2000, 'Mineralogische Untersuchungen zur Herkunft der Granate merowingerzeitlicher Cloisonnéarbeiten' *Germania* **78.i**, 75-96

Rackham, D J, 1995, 'Skeletal evidence of medieval horses from London sites' in Clark, J, (ed)

Rackham, O, 2006, *Woodlands*. New Naturalist Library No.100. Collins, London

Reimer, P J, Baillie, M G L, Bard, E, Bayliss, A, Beck, J W, Bertrand, C, Blackwell, P G, Buck, C E, Burr, G, Cutler, K B, Damon, P E, Edwards, R L, Fairbanks, R G, Friedrich, M, Guilderson, T P, Hogg, A G, Hughen, K A, Kromer, B, McCormac, F G, Manning, S, Bronk Ramsey, C, Reimer, R W, Remmele, S, Southon, J R, Stuiver, M, Talamo, S, Taylor, F W, van der Plicht, J, and Weyhenmeyer, C E, 2004 'INTCAL04 Terrestrial Radiocarbon Age Calibration 0-26 Cal kyr BP', *Radiocarbon* **46**, 1029-58

Richards, J, 1987, *The significance of form and decoration of Anglo-Saxon cremation urns*, BAR 166

Riddler, I, 2002, 'The small finds' in Hawkins et al, 203–4

Riddler, I, 2004, 'The loomweights' in Leary, 19–22

Riddler, I, 2004, 'The non-ceramic finds' in Leary, 22-26

Riddler, I, 2004, 'The small finds' in Brown and Rackham, 52–60

Riddler, I, 2005, 'Antler pin beater and bone pin or needle' in Butler, 59

Riddler, I, 2005a, 'Craft, industries and fashion' in Butler, 63–4

Rielly, K, 2006, *Assessment of the animal bones from London Transport Museum (LTM03)*. MoLAS unpublished report BON/ASS/05/2006

Roesdahl, E, Graham-Campbell, J, Connor, P, and Pearson, K (eds), 1981, *The Vikings in England*, London

Roberts, C A, Lee, F, Bintliff, J, (eds) 1989, *Burial archaeology, current research, methods, developments*. British Archaeological Reports British Series 211

Roberts, C, and Cox, M, 2003, *Health and Disease in Britain*. Sutton Publishing, Stroud.

Roberts, C, and Connell, B, 2004, 'Guidance on recording palaeopathology' in Brickley, M, McKinley, J, (eds) *Guidance to Standards for Recording Human Skeletal Remains*. IFA technical paper 7. BABAO/IFA, Reading. 33-38

Roberts, C, and Manchester, K, 1997, *The Archaeology of Disease*. Second edition. Sutton Publishing, Stroud.

Roberts, C, and Manchester, K, 2005, *The Archaeology of Disease*. Third edition. Sutton Publishing, Stroud.

Roberts, K, 2006, 'Assessment of the Plant Remains from London Transport Museum (LTM03) Museum of London Specialist Services (unpublished archive report)

Robinson, M, 1988, 'The significance of the tubers of Arrhenatherum elatius (L.) Beauv.' in Lambrick, G, *The Rollright Stones, megaliths, monuments and settlements in the prehistoric landscape. English Heritage Archaeological Report 6*. London: HBMC (E), England Oxfordshire

ROBINSON (2004) M Robinson 'The Charred Honeybees' in J Leary, 2004a, 38-9.

Rogers, N S H, 1993, *Anglian and other finds from 46–54 Fishergate*, The Archaeology of York, The Small Finds 17/9, CBA, London

Rogers, J, and Waldron, T, 1995, *A Field Guide to Joint Disease in Archaeology.* John Wiley and Sons, Chichester.

Saunders, S R, Herring, A, (eds) 1995, *Grave Reflections: Portraying the Past through Cemetery Studies.* Canadian Scholars' Press, Toronto

Scheuer, L, and Black, S, 2000, *Developmental Juvenile Osteology.* Academic Press, London.

Schmid, E, 1972, *Atlas of animal bones for prehistorians, archaeologists and Quaternary geologists*. Elsevier, London

Siegmund, F, 1998, *Merowingerzeit am Niederrhein. Die frühmittelalterlichen Funde aus dem Regierungsbezirk Düsseldorf und dem Kreis Heinsberg,* Rheinische Ausgrabungen 34, Köln

Smith, T P 2003 'Ceramic building material' in Malcolm and Bowsher, 222-224

Stace, C, 1991, *New Flora of the British Isles*. Cambridge

Stace, C, 1997 *New flora of the British Isles*. 2nd Edition. Cambridge University Press, Cambridge.

Stephenson, 2003, 'Pottery' in Sloane, B, and Hoad, S, *Early modern industry and settlement, excavations at George Street, Richmond and High Street, Mortlake in the London Borough of Richmond upon Thames*, MoLAS Archaeol Studies Ser 9, 69–79

Steuer, H, 2003, 'Pinzette' in Beck, H, Gueuenich, D, and Steuer, H, *Reallexikon der Altertumskunde* Bd 23, 178–82

Stiff, M J H, 2001, 'Typology and trade: a study of the vessel glass from wics and emporia in northwest Europe' in Hill and Cowie (eds), 43–9

Stiff, M J H, 2003, 'The glass finds' in Malcolm and Bowsher, 241–250

Stoodley, N, 2005, 'Discussion: the early cemetery and its place within southern England' in Birbeck, 75–81

Sundick, R I, 1978, 'Human skeletal growth and age determination' *Homo* **29**, 228-49

Sutherland, L D, and Suchey, J M, 1991, 'Use of the ventral arc in pubic sex determination' *Journal of Forensic Sciences* **36**, 501-511

Swift, D, Howell, I, Watson, B, and Cotton, J, in prep, *East London Landscapes: Thematic aspects of six multi-period archaeological sites excavated in advance of gravel quarrying*, MoLAS Monogr Ser

Taylor, A, 2001, *Burial Practices in Early England.* Tempus Publishing, Stroud.

Taylor, J, 2004, Middle Saxon remains at Covent Garden. *London Archaeologist* **10 (8)**

Telfer, A, 2008, *St Martin-in-the-Fields Church, St Martin's Lane, London WC2, A post-excavation assessment and updated project design*, MoLAS unpublished report

Thompson, A, Westman, A, and Dyson, T, (eds) 1998, *Archaeology in Greater London 1965-1990: a guide to records of excavations by the Museum of London*. The Archaeological Gazetteer Series, Volume 2. Museum of London

Timby, J, 1988, 'The Middle Saxon pottery' in Andrews, 73–122

Tyres, I, Hillam, J, and Groves, C, 1994 'Trees and woodland in the Saxon period: the dendrochronological evidence' in Rackham, J. (ed) *Environment and Economy in Anglo-Saxon England*. CBA Research Report 89: 12-

Tyrrell, A, 2000, 'Non-metric traits and the assessment of inter- and intra-population diversity: past populations and future potential' in Cox, M, and Mays, S, (eds) *Human Osteology in Archaeology and Forensic Science.* Greenwich Medical Media Ltd, London. 289-306.

Ubelaker, D H, 1989, *Human Skeletal Remains*. Second edition Taraxacum, Washington

Vince, A, 1990, *Saxon London: an archaeological investigation*

Vince, A, 2002, *Characterisation studies of some early to mid Anglo-Saxon pottery from rural sites in the Thames Basin*, Alan Vince Archaeol Consultancy unpublished report 2002/24

Vince, A, 2003, *Characterisation studies of Anglo-Saxon pottery from Lundenwic: chaff-tempered wares*, Alan Vince Archaeol Consultancy unpublished report 2003/67

Vince, A, 2006, *Characterisation Studies of Anglo-Saxon and Medieval Pottery from Upminster*, Alan Vince Archaeol Consultancy unpublished report 2006/62

Vince, A, 2007, *Characterisation studies of selected Anglo-Saxon pottery from the London Transport Museum, Westminster (LTM03)*, Alan Vince Archaeol Consultancy unpublished report 2007/123

Vince, A G, and Egan, G, 1981, 'The contents of a late 18th-century pit at Crosswall, City of London' *Trans London Middlesex Archaeol Soc* **32**, 159-182

Waldron, T, 2001, *Shadows in the Soil: Human Bones and Archaeology*. Tempus, Gloucestershire.

Walker, P L, Dean, G, and Shapiro, P, 1991, 'Estimating age from tooth wear in archaeological populations' in Kelley, M, Larsen, C S, (eds) *Advances in Dental Anthropology.* Alan R Liss, New York. 169-178.

Walker, P L, 1995, 'Problems of preservation and sexism in sexing: Some lessons from historical collections for palaeodemographers' in: Saunders and Herring, (eds) 31-47.

Walton Rogers, P, 1997 *Textile production at 16–22 Coppergate*, The Archaeology of York 17/11, York

Wastfelt, B, Gyllensvard, B, and Weibull, J, 1991, *Porcelain from the East Indiaman Götheborg*, Hoganas

Welch, M, 1983, *Anglo-Saxon Sussex*, Brit Archaeol Rep 112 (vols i, ii)

Werner, A, 1998, *London Bodies. The Changing Shape of Londoners from Prehistoric Times to the Present Day*. Museum of London, London.

West, S E, 1985, 'West Stow: the Anglo-Saxon village' *E Anglian Archaeol Rep* **24**, Bury St Edmunds

Wheeler, A, 1978, *Key to the fishes of northern Europe*. Warne, London

Wheeler, A, 1979, *The tidal Thames*. Routledge & Kegan Paul, London

Wheeler, R E M, 1935, *London and the Saxons*, London Museum Catalogues 6

White, R H, 1988, *Roman and Celtic objects from Anglo-Saxon graves, a catalogue and interpretation of their use*, BAR 191

White, R H, 1990, 'Scrap or substitute? Roman material in Anglo-Saxon graves' in Southworth, E (ed) *Anglo-Saxon cemeteries, a reappraisal*, Stroud

WHITELOCK (1979) D Whitelock *English Historical Documents I: 500-1042* (2nd ed) London.

Whytehead, R L, and Cowie, R, with Blackmore, L, 1989, Excavations at the Peabody site, Chandos Place and the National Gallery building, *Trans London Middlesex Archaeol Soc* **40**, 35–176

Williams, C, 1989, 'Loomweights and spindlewhorls' in Whytehead and Cowie, 107–10

Williams, D, 1988, 'Geological identifications' in Blackmore and Williams, 133

Williams, D, 1989, 'The stone' in Whytehead and Cowie, 129–31

Williams, H, 2002, 'Remains of pagan Saxondom? – the study of Anglo-Saxon cremation rites' in Lucy, S, and Reynolds, A, (eds*) Burial in Early medeival England and Wales*, Soc Medieval Archaeol Monogr 17, 47–71

Yorke 1990 *Kings and kingdoms of Early Anglo-Saxon England*, Routeledge, London

Appendices

AOC Archaeology Group

Appendix A – Finds Discussion

Lyn Blackmore

Many aspects of the finds are inter-related, but as far as possible they are considered under the theme that they contribute most to.

Dating

The most important aspect of the site is the artefactual evidence for activity that predates the foundation of St Pauls in AD 604 and could predate the first trading activities of Lundenwic as an emporium by up to 100 years.

Dating the cremations

Eight cremation vessels were found (see pottery report), but only three contained artefacts or possible artefacts. One is a single fragment of copper alloy sheet from fill [8570] of cremation [8569] (vessel <10>; Fig 00, No.5), while ten accessioned finds are from pit [8828], which contained two urns, nos <38> and <39> (Fig 00, Nos.1 and 2). Of these, fill [8867] of <39> contained a small fragment of burnt glass or fuel ash slag, while the others are from the main pit fill [8829] and could be from either vessel; of the 29 fragments, 23 fragments are from glass beads (<146>, <147> and <148>; see above, glass report). Most of these finds are difficult to identify with certainty as they are burnt and/or very small, but two, both possibly continental imports, are important for dating. The first is a glass bead in <148> that may be of Brugmann's 'Constricted Segmented' type, a form placed in her phase A2, which is broadly dated to *c* AD 480–580 (Brugmann 2004, 70; fig 173). The second is the pair of continental tweezers, a Frankish import of the late 5th or 6th century (see above, copper alloy). Assuming the dating proposed for the Haillot cemetery to be too early, and working on the more recent dating suggested by Koch (1977a, 132; 1977b, 144) and Siegmund (1998, 113–4), it seems most likely that the tweezers, and thus the bead, from [8829] date to before *c* 550. As at Broechem in Belgium, however, they could have been buried in the third quarter of the 6th century. Dating this cremation is, therefore, difficult, as it is not known whether the tweezers were contemporary with the burial or curated as an heirloom.

The cremation urns are not in themselves particularly helpful in pinning down the date of the burials as the shouldered/globular forms with simple upright rims are typical of the London area throughout the 6th century and continue into the 7th century (see pottery report and Blackmore in prep, a). Even the decorated jar No.6 (Fig 00) can only be broadly dated as the segmented ring stamp used is a common type with wide distribution (D Briscoe pers comm). Jar No.9 (Fig 00) may be more closely datable as one of the two stamp types is quite rare, and most of the other examples are from early Saxon cemeteries (notably Loveden Hill, Lincs, Spong Hill, Norfolk; Long Wittenham, Berks and Little Paxton, Cambs; see pottery report). Unfortunately, this jar is not from the cemetery horizon, but it is from a later pit that may well have disturbed a cremation. Similarly, the C14 dates generally have rather large brackets (see C14 dating report). That for pit [8828], for example (sample SUERC-15176), has a broad dating of AD 430–640, although the ceramic and artefactual evidence supports the narrower range of AD 530–610 (at 67% confidence). Cremation pot <10> (Fig 00, No.5) could be slightly earlier, as the broad C14 date range is AD 410–550 (SUERC-15174), although the above suggests that the narrower range of AD 480–540 (41.9% confidence) is more likely. The same problems were noted for the cremations vessels from the Stadium site, Hamwic, since although some have Early Saxon characteristics, other factors argue for a 7th-century date (Mepham 2005, 26–7; see below).

Dating the burial(s)

The most useful artefacts for dating burial [8699] are the copper alloy buckle <19> (Fig 00, No.2) and the glass and amber beads (Fig 00, No.1; Fig 00, No.1), the latter the first from a burial context in London. The use of amber beads is primarily a 6th-century tradition, and most typical of the mid to late 6th century, when they often occur in long strings that could be interpreted as status symbols (Huggett 1988, 64; Geake 1997, 47). The fashion largely died out in the early 7th century, but amber beads occur up to the late 7th century, usually singly as heirlooms kept for amuletic purposes and/or in children's graves (Dickinson 1974, 252; Meaney 1981, 67-71; Geake 1997, 12, 47). As several beads were found in [8699], a date in the second half of the 6th century seems likely.

Drum-shaped reticella glass bead <233> (Fig 00, No.2; see above, glass report) is the earliest type yet found in a burial context in Lundenwic. This continental form (Koch type 48) first came into fashion in the 6th century. Guido (1999, 66) notes that at Krefeld Gellep beads with herringbone and fine twist decoration appeared during *Stufe* (period) III (ie between AD 525–600), and continued into the well into 7th century, if not later. At Schretzheim, Germany, reticella beads of type 48 first appear in *Stufe* II (ie AD 545/50–565/70) and continue in *Stufe* 3 (ie AD 565–590/600; Koch 1977a, 20–1). At Pleidelsheim and in southern Germany they are dated to phase 5–6; as phase 5 spans AD 530–555, and phase 6 spans AD 555–580 (Koch 2001, 75–9), a central date of *c* AD 540–570 can be suggested. It can, therefore, be inferred that in northern Europe the type was most popular in the third quarter of the 6th century (Brugmann 1997, 60), and since *c* 1998 the end date has been adjusted to *c* 580–600 (Brugmann 2004, Table 3). In England, this form of reticella bead belongs to Brugmann's phase A2b, which is dated to 530–580 (ibid, 42, 78, table 3; fig 173), although they might fall within the later part of this bracket. Most of the English examples listed by Guido (1999, 313–6) are dated to the 6th-century, but some, perhaps heirlooms, are from 7th-century contexts. The finds from Dover Buckland are from burials of different date. Grave 92 is dated to phase 2, AD 525-575 (Evison 1987, 137, text fig 25), but grave 93 belongs to phase 3, AD 575–625 (ibid, 141) and grave 42, which contained a bead with three reticella bands, is dated to 625-650 (ibid, 141; Guido 1999, 314). Another bead of similar form and date but with different decoration (Koch type 50; Brugmann 2004, 38, 79, table 9) from the Stadium site, Hamwic, was found together with a plain bead near the neck/shoulder of an adult of indeterminate sex in grave [4037] in a mid- to late 7th-century cemetery (Birbeck 2005, fig 16). Although some items from the same grave, including a Roman brooch, were identified as possible heirlooms, this bead was not one of them (Loader 2005, 55; Every 2005, 67).

The shield on tongue buckle form is also a continental type typical of Böhner's *Stufe* III (probably AD 510–600; Böhner 1958; Martin 1989, 132, note 41). The date of buckle <19> (Fig 00, No.2) depends on two factors: firstly, whether it is an import or a native copy, and secondly, whether it was an heirloom or not. Given its small size and overall neatness, it seems likely that it is an import (see above, copper alloy report) and it is probably contemporary with the beads.

The Kentish keystone brooch <14> (Fig 00, No.1; see above, brooch report) is also probably of late 6th-century date, although production of the type could have continued into the first quarter of the 7th century. It could, therefore, be derived from grave [8699], but would take the dating of this grave to after AD 575. Alternatively, it may be derived from another grave in the near vicinity.

General dating of the burials and later activity

It was first thought that the occupation of Lundenwic did not start until the mid-7th century, and the pottery was thus dated accordingly as there was nothing to indicate otherwise (Blackmore 1988a; 1989; 1993; 1999, 41; 2001, 40; 2003a; in prep, b). Over time, however, this dating was pushed back to *c* 600, and following the discovery of early material in Long Acre, in the north-western part of the settlement (for example at LGC00 and LCR00), the possibility of activity in the 6th century was envisaged (Blackmore et al 2004; Capon 2006, 172). The discovery of cremation burials and potentially 6th-century finds at the present site

supports this theory, and following more recent finds at St Martin-in-the-Fields (Telfer 2008), it would seem that this activity was more widespread than first thought.

A key question for the present site is whether the cremations predate the burials or if all were contemporary. On the whole, cremation is considered typical of the Early Saxon period, predating the use of inhumation (Williams 2002, 60–1). Over much of southern England, however, there are cemeteries where both rites were used, apparently contemporaneously, in the 6th century, and in some cases, perhaps into the 7th century (ibid, 61, 64, 66; figs 3, 4, 6; Stoodley 2005, 76). The Stadium site at Hamwic, where 18 cremations and 26 inhumations were found, is problematic. There the cremations are mainly clustered in one part of the site (ibid), but while the C14 dates from two samples of cremated bone fall within the Early Saxon period, they are up to 250 radiocarbon years earlier than the associated charcoal. As the latter is considered to be more reliable (Allen 2005, 11), it is possible, albeit questioned (Mepham 2005. 26; Stoodley 2005, 75–6), that on this site cremation may have continued alongside inhumation burials into the second half of the 7th century. A factor that is not considered in the discussion, however, is that not all dates are from the same laboratory, the earlier dates being from Groningen, the later dates from Glasgow. Ideally all samples should be tested by both institutions before further hypotheses can be advanced.

For the present site, dating is difficult to determine from the artefacts alone. The cremation pots probably date to AD 540-600, while the stamp-decorated chaff-tempered wares ([8543], [8551]; Fig 00, Nos 6, 9) could date to the later 6th or early 7th century. Cremation [8299] could be a little earlier than grave [8699], the finds from which could date to the last quarter of the 6th century, and so a central date of *c* AD 560–580 might be proposed for the main use of the site as a cemetery. This is supported by the scarcity of sandstone-tempered ware or other typically Early Saxon fabrics, which suggests that the date is closer to AD 575-600 than to AD 550, and/or that burial and settlement activity took place in different areas. Either way, these are the first cremations from Lundenwic. Following recent excavations at St Martin-in-the-Fields (Telfer 2008), burial [8699] is now probably the second earliest post-Roman inhumation in the area that became Lundenwic. Both groups could be broadly contemporary with, or some 50 years earlier than, a grave from the nearby Royal Opera House site, the C14 dates for which are AD 607–660 (one standard deviation) and AD 559–676 (two standard deviations; Malcolm et al 2003, 19, 338; Leary 2004, 141).

The remainder of the pottery sequence follows the usual pattern up to a certain extent, with chaff-tempered wares being the most common in 7th and earlier 8th-century contexts. The amount of Ipswich ware from period IV is limited to five sherds, and none are present in period V deposits (mid-/late 8th century), although the total amount of pottery is limited to 16 sherds. In period VI, however, Ipswich ware is clearly the dominant type, while shell-tempered wares also appear in this period. The other fabric types are too limited to offer any new comments on their dating or frequency, other than that carbon residues on a chaff-tempered sherd from period IV give a broad C14 date of AD 650–750 (SUERC-15175). Of the narrower ranges, the date of AD 650–710 (68.2% confidence) fits nicely with the proposed ceramic chronology. Greensand-tempered wares (fabric group SLGS) are present in Period IV, but more common in Period V. The same applies at the Royal Opera House site, where they are present in periods 3 and 4, but much more common in period 5 (*c* AD 730–770; Blackmore 2003c, 236, Table 44). A date between AD 675 and AD 750 might thus be suggested for the lamp in fabric SLGSC found in Period VI (Fig 00, No.44). The C14 dates, however, give a broad range of AD 650–780, and narrower ranges of AD 665–715 (44.8% confidence) and AD 740–770 (23.4% confidence). Of these, the latest date fits well with the stratigraphic location, and might reflect the last use of an old vessel.

Burial rites, dress and ethnicity

Despite recent shifts in thinking, cremation is still generally accepted as a Germanic, or Anglian tradition and as a pagan rite (Williams 2002). Inhumation, on the other hand, has traditionally been seen as a Saxon tradition inherited from the Romans (ibid, 49–57, 70), although not necessarily any less pagan (ibid, 66). As

noted above, however, the two frequently occur together, especially in north Surrey (ibid, map 6; Poulton 1987, 197–207; McKinley 2003, 104–11), and present site appears to follow this pattern. While the number of finds is limited, a few comments can be made on the burials. With regard to the cremations, the presence of stamped vessels is notable, and the disturbed vessel No.9 (Fig.00) is very similar in form and decoration to a 6th-century urn from Park Lane, Croydon (McKinley 2003, fig 7, no.46; Mepham 2003, 89). The general uniformity of the other vessel forms, however, suggests a strong family or community tradition and possibly burial over a short period of time, particularly as there are two occurrences of double burials (Williams 2002, 68). Cremation may, therefore, have been a personal choice (ibid, 67), perhaps reflecting '*aspirations, idealizations and (in some cases at least) conscious ideological programs, as much as the stable realities of past ethnic communities*' (ibid, 64). Various theories have been put forward regarding the symbolism of the shape and size of cremation vessels, recently summarised by Blinkhorn (1997, 122; Williams 2002, 69–70). It has been suggested (Richards 1987) that the pot makes a statement about the sex, age and status of the deceased, which is reinforced by the presence or absence of grave goods. Status, for example, might be indicated by whether the pot was purpose made (upper class) or reused (lower status). While it is possible that the present pots were made purely for the burial rite, post-depositional wear and their generally fragmented condition makes this hard to determine. The more complete examples, however, are not of particularly high quality, being lop-sided and roughly finished, and the same applies to most urns from the Stadium site, Hamwic, although no link was found between age and the quality of a pot (Mepham 2005, 24–5).

Richards (1987) has proposed that cremations without grave goods are usually in shorter, wide-mouthed vessels, while those with grave goods are usually in taller, narrow-necked vessels. On this premise, most of the finds from pit [8828] should be from urn <39> (Fig 00, No.2), which is noticeably taller and more slender than <38 (Fig 00, No.1). However, Richards also suggests that males are typically buried in narrow pots, while females are associated with wider pots with wider mouths. If so, urn <39> should have been used for a male burial, while urn <38> should have been used for a female burial and may have contained the glass beads. Tweezers, whether of iron or copper alloy, usually occur in male graves in England (Evison 1987, 118), and so <43> might be expected to derive from urn <38>. On the continent, however, they also occur in female graves (Annaert and van Heesch 2004, 238), and so <43> could originally have been buried with the glass beads. Either way, it seems likely that this double burial contained one member of each sex. The beads were clearly burnt together with the deceased, but the tweezers are in perfect condition and so must have been placed in the urn, or pit, at the point of burial. Of the other urns, Nos.3, 4, 5, 6 and 7) should, from their form, all represent female burials, while No.8 might, from its slightly larger size represent a male. The latter is, gratifyingly, confirmed by analysis of the cremated bone (see human bone report); the other identifications are, frustratingly, all indeterminate, although the presence of bone from an adult and a juvenile in urn No.3 might suggest a mother and child. A second hypothesis is that the dimensions (height, width and height of maximum diameter) of a pot are related to age and status (infants = small, adults = tall; Richards 1987), and at the Stadium site, Hamwic, three correlations were noted between age and vessel size (Mepham 2005, 25). On this basis, urn No.4 may have been used for a senior female, and urn No.6 for a girl, although in both cases the cremated bone is from adults of indeterminate sex and age.

Turning to the grave goods, continental finds of shield-on-tongue buckles, are mainly from male graves, but in England they are most common in female graves (Marzinzik 2003, 21, 63, 81). In this case it was apparently worn centrally at hip level. The reticella glass bead <233> (Fig 00, No.2) is a type that was worn by men as well as women, and occasionally used as sword beads (Evison 1987, 65, 70; Brugmann 1997, 60). Given the nature of the other finds from [8699], however, there seems little doubt that this is a female burial, and this is confirmed by the skeletal remains (see human bone report) so buckle <19> (Fig 00, No.2) fits with the English usage. The amber beads <16> were strung together, and the context sheet suggests that the single glass bead <233> was at the centre of the necklace, in which case the ratio of glass to amber is 1:19, or 5%. While more glass beads might have been expected, personal taste played a part in the composition of a necklace, and in grave 38 at Dover the ratio of glass to amber beads was 7:77, or 9%

(Evison 1987, 65). The alignment of the glass and amber beads across the body is rather lower than usual, even if the string was attached to shoulder clasps. It may, therefore, have been placed there rather than worn. As a large and distinctive bead form, <233> it may have been selected for sentimental or amuletic reasons. The latter certainly applies to the Roman terret ring <17> (Fig 00, No.3), which was found between the thighs within an area of dark staining that suggests burial in a bag (see above, copper alloy report). The iron object <20> and knife <69> were possibly tucked inside the sleeve of the left arm, a position recorded elsewhere for knives (Evison 1987, 115), but unusual for other objects.

The artefactual assemblage this grave is typical of a later 6th-century female burial of some status, although not high ranking (Owen Crocker 2004, 93). One or more brooches, probably of saucer or keystone form, therefore, might well have been expected as a part of the funerary costume (cf Blackmore 2003a, 265–6; Malcolm *et al* 2003, 27, fig 13). It is, therefore, possible that the Kentish keystone brooch <14> (Fig 00, No.1) from well [8658], which disturbed the body from left shoulder upwards, is derived from this inhumation (but see above, dating). If worn as a pair or group in the Kentish style, such brooches would probably have been one above the other, rather than at the shoulders, and possibly linked by beads or a chain (Evison 1987, 69, text fig 13; Owen Crocker 2004, 91–2). Brooch <14> is important for several reasons. It is a significant extension of the mainly Kentish distribution of the keystone brooch form, the more so as it is one of few examples with four keystones (Avent 1975, class 2.5 or 2.6). Some 50 years earlier in style than the Kentish composite disc brooch from Floral Street (Blackmore 2006), it is also of importance for wider typological studies and as an addition to the rather limited corpus of items associated with personal ornament from Lundenwic.

The presence of continental objects in the cremations and burials does not necessarily mean that the deceased were Germanic or Frankish, although they may well have been statements of '*ideological and political affiliations with parts of Northern Europe*' (Williams 2002, 70). Whatever these may have been, the beads and shield on tongue buckle almost certainly reached London via Kent. Amber was particularly favoured in the Saxon and Anglian parts of the country, but has been found in some quantity at a few sites in East Kent (Huggett 1988, 64, 76; fig 1), notably at Mill Hill, Deal (Brugmann 1997, 55-6) and Dover Buckland (Evison 1987, 57-60). Together with the Kentish keystone brooch <14>, these finds suggest trade and/or familial links with other parts of the country (eg transfer of objects by marriage), if not with the continent. Although London was absorbed into the East Saxon kingdom in/by the 590s, the latter was ruled by Kent for much of the 7th century (Malcolm et al 2003, 17–8) and Yorke suggests that '*the expansion of [Kent's] interests to London .. by the end of the sixth century was a logical expansion of existing commercial interests*' (Yorke 1990, 40). The presence of a market there by *c* 560/580, frequented by Kentish, if not foreign traders, is a possibility that must now be given serious consideration.

Trade and industry

Textile production

This is the earliest industry represented on the site, evidenced by six loomweights and a spindlewhorl discarded in Period III. The main processes associated with textile production have been discussed elsewhere and are not detailed here, but general studies include those by Walton Rogers (1997), Leahy (2003, 61–82) and Owen-Crocker (2004, 272–315). The evidence from Lundenwic has been summarised elsewhere (Blackmore 1988b, 111–4; 2003c, 254–5; 2003d, 304–6; Williams 1989, 107–10; Goffin 2003a, 216–222; Malcolm and Bowsher 2003, 168–70; Leary 2004, 11; Jarrett 2004a, 95–7; 2005, 61–3; Riddler 2004a, 19–22; 2004b, 54–6). Due to the current lack of waterlogged deposits in Lundenwic, textiles survive only where mineralised, usually in burial contexts and spindlewhorls are the only evidence for spinning. Although never as common as weaving equipment, these occur across Lundenwic, occasionally in stone, but mostly of bone. The size of the central hole, usually 8–10mm, reflects the size of the spindle and the quality of the yarn to be spun (MacGregor 1985, 185–7; Hamerow 1993, 65; Walton Rogers 1997, 1731). The one

example from Period III, OA5 (<15>, Fig 00, No.1) is quite typical in size, form, and weight (Blackmore 2003c, 304–5; Goffin 2003b, 203–4; Malcolm and Bowsher 2003, 168).

The prepared yarn was woven into cloth on an upright loom, consisting of a frame and heddle placed at an angle against the wall. Loomweights gave the necessary tension to the warp threads, which were tied in groups, probably at intervals of 75–80mm (Walton-Rogers 1997, 1749–53; Plunkett 1999, 283; Leahy 2003, 66–74). The Lundenwic loomweight were almost certainly produced locally and the fabrics remain consistent over time (see loomweight report, Table 1). Fabric 3, a distinctive oxidised calcareous ware, is not common, but has been found at the Royal Opera House (Goffin 2003a, 216), Floral Street (Blackmore 2006), Bruce House, Kemble Street, Long Acre, Shorts Gardens and Southampton Row (Keily in prep).

Weaving seems to have increased in Lundenwic during the late 7th to early 8th century, especially after the introduction of Ipswich ware (Blackmore 1999, 47; 2003a, 169-70; Goffin 2003a, table 36; Leary 2004, 143; Riddler 2005, 63). The present finds follow this pattern, with a noticeable increase in Period IV (see loomweight report, Table 2), although only the five weights from pit [8526] are associated with Ipswich ware. Only one fragment is from a Period V context, but the number of fragments discarded in Period VI is much the same as in Period IV, and seven of these weights are from contexts dated to after *c* 770 by shell-tempered pottery. Half of a bone pin or needle from the Period VI pit [8287] may also have been used in textile production (<7>, Fig 00, No.9; see bone report).

Loomweight forms are governed by three main factors, profile, diameter and weight. The first has generally received most attention in the literature, and does seem to evolve over time. Here the profiles are quite consistent (see loomweight report, Table 2), and although annular weights are more common in periods III and IV, the one bun-shaped weight from Period III adds support to the suggestion that this type was probably in use by the late 7th century (Goffin 2003a, 218). Intermediate types, the most common form, are also present in Period III, but more common in Period IV. The disc-shaped weights (Fig 00, Nos 6, 8) are a new type for Lundenwic, the closest parallels being of late Saxon date: a group of smaller weights from Winchester (Hedges 1978) and three larger weights from Beckenham (Keily 2003, 174–6, fig 4). As this form is so rare in Lundenwic, it seems likely that if the examples from Period IV are stratified, those from later deposits are residual, but this remains to be proven. For now, it would appear that all the main forms occur together in Period VI, and the same has been noted for later contexts elsewhere in the settlement (Goffin 2003a, 218–220; Jarrett 2005, 62–3).

Differences in loomweight diameter, height and weight may reflect the production of different types of cloth, or the location of a weight in the row. Of the 64 examples found, 50 could be measured with some degree of confidence. Of these 33 have a diameter of *c* 130–140mm (including Fig 00, Nos 1, 2, 4, 6, 7), while a further 12 are *c* 120–125mm (including Fig 00, Nos 3, 9) and three others probably fall between 120mm and 140mm. Only six weights are smaller than this, while seven are larger. The smallest is 95mm in diameter (<48>; Fig 00, No.5), while the four largest, including No.8 (Fig 00) are 160mm. Excluding the disc-shaped weights (Fig 00, Nos 6, 8), heights of the annular and intermediate weighs mainly fall between 40–49mm, while most bun-shaped weights have heights between 53–66mm. Despite variation in profile, the collection thus conforms to the national pattern, which shows that 100–140mm was the standard range for loomweights until the 9th century (Hamerow 1993, figs 44, 45; Plunkett 1999, 279; Blackmore 1988b, 112; Goffin 2003a, Table 35; Riddler 2004b, 56). Fragmentation, together with variable factors such as diameter, height, asymmetry and size of the central hole make it difficult to calculate heaviness, but weights of the Middle Saxon period generally exceed 500g (Holden 1976, 315; Walton Rogers 1997, 1753; Riddler 2002, 203; Goffin 2003a, 220). Taking the most complete finds as a sample, the same seems to apply here, as the small weight <95> (Fig 00, No.5) is *c* 95% complete and probably weighed *c* 400g (now 379g). Weight <61> has a diameter of 110mm and *c* 60% of the circumference is present; it probably had an original weight of *c* 560g (now 338g). Weight <72>/<73> (Fig 00, No.4) has a diameter of 130mm (85% present); it probably weighed *c* 615g (now 512g).

Two bone pins and one possible needle (Fig 00, No.9) may be associated with sewing (Blackmore 2003c, 306, 309–10; Riddler 2004b, 55), while the hones could have been used for sharpening shears. Burnisher <49> (Fig 00, No.2) may initially have been used to sharpen the points of needles or awls and later to smooth the finished cloth (Every et al 2005, 138).

Metalworking and glassworking

Evidence for metal-working and related crafts in Lundenwic has been summarised elsewhere (Blackmore 2003d, 176–80, 251–4; Blackmore with Dennis 2003, 271–5; Dennis 2003; Keys 2003; Malcolm and Bowsher 2003; Riddler and Rackham 2004, 60–1). None of the slag, crucibles or mould fragment were associated with buildings or hearths, and given the small amount of slag it is likely to represent random debris from metalworking elsewhere in the settlement. The possible ingot <8> from Period VI, OA21, however, suggests non-ferrous metalworking nearby, and Marcos Martinón-Torres comments that 'the analysis of the crucibles and mould fragment speaks of a workshop where leaded gunmetal (and possibly leaded brass) was melted and cast, as typical throughout the Middle Ages, possibly using alloys of relatively haphazard composition obtained by remelting scrap. No evidence of noble metal processing was identified' (Martinón-Torres 2007). The latter, has, however, been nearby found on the Royal Opera House site (Dennis 2003). The possible touchstone is of interest both in view of its suggested function and as a possible import. Although identical stones have been found in Hamwic (D Williams pers comm), only one other possible example has been found in Lundenwic (Goffin 2003b, 202-3, <S90>). Although gold has been noted on similar stones from later contexts in Winchester (ibid, 202; Biddle and Barclay 1990, 76), none of the examples from Hamwic or Lundenwic have tested positive for gold.

Possible glass working can only be surmised by negative evidence. Roman glass occurs in small amounts across the settlement; it may be fortuitous, or have been purposely collected, either for symbolic or amuletic purposes, or for recycling. The near absence of Saxon glass lends supports the view that most broken glass in Lundenwic was carefully collected for reuse, possibly for bead making (Stiff 2001, 43–5; 2003, 246–7) but perhaps also for use in jewellery manufacture (Andrews 1997, 216). While no evidence for this has been found in the main settlement area, three glass working crucibles hint at specialised activity in the area of the Temple during the 9th century (Butler 2005, 19; Goodburn Brown 2005) and similar evidence has been found in Hamwic (Andrews 1997, 216–8).

Stone objects and querns

Other than pottery, stone is the best indicator of trade, as all equipment was made of non-local and imported stone. For the later Saxon/early medieval period it has been suggested that English hones were used for sharpening for the initial sharpening of tools, and subsequently for maintaining everyday tools, and that fine points and blades were sharpened with hones of imported stone such as Norwegian schist (MacGregor 1982, 79; Goffin 2003b, 202). In the Middle Saxon period, however, no hones were imported; the one example from Jubilee Hall is from a late context and could have arrived as a personal possession, not an item of trade (ibid). Hone [8155] <6> (Fig 00, No.3), made of a sedimentary rock, is the finest example to be found in Lundenwic, but its date is uncertain; although from a Saxon layer, it may be intrusive, possibly introduced by the post-medieval cesspit in this area. Hones <65> (Fig 00, No.4) and <220> are made of sandstone, which, along with Kentish ragstone, was the most common material for hones used in Lundenwic (Blackmore and Williams 1988, 132-4; Williams 1989, 129-31; Goffin 2003b, 202; Riddler 2004c, 25). A similar pattern applies to the hones from Hamwic, where other stone types are from 9th-century contexts (Andrews with Phillips 1997, 240). The hones of English stone were used for all types of blade, while deep grooves on some probably indicate use for sharpening needles, awls and the like (cf Riddler 2004b, 54, fig 38.3; Goffin 2003b, 197–201; fig 148, <S85>). The possible hone/burnisher <49> is of interest as it has numerous fine lines on the surface that may have been made by sharpening points, or perhaps needles,

although some of these have been more or less removed by subsequent use as a burnisher. Both attributes fit with this object being found together with two loomweights and a spindlewhorl (see above).

Use of querns made from English stone is evidenced by a find from Period VI, but, as in the Roman period, Rhenish lava querns were clearly preferred due to the superior qualities of the stone for the purpose in question, and they were a major import to Lundenwic. Most examples from the Royal Opera House site were from contexts dating to after *c* 730 (Goffin 2003b, table 28), but here most seem to be from earlier levels (see stone report, Table 2). In terms of fragment number the collection is consistent with assemblages from several other sites in the settlement. It differs, however, in that it includes some extremely large pieces, the like of which have only been found on the Royal Opera House site (ibid, fig 149) and at James Street (Riddler 2004c, 24-5, fig 23).

Some querns may have been exported from the Rhineland in a finished state, but evidence from sites such as Dorestad (Parkhouse 1976; Kars 1980) and Hebeby (Schön 1995) points to local quern finishing on a large scale. It is, therefore, likely that some, if not most, lava querns reached England as ballast, imported as blanks to avoid damage in transit and be finished at workshops closer to the point of distribution (Parkhouse 1976, 185–6; Goffin 2003b, 205). This was certainly the case in the 10th to 11th centuries, when such a workshop was operating in the City of London (Freshwater 1996) and unfinished stones were carried on the Graveney boat (Fenwick 1978; Smith 1978). Possible waste from quern dressing has been recovered from pit [448] at six Dials, Hamwic (Andrews with Phillips 1997, 240), and perhaps at Fishergate (Rogers 1993, 1322, fig 640, no.4528), but evidence for such workshops in Lundenwic has so far been lacking. Even in the large assemblage from the Royal Opera House site there were no pieces that could definitely be identified as waste (Goffin 2003b, 208).

While the six small chips from the present site could be derived from repairs or resurfacing damaged querns, or simply general breakage, there quite substantial fragments from some eight apparently unfinished querns (Fig 00, Nos 2, 3, 5, 6; see above, stone report) from deposits of periods IV, V and VI, which include features such as unfinished central holes that have not been noted anywhere else, either in or outside Lundenwic. An upper stone from Dorestad has the collar for the central hole but the hole itself is undrilled (van Es and Verwers 1980, 167, fig 120.3). On another Dorestad quern variations in the size of the central hole were attributed to wear (ibid, fig 120.2), although, like Nos 3 and 5 (Fig 00) it may have been drilled from both sides. Fragments <224> and <225>, from different fills of the same pit, appear to be from the edge of a large unworked block. These and other pieces have roughly tooled surfaces with no signs of wear. The collection is, therefore, of considerable importance as the first real evidence that some querns arrived in Lundenwic in an unfinished state throughout the 8th century and possibly earlier.

Few of the finished and/or worn querns have an outer edge, but the measurable diameters are broadly comparable with those from other Lundenwic sites (Blackmore and Williams 1988, 133-4; Goffin 2003b, 205, tables 26, 27; Riddler 2004b, 54; 2004c, 24). Taken together, the various studies show that that the average quern used in Lundenwic was rather smaller than in the later Saxon period, although comparable with the earlier stones from Dorestad (see above, worked stone report; Kars 1980, 410–20; Goffin 2003b, 205, tables 26, 27). The identification of upper and lower stones is problematic and although it has been inferred that former were thinner than the latter, this depends on various factors, and in some cases the reverse may apply. Late Saxon upper stones were often larger in diameter than the bedstones (ibid, 205, 207) but it is currently unclear whether this applies to the Middle Saxon period. To sum up, the worked stone assemblage is small but adds significantly to the corpus of finds from a trading settlement that was involved in both national and international trade.

Bone and antler working

Techniques of bone working and evidence of the craft in Lundenwic have been noted above (see bone report). The best evidence is from the Royal Opera House, where the amount of waste rises from *c* 1.4kg to *c* 4kg and *c* 10kg discarded in the periods *c* AD 600–675, AD 675–730 and AD 730–770 respectively (Blackmore 2003c, 170–5, 302–3, tables 67, 68). Even on this site, however, there were no large dumps of waste of the type found at Hamwic (Riddler 2001), where the late 9th-century pit [5238] at Six Dials, for example, contained 1790 fragments of antler waste and over 1000 other offcuts and other pits also contained quantities of antler, including shavings (Riddler with Andrews 1997, 228–9). For the present collection, most finds are from Period VI; while it is unclear whether all are contemporary or if some are residual, this fits with the general increase in the craft noted elsewhere (Leary 2004, 143–4; Riddler 2005, 63–4); the small amount, and limited range of offcuts, however, suggest random redeposition rather than bone working actually on the site. Different bone working techniques are, however, evident, as noted above (see worked bone report), while saw marks show that blades with a thickness of 1mm (<181>) and 2mm (<189>, <194>) were used. This is consistent with the Royal Opera House, where most cuts were made by blades 2mm thick, but a range of 1mm to 2.6mm was noted (Blackmore 2003c, 172). The absence of pedicles, burrs and cranial bone suggests that most of the antler was collected as shed, although fragments with skull attached have been found elsewhere, notably at the Lyceum Theatre site (Riddler 2004b, 55, tables 20, 21).

Pottery supply

Lyn Blackmore and Alan Vince

The established chronological sequence of the Saxon pottery from Lundenwic has been outlined above (see pottery report). It comprises three main ceramic phases, characterised in turn by chaff-tempered wares (in use until *c* AD 750), Ipswich wares (in use from *c* AD 730) and shell-tempered wares (from *c* AD 770). The presence of complete or substantially complete cremation pots, the first to be found in Lundenwic, or indeed anywhere in central London, make the present collection a particularly important one, not only in the local and regional context, but also at a national level. In view of this and the long sequence on the site, a number of samples were selected for thin section and chemical analysis (ICPS) in the hope of resolving questions about the identity and source of the locally-produced handmade pottery and the imported wheelthrown wares. The results are mainly considered in the same order as in the pottery report (see above), but are also grouped by source area. While the source of the local wares is no clearer, the discovery of a possible antler die for decorating pottery (<244>; Fig 00, No.4) suggests that this was not far away from the settlement.
Handmade local and regional wares and Ipswich ware

As noted in the pottery report, chaff-tempered and Ipswich wares are by far the most common wares, the former locally made, the latter imported; in third place are sand-tempered wares. Thin section analysis shows that the selected samples fall into eight groups, while chemical analysis shows that they are from at least three different sources. Starting with chaff-tempered wares and the related fabric SSANC, five cremation urns from period II and one jar from period III were analysed chemically (Fig.00, Nos 2, 4, 5, 6, 7, 9; samples V4640–V4645) and one was also studied in thin section (No.6). Of these, the chaff-tempered urns (Nos 2, 4, 5, 6 and 9) and the sand-tempered urn (No.7) appear to be local products, and so the fabrics were compared with those of other handmade vessels and five loomweights from the site, and with existing data on other chaff-tempered wares. This earlier work has shown that samples from Early Saxon rural settlements at Clapham, Enfield, Hammersmith and Harmondsworth, and from Middle Saxon sites in Lundenwic, mainly fall into two fabric groups and are remarkably homogenous, both spatially and chronologically (Vince 2002; 2003a; Blackmore and Vince in prep, a and b). Whether this reflects supply from a single source or similarity in the composition of the raw materials in different areas is unclear.

In the present study, the samples of chaff-tempered ware, fabric SSANC (sample V4641) and most of the loomweights were found to have very similar characteristics at x20 magnification. There are, however,

differences in the chemical composition of the two groups. Factor analysis (scores F1 and F2; Fig 1) shows that the all the handmade fabrics cluster fairly closely, with a slight overlap between the chaff-tempered and loomweight fabrics. The scores for F3 and F4, however, clearly separate the chaff-tempered wares from the other samples (Fig 2) and suggests that they were made from different sources of clay, the loomweights being made from local brickearth, the pots from London Clay or Thames alluvium derived from London Clay. While the source of the pots used in Lundenwic is currently unknown, it now seems unlikely that they are from Essex (Vince 1990, 99), as these are petrologically and chemically quite distinct from those found in the London area (Vince 2002; 2003; 2006; Blackmore and Vince in prep, a, b, c). Some fabrics found in Staines are also petrologically or chemically different. As far as forms are concerned, the Middle Saxon chaff-tempered wares are all quite typical for Lundenwic; those from period II differ, but are quite in keeping with finds from rural sites in the region. In terms of decoration, jars No.6 and No.9 are the most complete and most elaborately decorated yet found in central London, the only other example with stamped decoration from Lundenwic being a small sherd from Cubitt's Yard, James Street (Blackmore in prep). Perhaps surprisingly, no examples of comb-stamped pottery were found, a tradition now represented by five vessels from three different sites in Lundenwic (Blackmore 1988a, fig 24, no.1; 1989, 75-6, 97; fig 29, nos 20-22; Jarrett 2004b, 51, fig 37, no.4; 2004c, 78, fig 47, no.2).

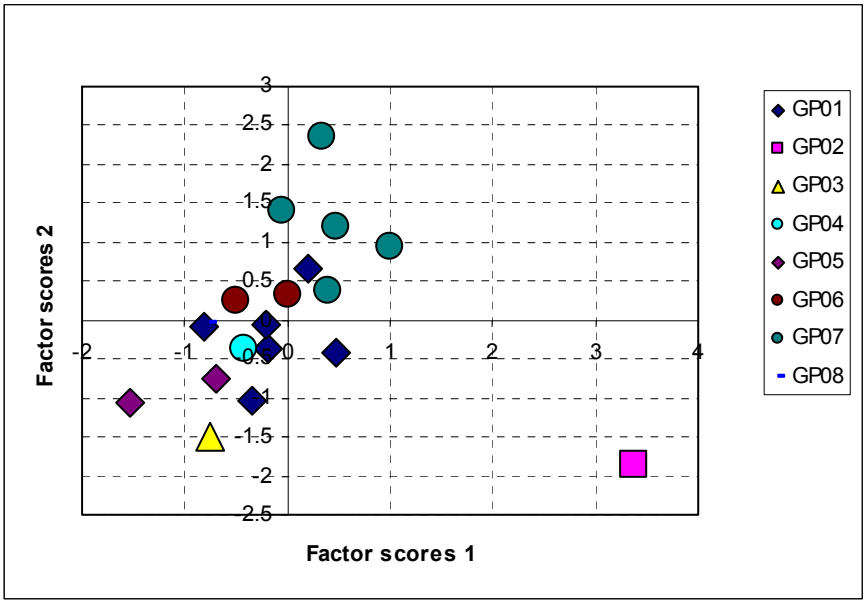


Fig 1 Chemical analysis of the handmade pottery and loomweights, factors 1 and 2. GP01=chaff-tempered wares; GP02=MSFL; GP03=SSTOL; GP04=MSLQA; GP05=SLGS; GP06=MSIG; GP07=loomweights; GP08=SHGS/Ipswich ware
fig label to be corrected by AV

Most of the Ipswich wares found on the site are jars, with some 11 possible pitchers, five of which have stamped decoration. These include a high proportion of gridded circle stamps (Fig 00, Nos 50, 54, 55), while the bisected lozenge stamp on No.46 (Fig 00) has not been seen before in the settlement. This ware was very successfully marketed and has a wide distribution in East Anglia, around the coast to Kent and up the Thames (Blackmore 1999, 39, 47; 2002, 27, 36–7; Blinkhorn 1999). Analysis of finds from Raunds, Northants, suggests that they were used for transporting beeswax (ibid, 16; Leary et al 2004, 143), but the original contents of the jars that reached Lundenwic is unknown. No sherds were deliberately sampled, but thin section of a sherd from a coarse sand-tempered jar recorded as fabric SHGS (sample V4646) shows that it contains a similar range of inclusions to Ipswich ware. The ICPS data for this sample was included in the factor analysis of the local wares described below. The results indicate that this sample is similar to the local wares, but especially close to the chaff-tempered samples (Figs 1 and 2). Comparison with samples of Ipswich ware from sites elsewhere (Barton upon Humber, York, Hinxton and Ipswich itself) indicates that

there is only slight separation of the local London products from those from Ipswich and that the Fabric 8 sample consistently plots in areas of overlap between the two groups. It is, therefore, impossible to say for certain whether sample V4646 is an Ipswich product or a local ware.

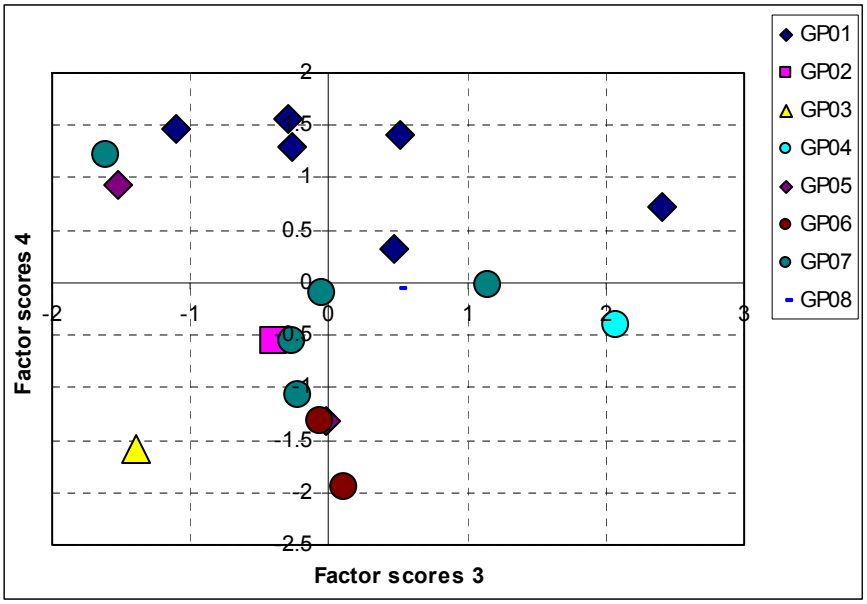


Fig 2 Chemical analysis of the handmade pottery and loomweights, factors 3 and 4. GP01=chaff-tempered wares; GP02=MSFL; GP03=SSTOL; GP04=MSLQA; GP05=SLGS; GP06=MSIG; GP07=loomweights; GP08=SHGS/Ipswich ware

Of the other handmade fabrics, the sand-tempered wares (SSAN) are the most common, and are probably fairly locally made. Greensand-tempered wares (SLGS) are less abundant, while all other fabrics are quite rare. The eight samples submitted for analysis can be divided into five petrological groups. The group is too small to say more about the sources of the clay, except that while chemical analysis of factors F1 and F2 shows a fairly close clustering with the chaff-tempered and loomweight fabrics, the different fabrics are clearly distinguished by their F3 and F4 scores. The closest match is with the flint-tempered fabric MSFLA used for urn No.8 (Fig.00; sample V4632), the petrological composition of which suggests that it could be made of a brickearth. While its F3 and F4 scores relate it to the loomweight samples (Fig 2), its high rare earth content makes this fabric chemically distinct from the other local and regional samples (Fig 1).

The Greensand-tempered wares (Fig 00, Nos.34, 44; samples V4633, V4634) are also chemically similar to the other handmade wares. Petrologically, however, they are similar to wares found to the south-west of London, the matrix of which comprises iron-cemented sands of Tertiary age in a light-firing clay which is also of Tertiary age, as found in the Barton Beds. This deposit, which is later than the Reading Beds, outcrops in patches to the south of the Thames around Kingston where it caps the London clay. The fossiliferous limestone found in fabric MSLQA (sample V4636) is certainly of Lower Cretaceous origin and no possible candidate has been noted to the north of the Thames. This fabric, therefore, is also probably from the south-east of England.

The igneous rock-tempered wares (MSIG; samples V4637, V4638) are mostly likely to come from East Anglia, where the rock itself could either have come from the Midlands or from northern England or Scandinavia. The other inclusion types are consistent with this interpretation and probably favour the Midlands origin of the sand, which would have been of fluvio-glacial origin. Similar fabrics occur on sites in northern Kent, such as Springhead, and might have been traded along the coast from East Anglia. They are

possibly evidence for an East Anglian trading connection with the Thames and south-east in the period preceding the production of Ipswich ware.

The same might apply to fabric SSTOL (sample V4639), the calcareous sandstone inclusions in which might be of Jurassic or Cretaceous origin. In either case, they are unlikely to have been present in a Thames valley sand. They might indicate a source to the south-east, in one of the valleys draining the Weald, or, perhaps more likely, to the north or north-east, in which case the sandstone would almost certainly be of middle or upper Jurassic origin. This rock type is not commonly found in early to mid Anglo-Saxon pottery in the Midlands or East Anglia, but was moved there by glacial action.

Imported wares

Imported wares are not particularly abundant on the site (45 sherds from *c* 34 vessels, 1.219kg), being rare in period III, slightly more common in period IV and most abundant in Period VI. Rhenish oxidised wares (BADO) are present but limited to seven sherds (including Fig 00, No.8 and Fig 00, No.48). The main evidence for international connections is with Northern France/the Low Countries and the discovery of a possible Rhenish reduced ware (MSGWA; Fig 00, No.19) is unexpected (see above, pottery report).

As previous analysis had concentrated on distinguishing whiteware fabrics from France and the Rhineland, the ten samples examined are mainly reduced wares. They fall into five petrological groups that come from at least three separate clay sources. Chemical analysis found four factors, of which only F2 distinguished the various fabric groups. Fabric MSGWA (fabric 12) has the lowest/negative F2 score, followed by NFEBB (Vince fabric 11), then fabric groups NFGW (which include Fig.00, No.53), NFRWB (Fig.00, No.19) and NFBW (Vince fabrics 9, 10 and 13). The ICPS data was then compared with that from a series of samples of Lower Seine origin (some from the production site at La Londe), Middle Rhenish origin (from consumer sites in England) and mid Saxon grey and black burnished wares of unknown but presumed northern French/south-eastern Belgian origin. The latter include samples of Evison's group I imports. This analysis clearly showed that none of the present samples are of Lower Rhenish origin but showed no clear patterning of the non-Lower Seine samples.

The analysis was then repeated excluding the Lower Seine samples (Fig.3). Four factors were found and a plot of F1 against F2 indicates that the Middle Rhenish samples have negative F1 scores whereas the black and grey burnished wares from other English sites (BLBURN) have positive F1 scores, as do the Evison Gp 1 samples (Evison 1979; ESAXIMP EVI). One sample of the NFBW group (Vince fabric 13) was found to group with the Middle Rhenish wares, as do the new fabric MSGWA and a sample of a light-bodied black surfaced import from Flixborough (BLBURNW). Fabrics NFGW, NFRWB, NFEBB and two samples of the NFBW group (Vince fabrics 9, 10, 11 and 13) mainly fall with the other early and mid-Saxon imports, although one of the NFBW samples is distinguished by a high F2 score. Neither the F3 nor F4 scores show any obvious patterning, but place the outlying NFBW sample (which is clearly of the same fabric as the other grey and black burnished wares) with its companions. The Flixborough sample again plots close to MSGWA (Fabric 12), to which it is visually and petrologically similar.

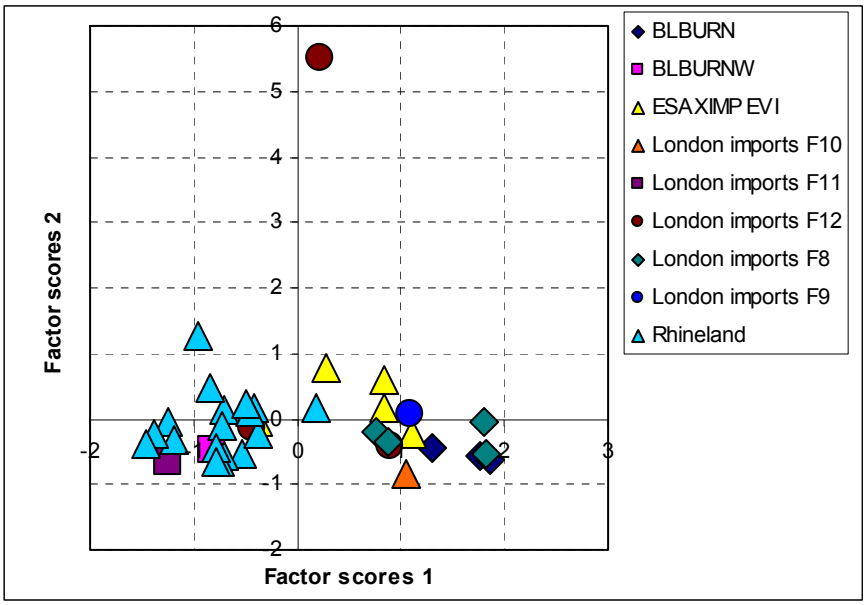


Fig 3 Chemical analysis of the imported wares, with comparanda, factors 1 and 2. (F8=F9=NFGW; F9=F10=NFWRB; F10=F11=NFEBB; F11=F12=MSGW; F12=F13=NFBW)

To summarise, the analysis has shown that most of the imported reduced wares are from the same source area as those sampled by Evison (1979; Cowell 1979), and that the oxidised fabric NFRWB is from the same area. Fabrics MSGWA and the NFBW samples have similar quartz sands, both including some extremely angular quartz grains. The latter, however, contain some well-rounded quartz grains that are absent from MSGWA. The two types, however, are chemically different. Fabric MSGWA, like a white-bodied grey burnished ware from Flixborough, might have a Rhenish origin; the three NFBW samples have rather different compositions, which could equally show that they are from different sources or, that the clay used to produce them is variable in composition.

The distinctive fabric NFEBB, probably from northern France/southern Belgium, has a very different clay matrix to the others. Chemical analysis suggests that this sample has the same source as equivalent wares from Flixborough, and probably the same as that of some reduced wares from York (Mainman 1993, 569–76) and other sites.

The remaining samples all have a fine-textured clay groundmass, in some cases with a moderate or high iron content and in others with a low iron content. It is likely that they are made using Tertiary clays, but unfortunately such clays outcrop widely in the potential source areas for these wares. The character of the quartzose sand found in the NFGW and NFRWB samples suggests that these have the same source and that they differ solely in the quantity of sand added as temper. This is supported by their chemical composition, which links them with a sherd of NFGWB from Drury Lane (DRY90; V1742), fabric NFEBB and imports from Flixborough. It is, therefore, probable, that these wares have a similar northern French/southern Belgian source.

Appendix B – Radiocarbon Dates

Director: *Professor A E Fallick*

Scottish Universities Environmental Research Centre

Rankine Avenue
Scottish Enterprise Technology Park
East Kilbride Scotland UK G75 0QF

Email: **g.cook@suerc.gla.ac.uk**
Telephone: **01355 223332**
Direct Dial: **01355 270136**
Fax: **01355 229898**

RADIOCARBON DATING CERTIFICATE

11 September 2007

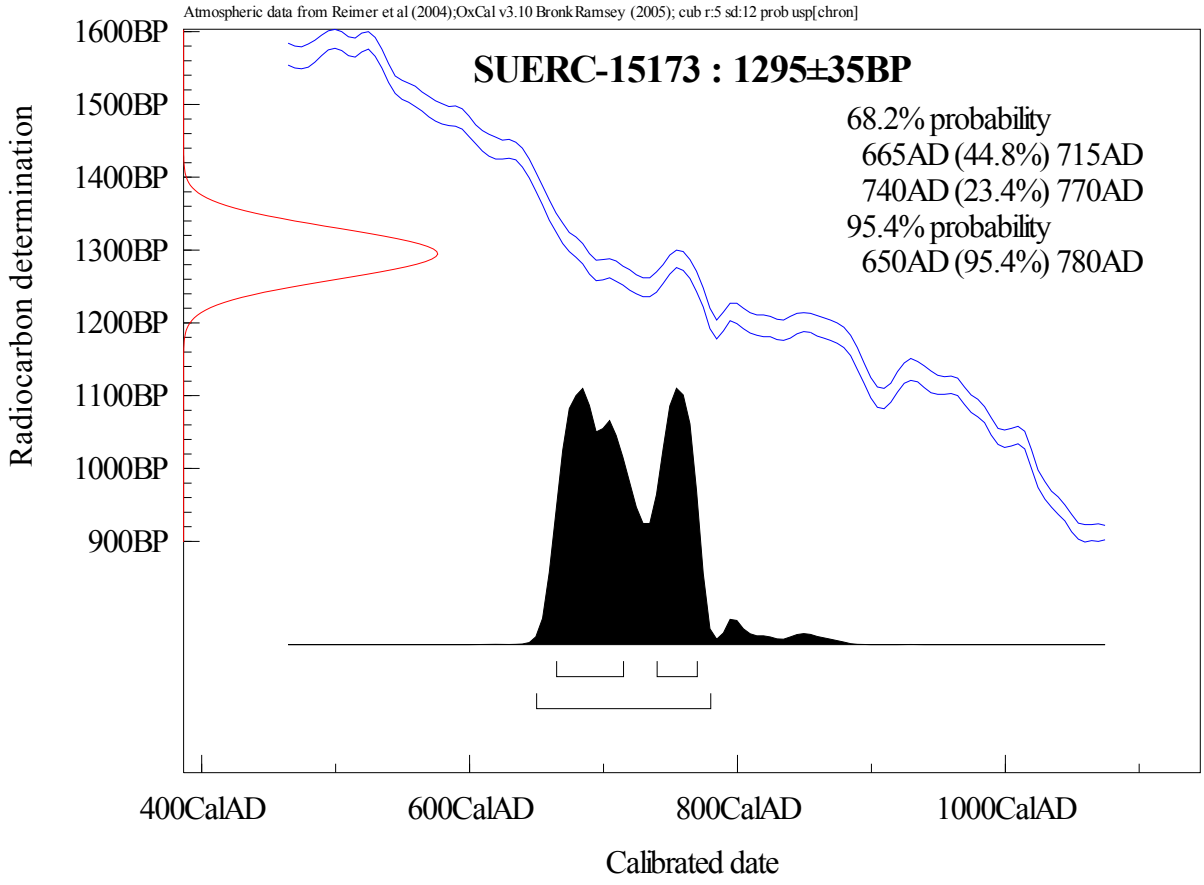
Laboratory Code	SUERC-15173 (GU-15661)
Submitter	Melissa Melikian AOC Archaeology Unit 7, St. Margaret's Business Centre Moor Mead Road Twickenham TW1 1JS
Site Reference	London Transport Museum
Sample Reference	8298
Material	Carbonised residue in ceramic vessel/lamp
$\delta^{13}C$ relative to VPDB	-30.1 ‰
Radiocarbon Age BP	1295 ± 35

N.B.
1. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.
2. The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal3).
3. Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code.

Conventional age and calibration age ranges calculated by :- Date :-

Checked and signed off by :- Date :-

Calibration Plot



Scottish Universities Environmental Research Centre

Rankine Avenue
Scottish Enterprise Technology Park
East Kilbride Scotland UK G75 0QF

Director: *Professor A E Fallick*

Email: **g.cook@suerc.gla.ac.uk**
Telephone: **01355 223332**
Direct Dial: **01355 270136**
Fax: **01355 229898**

RADIOCARBON DATING CERTIFICATE

11 September 2007

Laboratory Code	SUERC-15174 (GU-15662)
Submitter	Melissa Melikian
	AOC Archaeology
	Unit 7, St. Margaret's Business Centre

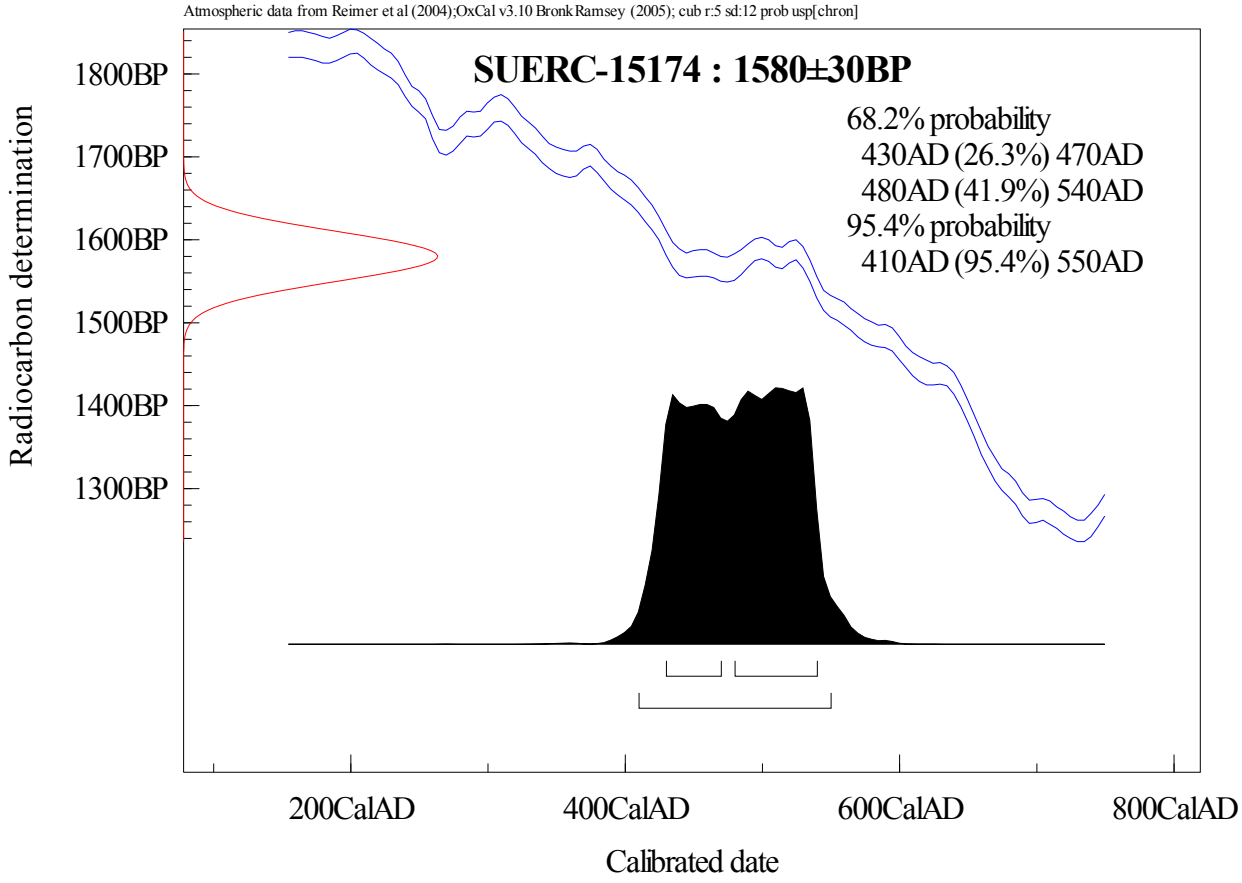
	Moor Mead Road Twickenham TW1 1JS
Site Reference	London Transport Museum
Sample Reference	8570
Material	Cremated bone : Human
$\delta^{13}C$ relative to VPDB	-24.5 ‰
Radiocarbon Age BP	1580 ± 30

N.B.
1. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.
2. The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal3).
3. Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code.

Conventional age and calibration age ranges calculated by :- Date :-

Checked and signed off by :- Date :-

Calibration Plot



Scottish Universities Environmental Research Centre

Rankine Avenue
Scottish Enterprise Technology Park
East Kilbride Scotland UK G75 0QF
Email: **g.cook@suerc.gla.ac.uk**
Telephone: **01355 223332**
Direct Dial: **01355 270136**
Fax: **01355 229898**

Director: *Professor A E Fallick*

RADIOCARBON DATING CERTIFICATE

11 September 2007

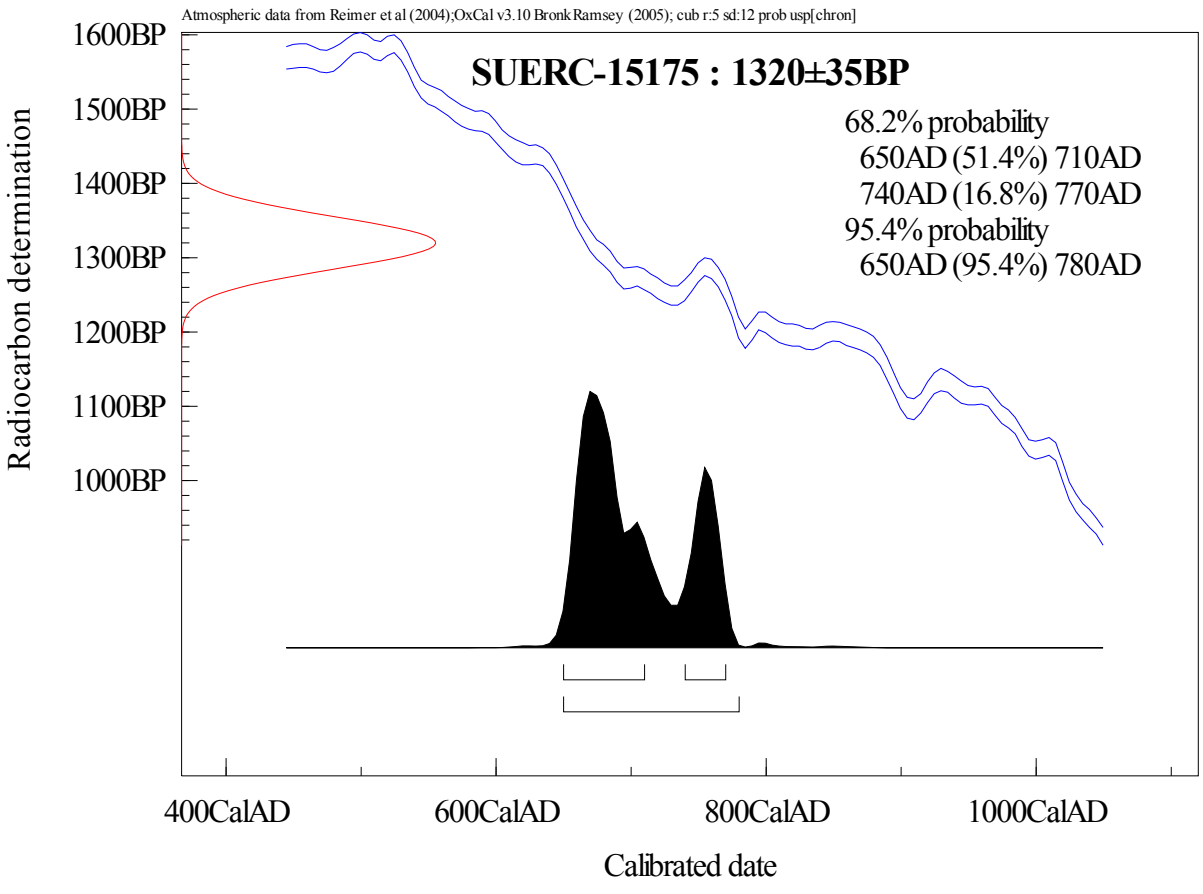
Laboratory Code	SUERC-15175 (GU-15663)
Submitter	Melissa Melikian AOC Archaeology Unit 7, St. Margaret's Business Centre Moor Mead Road Twickenham TW1 1JS
Site Reference	London Transport Museum
Sample Reference	8801

Material	Carbonised residue in ceramic vessel
$\delta^{13}C$ relative to VPDB	-28.4 ‰
Radiocarbon Age BP	1320 ± 35

N.B.
1. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.
2. The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal3).
3. Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code.

Conventional age and calibration age ranges calculated by :- Date :-
Checked and signed off by :- Date :-

Calibration Plot



Director: *Professor A E Fallick*

Scottish Universities Environmental Research Centre

Rankine Avenue
Scottish Enterprise Technology Park
East Kilbride Scotland UK G75 0QF
Email: **g.cook@suerc.gla.ac.uk**
Telephone: **01355 223332**
Direct Dial: **01355 270136**
Fax: **01355 229898**

RADIOCARBON DATING CERTIFICATE

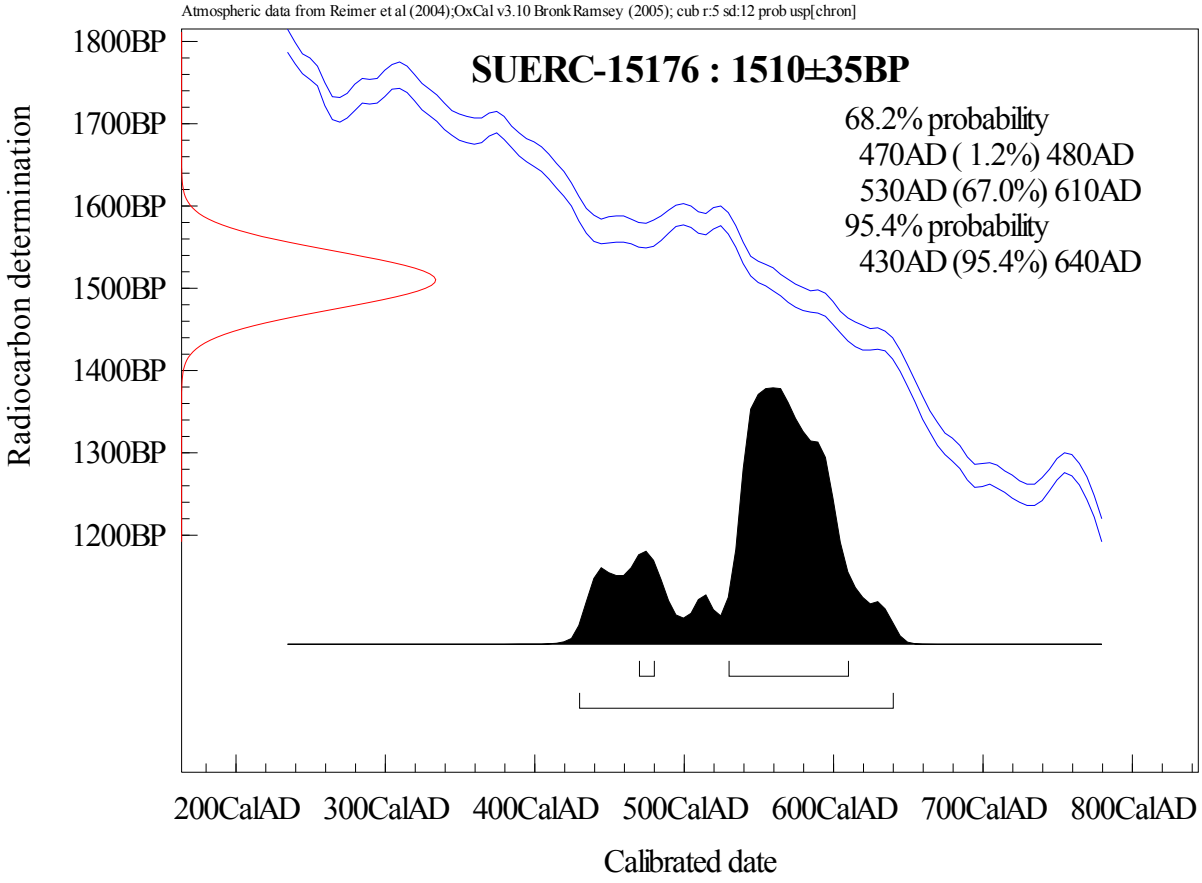
11 September 2007

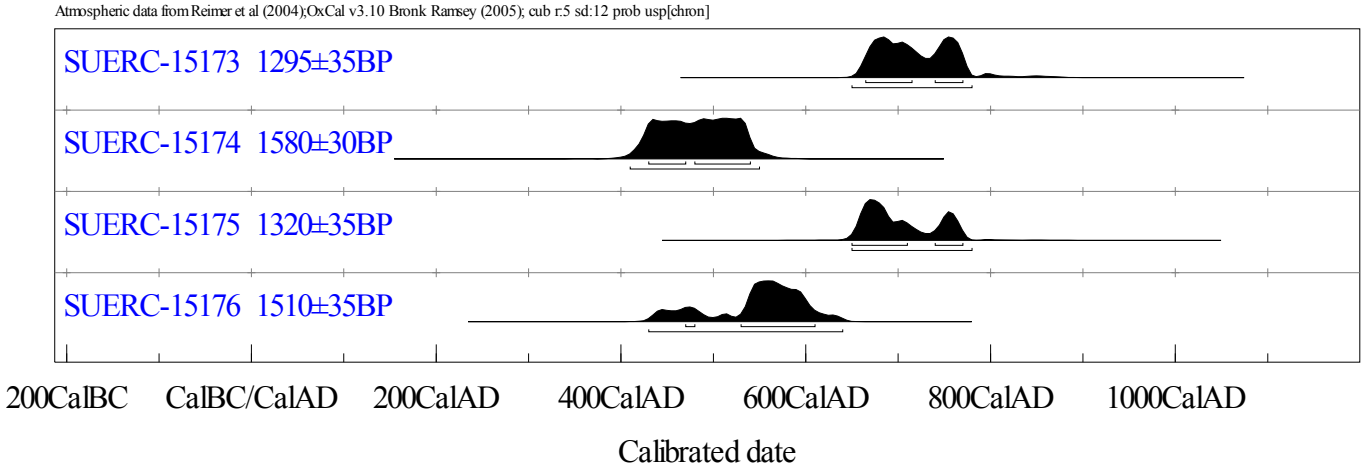
Laboratory Code	SUERC-15176 (GU-15664)
Submitter	Melissa Melikian AOC Archaeology Unit 7, St. Margaret's Business Centre Moor Mead Road Twickenham TW1 1JS
Site Reference	London Transport Museum
Sample Reference	8829
Material	Cremated bone : Human
$\delta^{13}C$ relative to VPDB	-23.1 ‰
Radiocarbon Age BP	1510 ± 35

N.B.
1. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.
2. The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal3).
3. Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code.

Conventional age and calibration age ranges calculated by :- Date :-
Checked and signed off by :- Date :-

Calibration Plot


Atmospheric data from Reimer et al (2004);OxCal v3.10 Bronk Ramsey (2005); cub r:5 sd:12 prob usp[chron]
SUERC-15176 : 1510±35BP
68.2% probability
470AD (1.2%) 480AD
530AD (67.0%) 610AD
95.4% probability
430AD (95.4%) 640AD
Radiocarbon determination
1800BP
1700BP
1600BP
1500BP
1400BP
1300BP
1200BP
200CalAD
300CalAD
400CalAD
500CalAD
600CalAD
700CalAD
800CalAD
Calibrated date


Atmospheric data from Reimer et al (2004);OxCal v3.10 Bronk Ramsey (2005); cub r:5 sd:12 prob usp[chron]
SUERC-15173 1295±35BP
SUERC-15174 1580±30BP
SUERC-15175 1320±35BP
SUERC-15176 1510±35BP
200CalBC
CalBC/CalAD
200CalAD
400CalAD
600CalAD
800CalAD
1000CalAD
Calibrated date

Appendix C – The Human Bones

Rachel Ives

1.0 Summary

1.0.1 A programme of archaeological works was undertaken by AOC Archaeology Group between June and October 2005 at the London Transport Museum, Covent Garden, London Borough of Westminster (NGR: TQ 3042 8085). The works comprised a watching brief on seven pile holes, followed by the stripping and recording of the remaining post-medieval structures and the subsequent open area excavation of any underlying archaeological features. Two inhumation burials and nine cremation burial deposits containing human bone were recovered together with a small quantity of cremated bone in secondary contexts and disarticulated human bone. One of the inhumation burials cut through a cremation deposit indicating the inhumation burials are likely to be of a later date than the cremation burials. The earliest archaeological features associated with the burial deposits date to the Early Saxon period (6th to early 7th centuries) and as such provide an important insight into the development of the settlement of *Lundenwic*.

1.0.2 Following recommendations outlined in the assessment report (AOC 2006a) a full osteological analysis was carried out on the human remains from the London Transport Museum site. The analysis of the human bone was conducted in accordance with recommendations by English Heritage (1991), English Heritage (2002) and guidance presented by the British Association for Biological Anthropology and Osteoarchaeology (BABAO) together with the IFA (Brickley & McKinley 2004).

1.0.3 The inhumation burials comprised one female aged 25-36 years at death and one adult of undetermined sex. The minimum number of individuals from the cremated burial deposits was estimated at ten individuals, with the remains of nine adults and one juvenile identified. Pathological changes observed in the inhumation skeletons include a healed rib fracture and Schmorl's nodes of the vertebrae and for the cremated bone non-specific periosteal new bone formation and a healed fracture of an upper arm (radius or ulna shaft). The results of the analysis are detailed in this report. The findings have also been compared with previous archaeological evidence for burial in this region of London in order to further the understanding of the development and history of *Lundenwic*.

2.0 Introduction

2.0.1 The results of the analysis of the human bones recovered from the excavations at the London Transport Museum, Covent Garden, London Borough of Westminster (NGR: TQ 3042 8085) are presented in this report. A programme of archaeological works was undertaken by AOC Archaeology Group between June and October 2005 on behalf of the Wates Group. The works comprised a watching brief on seven pile holes, followed by the stripping and recording of the remaining post-medieval structures and the subsequent open area excavation of any underlying archaeological features.

2.0.2 The works revealed a large number of features in the form of wells, large pits and postholes and layers of general dumping or possible levelling. Two inhumations and ten cremation deposits were recorded cutting the natural deposits. Of the cremation deposits, one, (8167), contained only burnt animal bone and was examined further by a zooarchaeologist. This deposit derived from a later phase of Saxon activity on site (late 8th to 9th centuries) and overlay a pit [8187] in Open Area 20 from Phase IV. As such,

these animal remains are not associated with the cremated human burials from the site. The remaining cremation deposits predominantly contained human bone. Radiocarbon dating has confirmed these features date to the Saxon period. The burials were localised in the south-west portion of the site. Inhumation burial (8558) was orientated north-south and skeleton (8700) east-west. In most instances there was no stratigraphic relationship between the burials. However, grave cut [8552] for skeleton (8558) cut (8570); a cremation deposit. This tentatively suggests that the inhumations may have been later.

2.0.3 Eight of the nine cremation deposits were found within cremation vessels. The remaining cremation deposit (8829) derived from fill from a pit [8828], which contained two cremation vessels (SF 38 and 39). Where relatively complete the cremation vessels were hand excavated in 'spits' or layers following the methods outlined by McKinley (1994, 2004). Prior to the analysis the human bone was processed using flotation for the cremation deposits followed by hand-sorting of the residue. Human bone from the inhumation burials was washed with lukewarm water and allowed to dry at room temperature.

2.1 *Lundenwic* – The Saxon Settlement

2.1.1 The site of the London Transport Museum in Covent Garden is situated on an area which was once, *Lundenwic*, the Saxon settlement of London. Following the withdrawal of Romans from *Londinium* in the 4th century, Saxon settlement and trading networks were re-established in the capital. The location of the central Saxon settlement *Lundenwic* was long thought to have been in the same location as the Roman settlement. Subsequent investigations have however, demonstrated that the site of *Lundenwic* existed in Covent Garden and the Strand rather than in the City of London (Vince 1990; AOC 2006a). The discovery of the location of *Lundenwic* is relatively recent and whilst a number of excavations have been carried out (*c*.40 to date), these have only investigated approximately 1.5% of the total area of the settlement. *Lundenwic* developed into a port in the late 7th century (AOC 2006a). It was principally a centre for manufacture and commerce, trading with similar *emporia* in England and on the continent via the River Thames. As such, it is likely that the original settlement would have been located along the shoreline of the river where wharves and storehouses for trading would have been erected. Archaeological investigations on the higher ground towards the north in the area of Covent Garden have revealed evidence of Middle Saxon settlement (Cowie & Whytehead 1988; Leary *et al* 2004; Capon 2006; AOC 2006a).

2.1.2 Cremation burials were favoured during the Early Saxon period (5th to 6th centuries). Inhumation became the preferred method of burial from the seventh century, although there is likely to have been a period of transitional overlap in the use of these techniques in many regional settlements (Lucy 2000, 119; Taylor 2001, 92; Hadley 2001). A number of Saxon cemeteries have been identified to the southeast of London, including Croydon, Mitcham and Ewell (see further Werner 1998, 52), as well as cemeteries of cremation burials south of the Thames (Lucy 2000, 140). In contrast, only two cemetery areas containing inhumation burials have been identified in *Lundenwic*; St Martin-in-the-Fields and a dispersed 7th century cemetery in the Covent Garden area. Saxon cremation burials tend to be rare in the south of England and previous investigations have identified an imbalance in the number of cremation burials compared to inhumation burials, particularly in the east of England. For example, in eastern Britain Lucy (2000, 140) refers to 692 known sites with inhumation burials compared to 70 sites with cremation burials. It is significant that no other cremation burials have been found in *Lundenwic* to date. The results determined from the osteological analysis from the London Transport Museum excavations will be discussed in relation to burials previously excavated from *Lundenwic*.

3.0 Methods

3.0.1 Analysis of the inhumation burials followed recent guidance recommended by BABAO/IFA (Brickley & McKinley 2004) and included compilation of the skeletal elements present prior to determination of individual age and sex, as well as analysis of individual traits of normal variation (non-metric traits) and metrical variation. Any evident pathological changes were also documented. The inhumation burials were recorded utilising a numerical recording system documented by the Museum of London (Connell & Rauxloh 2003; Powers 2007), which enables rapid skeletal recording. The adoption of this recording procedure within the current study was envisaged to also enable consistency in osteological analyses and reporting across archaeological sites within London thus improving the comparability of and interpretations made from the investigations of the human remains. The methods of inhumation recording are outlined in detail below.

3.1 Inventory

3.1.1 A full inventory of the human bone present was compiled. The numerical recording system utilises codes for elements present (1) and elements missing (0) based on a substantial portion of each bone being present (over 50%). Certain areas of the skeleton are divided into multiple segments for more accurate recording of bone presence or absence. The long bones are divided into three parts comprising the proximal, middle, and distal thirds of the shaft, with the clavicle recorded according to medial, middle or lateral (sternal) portions present or absent. The Museum of London recording system applies similar divisions to bones such as the scapula (glenoid fossa, coracoid process, acromion, infraspinous portion of blade), sternum body (as four sections in addition to the manubrium and xiphoid process as separate digits) and vertebrae (complete, centrum only or arch only). An inventory of joints present was also undertaken. The numerical coding protocol is detailed further in Connell & Rauxloh (2003) and Powers (2007).

3.2 Preservation and Completeness

3.2.1 The preservation of the bones present was evaluated according to the guidance suggested by McKinley (2004), which assigns grades (0-5) to the bone surface preservation according to damage by taphonomic variables such as root damage and bone abrasion. In addition, the bone preservation was categorised by the Museum of London recording schema, whereby the degree of surface preservation is classified using the following criteria:

1 = Bone surface is in good condition with no erosion, fine surface detail such as coarse woven bone deposition would be clearly visible (if present) to the naked eye.

2 = Bone surface is in moderate condition with some post-mortem erosion on long bone shafts but the margins of articular surfaces are eroded and some prominences are eroded.

3 = Bone surface is in poor condition with extensive post-mortem erosion resulting in pitted and eroded cortical surfaces and long bones with articular surfaces missing or severely eroded.

3.2.2 Various methods of determining skeletal completeness have been previously reported. Cranial and post-cranial skeletal regions can be considered as less than 25% complete, between 25-75% complete or

over 75% complete following Buikstra & Ubelaker (1994, 7). Alternatively the percentage completeness of each skeleton can be calculated. The Museum of London recording protocol calculates skeletal completeness on the basis that that the skull equates to 20% of the skeleton, the upper limbs 20%, the torso 40%, and the lower limbs 20%.

3.3 Sex Determination

3.3.1 Sexually dimorphic regions of the pelvis and cranium develop with the onset of puberty. The development of these features can be variable and some areas such as the cranium may not remain static over the course of an individual's lifetime. Older females, for example, can develop robust and rugged traits more frequently associated with male characteristics (Meindl *et al* 1985; Walker 1995; Brickley 2004). Prior to puberty, it is not possible to accurately determine the sex of a juvenile skeleton without undertaking destructive biomolecular analyses.

3.3.2 Various regions of the pelvis and skull were recorded in order to provide an estimation of the sex of each adult skeleton assessed. The female pelvis is typically more gracile than a male pelvis, and is also broader as modified for childbirth. The specific areas analysed include the ventral arc, ischio-pubic ramus ridge and sub-pubic concavity of the pubis (Phenice 1969; Sutherland & Suchey 1991), together with the greater sciatic notch (Buikstra & Ubelaker 1994, 18; Bass 1995). The presence and morphology of the pre-auricular sulcus was recorded following the criteria in Buikstra & Ubelaker (1994, 18), but at present there is incomplete understanding of how this trait may relate to skeletal sexual dimorphism (see Cox 2000). This trait can occur in males but can also be absent in both sexes (Roberts & Manchester 2005). Therefore, this feature was not given emphasis during the skeletal determination of sex for the adults recorded. The regions of the cranium that can display sexually dimorphic features include the supra-orbital brow ridges (glabella), the supra-orbital margins, the mastoid processes, the nuchal crest and inion protuberance, as well as the shape and slope of the forehead when viewed in profile and the shape of the eye orbits. The assessment of these regions for the determination of sex followed the methods of Buikstra & Ubelaker (1994, 20). Sexually dimorphic skeletal traits were recorded using a system of codes (see further Buikstra & Ubelaker 1994). The numerical coding adopted in this analysis followed the Museum of London recording protocol is outlined in Table 1.

Table 1. Sex categories used in the analysis of human remains

Code	Sex estimate
1	Male
2	Possible male
3	Intermediate
4	Possible female
5	Female
6	Undetermined

3.4 Age Determination

3.4.1 Methods of adult age-at-death determination are based on degenerative changes that occur at various joint surfaces including the pubic symphysis (Brooks & Suchey 1990) and auricular surface of the pelves (Lovejoy *et al* 1985), as well as at the sternal rib end (İşcan & Loth 1984; İşcan *et al* 1985), and have been reviewed by Buikstra & Ubelaker (1994, 21-32). Methods of assessing adult age based on the rate

of tooth wear can be modified by the coarseness and content of the diet, which may complicate estimations of individual age (Walker *et al* 1991,169; Larsen 1999, 247-257). Methods assessing the extent of cranial suture closure (eg. Buikstra & Ubelaker 1994, 32) as related to ageing, are not sufficiently accurate to be meaningfully incorporated into osteological analyses (see further O'Connell 2004, 19). Methods for the determination of age-at-death from juvenile remains include assessment of the degree of tooth formation and eruption sequence (Moorees *et al* 1963; Ubelaker 1989; Gustafson & Koch 1974), together with estimations of growth derived from long bone diaphyseal lengths and additional bone size estimates (eg. width and length of the pars basilaris and ilium) (see further Sundick 1978; Scheuer & Black 2000) together with estimates of epiphyseal fusion rates (see Buikstra & Ubelaker 1994, 40; Scheuer & Black 2000).

3.4.2 Skeletal age-at-death estimations are presented using age categories as it is not possible to present an individual age estimate in years (Buikstra & Ubelaker 1994; O'Connell 2004). The age categories used in the current analysis followed those presented in the Museum of London recording protocol and are shown in Table 2.

Table 2. Age-at-death categories used in the analysis of human remains

Age category	Age group	Description
0	no data	-
1	Perinatal	Intra-uterine - neonate
2	1-6 months	Early post-neonatal infant
3	7-11 months	Later post-neonatal infant
4	1-5 yrs	Early childhood
5	6-11yrs	Later childhood
6	12-17yrs	Adolescence
7	18-25yrs	Young adult
8	26-35 yrs	Middle adult A
9	36-45 yrs	Middle adult B
10	46+ yrs	Mature adult
11	Adult	18+ years
12	Subadult	< 18 years

3.5 Metric and Non-Metric (Normal) Variation

3.5.1 Where complete the remains were subjected to cranial and post-cranial metrical evaluation including long bone lengths, which enable estimates of stature to be derived. The measurements recorded follow those outlined in the Museum of London recording protocol (Connell & Rauxloh 2003; Powers 2007), which are based around guidance issued in both Buikstra & Ubelaker (1994) and Brothwell & Zakrzewski (2004). Analysis of non-metric variations includes a series of traits that are normal (non- pathological) skeletal variants, and which can in certain cases be used to tentatively indicate familial groupings (Berry & Berry 1967; Finnigan 1978; Tyrell 2000). The traits recorded in the current study followed those outlined by Connell & Rauxloh (2003) and Powers (2007), which are derived from Buikstra & Ubelaker (1994) and which largely incorporate those recommended by Brothwell & Zakrzewski (2004).

3.6 Pathology

3.6.1 Pathological changes across the skeleton and dentition were recorded following various standard osteological reference works including Brothwell (1981), Barnes (1994), Hillson (1996), Rogers & Waldron (1995), Aufderheide & Rodríguez-Martín (1998), Ortner (2003) and Roberts & Manchester (2005), as well as guidance issued in Roberts & Connell (2004).

3.7 Cremation Burials

3.7.1 Prior to analysis the cremated samples were wet-sieved through a 1 mm mesh, air dried and then hand sorted to remove any extraneous material from within the residue. The cremation vessels were hand excavated in layers or spits in order to assess potential trends in deposition within the cremation vessels as outlined by McKinley (2004) and illustrated in Figure 1. Osteological analysis of the human bone from the cremated burial deposits followed the guidance and methods presented by McKinley (1994, 2000, 2004). The bone contained within each spit was identified and recorded in an inventory prior to amalgamation of the bone from the spit levels to determine the total weight of the cremated human bone present. The human bone was then passed through three sieves of 10 mm, 5 mm and 2 mm sized mesh and the bone weight at each fraction was recorded. The level of fragmentation of the cremated bone within a deposit is related to the pyre conditions, as well as any ritual activity related to burials and additional taphonomic variables acting on the burial environment.

3.7.2 The cremated bone was subsequently hand sorted and identified by regions of the skeleton such as bones of the cranium, axial skeleton, upper or lower limb, as well as identified to individual features where possible. An inventory of the human bone present also enables determination of the minimum number of individuals (MNI) present in each cremation deposit. The weight of each grouped unit was compared to the total weight of the cremation deposit to gauge an indication of the fragmentation and preservation of the skeleton following cremation and burial.

3.7.3 The variation in colour of the burnt human bone was recorded and correlated with the bones affected where possible. McKinley (2004:11) has stated that the colour of cremated bone can reflect on the oxidation of the organic component of bone relevant to the temperature acting on the bone, and as such can reflect the efficiency of the cremation (see also McKinley 1989). The colour changes in cremated bone can be broadly interpreted as outlined in Table 3.

Table 3. Colour variation of cremated human bone (following McKinley 2004, 11)

Colour	Implication
Brown/orange	Unburnt
Black	Charred c.300 degrees C.
Blue/grey	Incompletely oxidised, up to c.600 degrees C.
White	Fully oxidised, over 600 degrees C.

3.7.4 The maximum size of human bone fragments within each cremation deposit was also recorded. Where possible, methods as outlined above (Sections 3.3 and 3.4) were employed to determine the sex and age of the individuals included in the burial deposits, although this can be extremely difficult to determine based on fragmentary remains. Any non-metric traits that could be potentially identified on any identifiable skeletal regions and any evident pathology were also recorded following the methods outlined above.

4.0 Results

4.0.1 The results of the osteological analysis are presented first for the inhumation burials (Section 4.1) followed by the cremation burials (Section 4.2). The human bone present in secondary deposits from the site are outlined in Sections 4.3 and 4.4, prior to documentation of the radiocarbon dates obtained from samples of cremated human bone (Section 4.5). The archive will be deposited and accessible from the London Archaeological Archive and Resource Centre.

4.1 Inhumation Burials

4.1.0.1 Two inhumation burials were recovered from the excavations at the London Transport Museum. Given the small number of individuals present, the results will be presented on an individual basis rather than considered using a population-based approach.

4.1.2 Skeleton 8558

4.1.2.1 Skeleton 8558 was determined to be an early middle adult female with an age-at-death ranging from 25-36 years as based on the auricular surface of the pelvis and degree of molar tooth wear. Skeleton 8558 was buried lying on its left side, with the arms flexed towards the chest with the right hand under the left elbow. The legs were slightly flexed at the knees but the left leg was positioned on top of the right at the knee. The burial was aligned north-south, with the head at the north end of the grave. The cut for this grave [8552] cut through cremation burial deposit (8569), indicating the inhumation was later than the cremation burial. The skeleton was largely complete (80%) and bone preservation was moderate with some abrasion of the joint surfaces and bone margins, fragmentation and some small patches of surface removal of bone (Grade 2, Museum of London recording protocol). There was no specific taphonomic abrasion or erosion of the bone surfaces as documented by McKinley (2004). There was however, evidence of discolouration throughout some of the bones, with the skull showing variation between white/cream and mottled dark brown patches, and the scapula and clavicle displaying a much whiter colour than the remainder of the skeleton. It is probable that such differences in colouration result from taphonomic changes specific to the burial position or environment. Various factors can cause colour change on bones from inhumation burials. For example, bacteria, plants and minerals in the soil of the burial environment can affect the surface colour of bone (Buikstra & Ubelaker 1994, 96). Bleaching by sunlight of exposed bone surfaces can also occur. Some fissuring had occurred across the pelvis, endocranium and vertically throughout the shaft of the humerus following post-mortem breaks at the margins of these regions. It is unclear to what extent the post-mortem alterations evident on the skeleton may have been influenced by taphonomic processes that derived from the burial position. Variation in groundwater levels, flunctuating ground or soil temperatures as well as pressure from soil weight may all potentially impact on bone preservation in the burial environment.

4.1.2.2 Cranial metrical analysis was limited in skeleton 8558 due to fragmentation and poor bone preservation. The few measurements that could be determined from the mandible are presented in the paper-based records in the site archive. Similarly, the recording of cranial non-metric variants was limited. Only the presence or absence of metopism, lambdoid ossicle, inca bone, torus auditivi, supraorbital foramen, mastoid foramen, foramen of Huschke, mandibular foramen, torus mandibularis and mandibular mylohyoid bridging could be recorded. No traits except for a left supra-orbital groove were present in this individual. The individual also displayed evidence for post-cranial non-metric traits with a septal aperture

of the right humerus and bilateral third trochanters of the femora. These traits represent normal variants rather than pathological changes and would not have had any notable effects during life. The long bones were insufficiently preserved to enable the calculation of stature in this individual.

4.1.2.3 Skeleton 8558 displayed four pathological changes. The distal joint surface of the right second metacarpal of the hand displayed a small patch of eburnation, which covered less than 50% of the joint surface (1/4 metacarpal heads present). This change occurs following degenerative breakdown of the protective cartilage in the joint, which allows bone surfaces to come into direct contact during joint movement. With continued joint movement the bone surfaces become eburnated or polished. This is one of the conditions of osteoarthritis (Rogers & Waldron 1995, 35-36). The aetiology of osteoarthritis is multi-factorial and can be difficult to relate to a specific cause. For example, osteoarthritis can occur due to a secondary consequence of fracture or infection, which alters the normal function of a joint. Alternatively, osteoarthritis can result from age-related or activity-related wear and tear on the joints (see Roberts & Manchester 2005, 143). To date, it is also unclear to what extent a genetic predisposition or lifestyle factors such as obesity, may have on disease onset, as well as how disease prevalence may vary between different environmental conditions such as between urban or rural contexts (see further Roberts & Manchester 1997, 106).

4.1.2.4 The lower spine of skeleton 8558 displayed evidence of Schmorl's nodes (Fig. 2). These bone lesions are caused by herniation and expulsion of material contained in the intervertebral disc into the surrounding vertebral body surfaces following compression of the spine (Rogers & Waldron 1995, 27; Aufderheide & Rodríguez-Martín 1998, 97). Schmorl's nodes often occur in the lower thoracic and lumbar spine (Roberts & Manchester 1997, 107) most likely at the points of greatest load-bearing. Degeneration of the intervertebral discs can occur as a result of increasing age, but may be exacerbated by a range of conditions during life (Roberts & Manchester 2005, 140). Trauma can predispose to such herniations, including falls from a height or heavy lifting or activity (Mann & Hunt 2005, 95). The lesions themselves may be asymptomatic. The superior and inferior aspects of the twelfth thoracic vertebral body (T12) displayed evidence for Schmorl's nodes, as did the superior and inferior aspect of the first lumbar vertebra (L1) (2 vertebrae affected/23 observable). The superior surfaces of both vertebrae manifested medium sized-lesions (between 15-25mm in length and/or depth) affecting the anterior margins of the vertebral bodies, with T12 also affected by a second lesion towards the central-posterior aspect of the body. The inferior surfaces displayed slightly smaller Schmorl's nodes (less than 15mm in length and/or depth) at the central-posterior aspect of T12 and anterior aspect of L1. Only one other aspect of vertebral pathology was noted in this skeleton manifest as intervertebral disc disease (IVD). This condition represents bone reaction to the degeneration of the intervertebral discs, which results in porosity of the superior and inferior vertebral surfaces often together with osteophyte bone formation. These changes tend to occur in the mid- to lower cervical vertebrae as well as in the lower lumbar region (Rogers & Waldron 1995, 27). In skeleton 8558 IVD was identified between the inferior surface of the fifth cervical vertebra and superior surface of the sixth cervical vertebra. Marked pitting and porosity of the bone surface was apparent on the centrum rather than around the peripheral annulus fibrosus of the vertebrae.

4.1.2.5 The occurrence of a number of Schmorl's nodes in burial 8558 may indicate that episodes of increased axial loading of the spine contributed to the onset of these lesions. The lifestyle of the early medieval period most likely included high levels of physical activity in both agricultural production (Roberts & Cox 2003, 195) as well as in urban trading centres. A survey of health by Roberts & Cox (2003, 195) in the

early medieval period in Britain has indicated that the prevalence of Schmorl's nodes declined slightly from the Roman to early medieval period (4.84% compared to 2.9%).

4.1.2.6 Skeleton 8558 also displayed one united and well-healed rib fracture evident in a small (*c* 6 cm) fragment of rib (Fig. 3). The fracture location is evident in the shaft rather than at the rib neck. Which rib affected could not be determined further than it was not an upper rib (1-3). The overall preservation of the ribs was quite poor with lots of fragmentation. The fracture presents slight lateral displacement of the fractured end with minor residual mal-alignment. The fracture is very well-healed and comprises of well-remodelled lamellar bone and with slightly rounded edges on the superior and inferior margins of the shaft indicating the residual fracture callus. Trauma from a range of contexts can result in fractures, and it is possible that accidents caused during physical work in agriculture or labour may have contributed to fracture occurrence in the early medieval period (see further Roberts & Cox (2003, 203). A survey of fracture types and prevalence in the early medieval period has indicated that more males than females were affected by rib fractures (28:8 respectively) but this trend may be influenced by the manner of data collation and reporting (Roberts & Cox 2003, 34).

4.1.2.7 Burial 8558 did not display any evidence of dental caries or calculus (0/13 teeth observable). The right and left second mandibular premolar and first molar were however, lost ante-mortem, which in a young adult indicates some dental health complications quite early in adult life. Ante-mortem tooth loss can occur as a function of age but can be exacerbated by caries or abscesses, or by periodontal disease resulting from soft tissue inflammation caused by bacteria or dental calculus. Sugar was unknown in the early medieval period in Britain, but sweetening agents such as honey existed in the diet (Roberts & Cox 2003, 190). Dietary reconstructions for the Saxon period further indicate a high consumption level of cereals and carbohydrates, which are likely to have contributed to poor dental health particularly caries and calculus, as observed in Saxon inhumation contexts and discussed by Roberts & Cox (2003). The botanical evidence recovered from the London Transport Museum site provides evidence for the cultivation of cereal crops from *Lundenwic*, principally of wheat and barley but also including rye and oats. Evidence for the cultivation of wheat and barley as principal crops during the Saxon period elsewhere in southern England has also been recently outlined (see further Giorgi this volume). Severe or prolonged periodontal disease can result in loosening of the periodontal ligament, which in turn loosens the tooth in the socket (Roberts and Manchester 2005, 73-74). Bone resorption triggered by the inflammation can also exacerbate tooth loosening and loss. There was no evidence of childhood stress manifest as linear enamel hypoplasia in the teeth observable in this individual (0/13).

4.1.3 Skeleton 8700

4.1.3.1 Skeleton 8700 was poorly preserved with significant fragmentation of the bones present. The preservation of the remains was graded as 3 (Museum of London recording protocol), although this represented the loss of articular bone surface as well as some surface flaking and loss of cortical bone, rather then indicating extensive pitting and erosive destruction of the bone surface. The remains were less than 25% complete (Buikstra & Ubelaker 1994) and were estimated to be only about 10% complete (Museum of London recording protocol).

4.1.3.2 Skeleton 8700 was aligned west-east with the cranium originally likely to have been located at the west end of the grave. The remains were buried supine with arms and legs extended. The body orientation and position differs to that of burial 8558 above. The skeleton predominantly comprised of fragmentary remains of the arm and leg bones, with a few fragmentary remains of pelvis bones also present. Visible

regions of the skeleton that could be assessed for epiphyseal fusion of secondary centres of bone ossification, such as the pelvis and distal femoral condyle, demonstrated that epiphyseal fusion was complete indicating an adult individual. It was not possible to determine the age-at-death or sex of the individual from the fragmentary remains present.

4.1.3.3 No metrical data could be recorded for this individual and it was only possible to record the presence or absence of hypotrochanteric fossae and third trochanters from the femora and neither of these traits were present in this individual. No pathological changes were evident on the human bones from this context. The burial was recovered with a number of grave goods including a red and yellow glass bead, a small angle-backed knife, as well as a shield-on-tongue buckle. A necklace made from nineteen amber beads was placed on the chest of burial 8700, which Blackmore (this volume) has noted appears to be the earliest evidence of this type of necklace from London, and this type was particularly fashionable during the 5th and 6th centuries (see further Blackmore this volume). Blackmore further suggests that the presence of the amber beads together with the small knife blade found with this inhumation may indicate that the human remains were female.

4.2 Cremation Burials

4.2.0.1 Nine cremation deposits were excavated from the London Transport Museum site. Of these, analysis determined eight to represent clear burials deposits, with the ninth (8829) representing cremated human bone found within a pit fill for two burial deposits (8867 & 8868). The metrical analyses of maximum fragment size together with total weight and fractional weights of bone across the cremated deposits are presented in Appendix C.1 Table 1. The cremated human bone deposits as a whole were extremely fragmented and it was difficult at times to attain a specific identification of the bones present. Where a significant number of unidentified small bone fragments existed, these have been indicated in the inventories below as 50+ fragments. The results for each deposit are presented below.

4.2.1 Cremation 8543

4.2.1.1 Cremation deposit 8543 contained a relatively small amount of human bone compared to other cremation burials within the assemblage (total weight 189g) (see Appendix C.1 Table 1). The remains represented an MNI of one individual based on a lack of duplicated skeletal elements and indicate an adult individual. No further ageing or sexing of the remains could be undertaken due to the fragmentation of the human bone present. Very little evidence of the axial skeleton (vertebrae, ribs, pelvis) were present in this context, although the few fragments of vertebral body present were almost intact centrums. There were no remains of the lower limb or feet. Whether this trend indicates factors related to the context at the time of burial or post-deposition processes is not clear. The cremated human bone was white to light grey in colour for the majority of the bone fragments and was noted as such even across very small, unidentifiable fragments. An inventory of the bones identified from this cremation context is presented in Table 4. No pathological changes were recorded on the bones present in this context.

Table 4. Number of identified bone fragments in cremation burial deposit 8543

Bone fragments	Number	Bone fragments	Number
Cranial	5	Feet	-
Teeth	-	Axial	3

Upper limb	16	Ribs	-
Humeri	1	Vertebrae (total)	3
Ulnae	-	Cervical vertebrae	-
Radii	-	Thoracic vertebrae	-
Scapulae	-	Lumbar vertebrae	-
Clavicles	-	Sacrum	-
Hands	1	Pelves	-
Lower limb	0	Sternum	-
Femora	-	Unidentified	<50
Tibiae	-	Articular bone	-
Fibulae	-	Other	-

4.2.2 Cremation 8570

4.2.2.1 Cremation deposit 8570 contains a MNI of one individual based on the lack of duplicated skeletal elements. The remains represent an adult skeleton but it was not possible to determine a more specific age-at-death or sex of the individual. Aspects of various bones adjacent to joint surfaces tended to survive quite well in this deposit, including part of the right sacral ala (Fig. 4), a portion of the medial distal femoral condyle, proximal and distal articular surfaces of a tibia (knee joint), part of the olecranon fossa of the proximal ulna (elbow joint), the distal head of a metacarpal (hand), as well as small fragments of the lateral cuneiform and cuboid of the foot. In contrast, the vertebrae were very poorly represented in this context. An inventory of the bones identified from this cremation context is presented in Table 5. The bones were predominantly noted to be a buff/light brown colour, except for the tarsals which were a dark grey colour and remains from the fibula that were white. No pathological changes were recorded on the bones present in this context.

4.2.2.2 Three small fragments of long bone shaft displayed evidence of retained copper alloy adhering to the bone surface. The bone pieces were very small and it was not possible to determine whether the bones derived from the upper or lower limb. Two fragments contained very small and incomplete remnants of material, while the third fragment presented a better preserved, small (*c* 1 cm) round or oval feature attached to the bone surface, although the incomplete preservation of the bone significantly limits the potential to fully understand the origin of this metal. Blackmore (this volume) found a further piece of unidentified copper alloy material from this cremation deposit. It is likely that these metal fragments derived from costume fittings placed with the body on the cremation pyre.

Table 5. Number of identified bone fragments in cremation burial deposit 8570

Bone fragments	Number	Bone fragments	Number
Cranial	38	Feet	4
Teeth	-	Axial	8
Upper limb	c.25-50	Ribs	6
Humeri	-	Vertebrae (total)	-
Ulnae	1	Cervical vertebrae	-
Radii	-	Thoracic vertebrae	-
Scapulae	-	Lumbar vertebrae	-
Clavicles		Sacrum	1
Hands	1	Pelves	1
Lower limb	29	Sternum	-

Femora	2	Unidentified	
Tibiae	1	Articular bone	19
Fibulae	2	Other	-

4.2.3 Cremation 8829

4.2.3.1 Cremation deposit 8829 is a pit fill that contained two cremation burials (8867 & 8868). It is possible that human remains from these burials contexts have been inter-mingled in deposit 8829. However, the nature of fragmented cremated human remains means that it is difficult, if not impossible, to attempt to distinguish the nature of the original contexts.

4.2.3.2 The remains from context 8829 represent a MNI of one individual. The remains could be determined as an adult owing to the presence of several complete bones of the wrist (hamate and lunate, Fig. 5), as well as an incomplete patella fragment (Fig. 6). An inventory of the bones identified from this cremation context is presented in Table 6. The small finds analysis has identified a pair of tweezers with quite elaborate incised decoration, suggestive of a Roman style associated with this cremation deposit. Whilst tweezers are a frequent inclusion with Saxon grave good assemblages (Lucy 2000, 108), Blackmore (this volume) suggests that the form of the tweezers from cremation deposit 8829 potentially indicates a relatively high status with a possible indication of a 6th century Frankish import. It is of interest that tweezers in Saxon contexts have been associated with male burials (see further Blackmore this volume), although the fragmentary human remains of this deposit prevented determination of an accurate age or sex estimate. Up to 19 glass beads were also recovered from this cremation deposit, with two instances of multiple beads melted and fused together. The beads vary in colour from blue-green as well as a blue and a yellow bead (see Blackmore this volume). Additional evidence of unidentified iron strips were also found with this cremation deposit, as well as two heat-altered fragments of possible wire (Blackmore this volume). Blackmore (this volume) found further evidence of an unidentified fragment of copper alloy from this cremation deposit. It is likely that these remains represent further grave goods or clothing fixtures either associated with the body during the cremation or subsequently during burial.

4.2.3.3 This deposit contained five adult tooth roots (Fig. 7). Enamel is susceptible to cracking and destruction by heat so it is likely that the tooth crowns were destroyed by the cremation process. The majority of the tooth roots are black/dark grey in colour, but remain buff/light brown in colour at the very root apex. The teeth comprised one mandibular incisor, two maxillary premolars, and one maxillary third molar. The majority of human bone within context 8829 was a white or light grey colour indicating quite high oxidation of the bone during the cremation (McKinley 2004, 11). The exceptions to this colouration derive from long bone articular surfaces, which were noted to be predominantly buff/light brown in colour, as well as a fragment of incompletely oxidised first cervical vertebra comprising the facet for the odontoid peg of the second cervical vertebra (Figs. 8 and 9).

4.2.3.4 Pathological changes were evident on the human bone in deposit 8829. A fragment of probable humerus (based on dimensions, shape and thickness of the cortex) presented extensive vertical striations in the bone surface, which were manifest over the majority of the surviving fragment (Fig. 10). The striations were evident in the existing layer of lamellar cortical bone rather than as a discrete layer on top of the bone surface. The lines were not indicative of fissure fractures, and were vertical rather than concentric fissures or cracks caused by warping as can otherwise be evident on burnt bone. In addition, the shape of the bone fragment presented no evidence of warping or abnormal bending. The striations did not separate or split the cortical shaft at the broken edges of the shaft fragment, which may

have been expected if these originated as part of the cremation or burial (taphonomic) processes. The features on this fragment of humerus are interpreted as evidence of non-specific periosteal lamellar new bone formation that is well-healed and remodelling and well-integrated into the humerus shaft. The vertical striations covered the bone fragment which measured 32.74mm (superior-inferior) by 10.59mm (medio-lateral).

Table 6. Number of identified bone fragments in cremation burial deposit 8829

Bone fragments	Number	Bone fragments	Number
Cranial	108	Feet	1
Teeth	5	Axial	33
Upper limb	65	Ribs	22
Humeri	1	Vertebrae (total)	7
Ulnae	-	Cervical vertebrae	2
Radii	-	Thoracic vertebrae	2
Scapulae	-	Lumbar vertebrae	-
Clavicles	-	Sacrum	-
Hands	7	Pelves	-
Lower limb	18	Sternum	-
Femora	-	Unidentified	50+
Tibiae	-	Articular bone	12
Fibulae	-	Other	-

4.2.4 Cremation 8840

4.2.4.1 Cremation 8840 contained both human and animal bone. A total weight of 103g of animal bone was retrieved from the context. It is probable that the animal bone was originally placed onto the pyre as food offerings and was subsequently incorporated into the burial deposit with remains from the pyre, The human bone represents a MNI of one individual. The remains were from an adult individual. A more detailed identification of individual age-at-death and sex was not possible due to the bone preservation and fragmentation in this context. The bones were predominantly buff/light brown or white in colour. Fragments of articular surfaces and small bones of the hands and feet (eg. distal fibulae joint surfaces, acetabulum, proximal humerus joint surface, distal heads of metacarpals and metatarsals, talus and navicular) survived the cremation process quite well. Of the cranial remains, a portion of the right orbit was present together with one tooth root of a probable maxillary first premolar, the crown having been destroyed during the cremation. An inventory of bones identified in the cremation deposit is listed in Table 7.

4.2.4.2 A fragment of radius or ulna (it was not possible to discern more accurately between the two based on the size of the bone fragment) displayed a fracture of the shaft (Fig. 11). The external periosteal bone surface displays an overlap evident in the normally expected straight shaft surface. The fragment of bone present measures 39.57mm (superior-inferior) by 11.46mm (medial-lateral). It appears that a fracture with residual apposition and mal-alignment of the fractured ends occurred in the shaft of forearm. The over-lapping segment of bone comprises of lateral (external) displacement of the fractured piece with appositional overlap of 9.32mm between the two periosteal surfaces.

4.2.4.3 The margins of the bone fragment which overlies the residual outline of the shaft, are largely sharp-edged and have been abraded post-mortem. Whether this has occurred as part of the effects of the

cremation process, as a result of the taphonomic processes during burial or due to excavation and processing is not clear. However, the margins of bone surrounding the overlapped fragment clearly show continuation of the bone shafts, indicating that the bone has not simply snapped or been warped post-mortem, but that a reactionary bone response to the overlapping of bone segments had occurred prior to death. The lamellar nature of the surrounding bone, which bears no evidence of woven bone formation, indicates that the fracture was not a recent occurrence prior to death. The fragment of bone is not complete. The meduallary cavity is exposed and there has been post-mortem damage of the endosteal bone surface. However, the longitudinal section through the cortical bone of the fractured shaft also indicates a directional change in outline with external inclination of the bone leading to towards the appositional fractured portion in contrast to the expected horizontal alignment in a normal shaft.

Table 7. Number of identified bone fragments in cremation burial deposit 8840

Bone fragments	Number	Bone fragments	Number
Cranial	77	Feet	8
Teeth	1	Axial	14
Upper limb	69	Ribs	8
Humeri	8	Vertebrae (total)	4
Ulnae	2 (1?)	Cervical vertebrae	
Radii	1?	Thoracic vertebrae	
Scapulae	2	Lumbar vertebrae	
Clavicles		Sacrum	
Hands	4	Pelves	2
Lower limb	59	Sternum	
Femora	1	Unidentified	
Tibiae	1	Articular bone	3
Fibulae	2	Other	3

4.2.5 Cremation 8853

4.2.5.1 Cremation deposit 8853 contained a small amount of human bone (total weight 19g) compared to others within the assemblage (Appendix C.1 Table 1). The context contained adult human bone and represents a MNI of one individual based on a lack of duplicated skeletal elements. The context contained cranial and post-cranial bone fragments. A fragment of adult occipital bone, which presented a robust nuchal crest and inion protuberance, demonstrated an adult male individual in this context. The occipital fragment was the largest piece of bone that survived in this deposit, and was white together with dark grey in colour on the ectocranium and dark grey/black on the endocranium. A small number of white long bone fragments from the upper limb were also present. There was no clear evidence of lower limb bones or bones from the axial skeleton in this cremated deposit. It is unclear whether this represents deliberate bone selection for the burial deposit, a practice which would not be supported on the trends evident in the other cremation burials from this site, or alternatively represents an incomplete burial context or a secondary deposit. No pathological changes were recorded on the bones present in this context. An inventory of the bones identified is presented in Table 8.

Table 8. Number of identified bone fragments in cremation burial deposit 8853

Bone fragments	Number	Bone fragments	Number

Cranial	1	Feet	
Teeth	-	Axial	-
Upper limb	6	Ribs	-
Humeri	-	Vertebrae (total)	-
Ulnae	1	Cervical vertebrae	-
Radii	-	Thoracic vertebrae	-
Scapulae	-	Lumbar vertebrae	-
Clavicles	-	Sacrum	-
Hands	-	Pelves	-
Lower limb	-	Sternum	-
Femora	-	Unidentified	5
Tibiae	-	Articular bone	1
Fibulae	-	Other	-

4.2.6 Cremation 8855

4.2.6.1 Cremation deposit 8855 contained a MNI of one individual based on the lack of duplication of any skeletal elements. The cremation deposit was relatively small (218g total weight) compared to others recovered from the assemblage (Appendix C.1 Table 1). The cremation deposit was excavated in spits, which revealed a trend for larger bone fragments to be located towards the bottom of the cremation urn. The majority of bone surfaces within the deposit were of a cream or white colour, with one fragment a light grey colour and a few fragments of bone, particularly articular surfaces, showing more brown-buff colouration. The deposit was found to contain adult human bones, but there was insufficient completeness of the bones to determine a more accurate age-at-death or sex of the individual. No pathological changes were recorded on the bones present in this context. A range of bones from across all of the principal skeletal groups were represented from this individual as detailed in Table 9.

Table 9. Number of identified bone fragments in cremation burial deposit 8858

Bone fragments	Number	Bone fragments	Number
Cranial	23	Feet	3
Teeth	-	Axial	22
Upper limb	46	Ribs	-
Humeri	2	Vertebrae (total)	12
Ulnae	1	Cervical vertebrae	-
Radii	1	Thoracic vertebrae	5
Scapulae	-	Lumbar vertebrae	-
Clavicles	-	Sacrum	1
Hands	-	Pelves	4
Lower limb	30	Sternum	-
Femora	2	Unidentified	
Tibiae	-	Articular bone	4
Fibulae	-	Other	-

4.2.7 Cremation 8858

4.2.7.1 Cremation deposit 8858 contained a MNI of two individuals. One individual was an adult represented by fully grown bones including a navicular of the foot. The second individual was a juvenile represented by bones that were still growing at the time of death, including an epiphysis of the proximal femoral head

present (Fig. 12) and fragments of the proximal metaphysis of the tibia (Fig. 13). The size of the juvenile bones indicated that the remains were not from a neonate (approximately birth to one month). The femoral head epiphysis first appears between six to twelve months (Scheuer & Black 2000, 392), indicating the juvenile was older than six to twelve months at the time of death. There was no epiphyseal fusion of the tibial metaphysis or the femoral head epiphysis, which demonstrates the juvenile was likely to be aged below 13-15 years at the time of death (Scheuer & Black 2000).

4.2.7.2 The cremation deposit was excavated from nine spits, and the upper spits contained human bone in very small fragments compared to the larger size of bone prices present further down into the vessel. Each spit contained a mixture of bones from the skeleton rather than specific groups of skeletal elements.

4.2.7.3 The juvenile remains that were identifiable were extremely fragmentary and consist of two fragments of proximal tibia, one proximal femur epiphysis and some small, thin fragments of cranial bone. Various fragments of cranial bone may also have originated from the adult remains, although all of the cranial bones were very fragmented and incomplete. The remaining bones of this context are shown in the inventory in Table 10. The juvenile long bones were a light brown/buff colour while the cranial bones were predominantly white on the endocranium and varying shades of grey together with some white fragments on the ectocranium. The majority of adult bone was buff/light brown in colour.

4.2.7.4 The adult human remains comprised fragments of axial skeleton, including the ribs, long bone fragments of the upper and lower limb as well as cranial remains. Whilst there were fragmentary remains present, it appears that most regions of the skeleton were present in the cremated assemblage. One fragment of cremated adult human bone displayed evidence of a pathological change. A layer of periosteal new bone formation comprising striated and porous woven bone on top of the existing bone shaft was evident on a fragment of tibia (Fig. 14). The new bone formation was clearly defined although the margins of the layer were remodelling into the underlying normal periosteal shaft surface. The fragment of tibia shaft measured 19.86 mm (superior-inferior) by 14.02 mm (medial-lateral), and the layer of new bone formation measured 7.24 mm (SI) by 9.30 mm (ML), although these dimensions naturally do not indicate the full extent of the new bone formation on the tibial surface.

Table 10. Number of identified bone fragments in cremation burial deposit 8858

Bone fragments	Number	Bone fragments	Number
Cranial	51	Feet	1
Teeth	-	Axial	2
Upper limb	2	Ribs	3
Humeri	-	Vertebrae (total)	2
Ulnae	-	Cervical vertebrae	-
Radii	-	Thoracic vertebrae	-
Scapulae	-	Lumbar vertebrae	-
Clavicles	-	Sacrum	-
Hands	-	Pelves	-
Lower limb	2	Sternum	
Femora	1	Unidentified	c.25-50
Tibiae	3	Articular bone	-
Fibulae	-	Other	-

4.2.8 Cremation 8867

4.2.8.1 Cremation deposit 8867 contained a MNI of one individual based on the lack of duplication of skeletal elements in the context. The deposit was excavated in six spits. The upper spits contained smaller fragments of human bone than those located lower in the cremation urn. There was however, no discernable trend for particular bone elements to have been placed in a sequence in the urn prior to burial in the ground. The bone fragments were uniformly buff/light brown in colour.

4.2.8.2 The human bone in this deposit was well-preserved with a high number of identifiable bone fragments (Table 11), and included one partial ear ossicle (Fig. 15). The human bone represented an adult individual. An almost complete auricular surface of the pelvis was present from this cremation deposit, but had suffered some warping affecting the bone surface, which indicated that a reliable age estimate based on this element could not be ascertained. There were a few possible residual striae in the bone surface but these features were complicated by overlying fine fissure fractures across the bone surface as a residual factor of the cremation. There was no billowing or transverse organisation of the bone in the auricular surface, indicating that this individual was definitely not a very young adult (eg. less than 25-29 years, Phase 2) and can be aged as over 30 years at the time of death. However, the age-at-death can not be determined more accurately from the remains present. No pathological changes were recorded on the bones present in this context.

4.2.8.3 One fragment of rib displayed a small patch of turquoise-green staining towards the neck of the fragment, most likely where the bone surface had come into contact with some metal such as copper alloy. These fragments were too small to be identified as a specific metal object but are likely to have been a clothes fastening or possibly a remnant of jewellery. The remainder of the rib fragments ranged from buff to a light grey/white colour. Evidence of fuel ash slag from the cremation pyre was recovered from this cremation context (see Blackmore this volume).

Table 11. Number of identified bone fragments in cremation burial deposit 8867

Bone fragments	Number	Bone fragments	Number
Cranial	55	Feet	7
Teeth	-	Axial	85
Upper limb	54	Sternum	-
Humeri	3	Ribs	33
Ulnae		Vertebrae (total)	36
Radii	1	Cervical vertebrae	1
Scapulae	2	Thoracic vertebrae	1
Clavicles	1	Lumbar vertebrae	-
Hands	4	Sacrum	-
Lower limb	27	Pelves	16
Femora	2	Unidentified	50+
Tibiae	-	Articular bone	11
Fibulae	2	Other	58

4.2.9 Cremation 8868

4.2.9.1 Cremation deposit 8868 contained a MNI of one individual based on the lack of duplication of skeletal elements in the context. This deposit was excavated in four spits. There was an increasing size of bone fragment towards the spits located near the base of the cremation vessel. There was no distinguishable depositional trend regarding placement of specific bone elements within the vessel following the cremation. The human bone represented an adult individual, but there was insufficient preservation of bone fragments to enable more detailed ageing or sex to be determined. A large portion of the cremated bone in this deposit was white in colour indicating a high level of oxidisation. A small number of fragments of the cranial vault displayed a light grey/blue colour, as did several pieces of long bone, reflecting a lesser temperature and degree of oxidisation. One piece of long bone was dark grey and most probably represented a fragment of proximal ulna. Pieces of articular bone were predominantly light brown/buff in colour. One piece of unidentified cranial bone displayed green staining on both the ecto- and endocranial aspects. No pathological changes were recorded on the bones present in this context. An inventory of identified bones present in this context is shown in Table 12.

Table 12. Number of identified bone fragments in cremation burial deposit 8668.

Bone fragments	Number	Bone fragments	Number
Cranial	59	Feet	-
Teeth	-	Axial	16
Upper limb	31	Ribs	6
Humeri	6	Vertebrae (total)	6
Ulnae	-	Cervical vertebrae	-
Radii	2	Thoracic vertebrae	2
Scapulae	-	Lumbar vertebrae	-
Clavicles	1	Sacrum	1
Hands	1	Pelves	3
Lower limb	6	Sternum	-
Femora	-	Unidentified	50+
Tibiae	-		
Fibulae	-		

4.3 Burnt Human Bone from Pit Fills

4.3.0.1 Human remains were recovered from eight deposits that are thought to be the result of secondary deposition. The amount of human bone from these contexts was small and many fragments were not possible to identify. The results of the analysis of these deposits are presented in Table 13.

Table 13. Contexts of human bone from pit fills from the London Transport Museum.

Context	Context Description	Weight (g)	An. bone/ Hum. bone	MNI	Age/ Sex	Identifiable bones present
8202	Fill of rubbish pit	2	N/A	1	N/A	One fragment unidentified articular surface One fragment lower limb
8571	Fill of pit?	3	Hum?	1	Adult	Two probable fragments of upper limb (humerus)
8605	Fill of pit/well	0	Hum.	1	Adult	Possible articular surface of metatarsal One fragment of upper limb (radius or ulna)

8683	Fill of pit	18	Hum.	1	Adult	One fragment mandibular ramus One fragment of sacrum Two fragments of lower limb Four fragments of cranium Thirteen fragments of upper limb
8787	Re-deposited natural layer	1	Hum?	1	Adult?	One fragment of thin, flat bone possibly scapula rather than cranial bone.
8801	Fill of rubbish pit	5	Hum.	1	Adult	Eight fragments cranial bone, white and dark grey One long bone fragment, possibly lower limb
8804	Levelling layer	8	Hum.	1	Adult	One fragment long bone, possibly upper limb One fragment of upper limb ulna or radius One fragment of scapular acromion process White colour predominantly, some grey variation
8811	Dump	1	N/A	1	N/A	Two fragments of long bone

An. Animal bone, Hum. Human bone. N/A data was not discernable. Minimum number of individuals (MNI) estimated on the basis of no discernable duplicated skeletal elements present.

4.4 Disarticulated Human Bone

4.4.0.1 Disarticulated human bone was recovered from four contexts from the London Transport Museum site. The identified fragments of disarticulated human bone are listed in Table 14. The disarticulated human bone predominantly consisted of adult cranial remains. The adult age of the remains within context 8327 could be confirmed by the presence of adult mandibular teeth. Deposits 8382 and 8384 came from pit fills. Context 8327 derived from a charcoal layer. It is probable that the human bone originated from truncation or re-working of the cemetery deposits by later features. Context 8553 represents the grave fill of the inhumation burial 8558 (see Section 4.1.2) and the disarticulated bone comprises remains of a knee joint and hand bones, which correspond with missing skeletal elements from skeleton 8558. It is likely that these remains originally belonged to this inhumation burial.

Table 14. Disarticulated human bone from the London Transport Museum

Context	Bones present	Age/sex?	Comments
8327	1x Frontal Left and right orbits 2x Parietal Right mandible Left first permanent mandibular molar Right second permanent mandibular molar Right permanent third mandibular molar	Adult	No metopic suture No cribra orbitalia Dentine exposure from tooth wear first molar, enamel polishing second and third molars.
8382	One cranial fragment, probable parietal	Adult	-
8384	One fragment left parietal One fragment occipital	Adult	-
8553	Fragmentary remains of hand phalanges and	Adult	Fill of grave cut for inhumation burial (8558)

	carpals (triquetral and pisiform) Fragment of distal femur joint surface Fragment of proximal tibia joint surface		Associated with piece of chaff-tempered Saxon pottery

4.5 Radiocarbon Dating of Cremated Human Remains

4.5.0.1 Radiocarbon dating was undertaken on two samples of cremated human bone from burials at the London Transport Museum site by the Scottish Universities Environmental Research Centre AMS Facility. The results of the radiocarbon dating are presented in Table 15.

Table 15. Radiocarbon dates from cremated human bone contexts from the London Transport Museum Site.

Lab Code	Sample Material	Context Number	$\sigma^{13}C$ (‰)	Years BP	1 σ Calibrated Range	2 σ Calibrated Range
SUERC-15174 (GU-15662)	Human Bone	8570	-24.5‰	1580±30	AD 430-470 (26.3%) AD 480-540 (41.9%)	AD 410-550 (95.4%)
SUERC-15176 (GU-15664)	Human Bone	8829	-23.1‰	1510±35	AD 470-480 (1.2%) AD 530-610 (67.0%)	AD 430-640 (95.4%)

Radiocarbon dates calibrated using Oxcal v3.10 Brook Ramsey (2002) with atmospheric data from Reimer et al (2004).

5.0 Discussion

5.0.1 The inhumation burials from the London Transport Museum site provide an insight into early Saxon burial practices in *Lundenwic*. The inconsistency in burial alignment of the inhumations, with one west-east and one north-south, and one supine extended and slightly crouched on the left side, may indicate the transition from pre to Christian burial practice that appears typical of the early medieval period. Grave alignments can further be affected by extraneous factors within the burial site such as pre-existing architectural features as well as locally adopted burial traditions (Lucy 2000, 132; Taylor 2001, 103, 138). Saxon burials in the early period were often buried in clothing and often burials can retain evidence of clothes fittings, such as buckles and brooches (Taylor 2001, 135). This trend is supported by evidence from the burials from the London Transport Museum site with the shield-on-tongue buckle. Evidence of grave goods from inhumation burial 8700 includes an amber necklace with one glass bead and a buckle, indicating clothing-related ornamentation. A rare ornate brooch was recovered with early Saxon inhumation burials from a nearby site from Long Acre, Covent Garden (see AOC 2006b, and Section 5.0.2). Lucy (2000, 42) has previously highlighted the range of ways that beads may have been used in Saxon contexts. For example, whilst necklaces were frequently worn around the neck, beads were also sewn into clothing as ornamentation, or strung across the neck between two brooches as festoons. Blackmore (this volume) has suggested that the incorporation of the glass bead with the amber beads from burial 8700 may indicate that the beads were not strung but may have instead been placed on the body during the burial. Further evidence for the incorporation of grave goods as part of Saxon burial ritual exists from the London Transport Museum site with the small knife buried with inhumation 8700.

5.0.2 No evidence of coffins was recovered with the inhumation burials from the London Transport Museum. Taylor (2001, 64) has previously documented that burials in wooden coffins did occur during the early medieval period but was an extremely variable practice. Coffined burials became a more frequent burial

practice throughout the 10th and 11th centuries. Taylor (2001, 103) has further argued that the presence of absence of coffins in early medieval burials cannot be utilised as an indicator of the status of the burials for this period.

5.0.3 The cremation burials from the London Transport Museum site are also important in developing the knowledge of burial practices adopted in the early Saxon period in *Lundenwic*. The cremation deposits are the first definite Saxon cremation burials excavated from the *Lundenwic*. Botanical evidence of charred cereal grains from the cremations indicates the use of grass species such as onion couch/false oat-grass as plausibly indicative of tinder material used in the cremation pyre. This practice has been previously documented from the Bronze Age and Giorgi (this volume) has suggested may well have continued in the Saxon period. Further evidence from the cremation pyres includes hardwoods. Analysis by Austin (this volume) determined that oak was the predominant species evident from the environmental samples collated from this site. Previous Saxon evidence from Andover has determined the use of oak in wooden coffins from inhumation burials as reported on Taylor (2001, 145). Austin (this volume) has suggested that the predominance of oak within the cremation burial deposits for the London Transport Museum site is likely to indicate the consistent and deliberate selection of oak as the wood for the cremation pyre structures. This would imply that ready supplies of oak were available to individuals living in *Lundenwic* in the Saxon period, although Austin (this volume) has questioned to what extent hardwoods may also have been resourced and transported from further afield in Europe. The close proximity of the river Thames to the settlement of *Lundenwic* during the Saxon period may have played an important role in aiding the provision of timber. Additional woods utilised include willow/poplar in contexts 8868 and 8829 and were likely to have been utilised where locally available.

5.0.4 One of the nine cremation burial deposits contained a quantity of animal bone together with human bone (context 8840). The inclusion of animal bone as grave offerings in Saxon cremation burials has been previously attested, for example at Spong Hill (see McKinley 1989; Lucy 2000, 112; Taylor 2001, 155). The animal species included in the cremation deposits often include horses and dogs, which Lucy (2000, 112) suggests are likely to indicate personal possessions, as well as sheep/goat, cattle and pig that were most likely to represent food offerings placed on the cremation pyre (Lucy 2000, 112). Taylor (2001, 155) has suggested that foods typically consumed in life were frequently used as food offerings to provide sustenance in the afterlife. Butchery markings on cremated bone may indicate a joint of meat was placed on the cremation pyre, or alternatively the remains of feasting practices (Lucy 2000, 112).

5.0.5 The human bone from the London Transport Museum cremation burials showed a frequent tendency for burnt bone to be a white colour (7/10 cremation deposits with predominantly white bones). The affected bones included both cranial and post-cranial regions of the skeleton. McKinley (2004, 11) has suggested that white cremated bone indicates near complete oxidation of the bone had occurred, which tends to indicate a temperature of over 600 degrees C), and likely indicating an efficient cremation pyre, either reflecting on the material used to create the pyre, the temperature the pyre attained or potentially the duration of time which the body remained on the pyre (McKinley, 1994, 11). Where cremated bone varied from a white colour, a dark grey was noted, affecting cranial bones and tooth roots. This colour reflects a slightly more inefficient level of oxidation linked to a temperature of up to 600 degrees C. There was a notable trend for skeleton regions comprising articular bone surfaces to be a buff or light brown colour rather than white. It is likely that this reflects incomplete oxidation of articular surfaces, which may derived from the thicker bone surface often found in joint surfaces. The cremation process dehydrates bone and often results in shrinkage, warping or fissuring and fragmentation of the skeleton. Quite high levels of fragmentation were observed throughout the cremation burials from the London

Transport Museum site as a whole (see Appendix C.1 Table 1). Such fragmentation has a notable impact on the potential osteological determination of age and sex as was demonstrated throughout the analysis of the cremation burials from this site. Several of the cremation deposits were notably smaller than the remainder (eg. 8543, 8853, 8855). Considerable vertical and horizontal truncation was noted on site during the excavations and it is likely that such activity disturbed the cremation burials sufficiently to influence the deposit size.

5.0.6 It is significant that the cremation burials from the London Transport Museum contained grave goods, such as tweezers, which appear more associated with male burial deposits (Lucy 2000, 111). Grave goods in cremation burials were either placed on the body prior to the cremation or could be subsequently added to the remains in the cremation vessel (Lucy 2000, 108). The presence of nineteen glass beads from the cremation deposit 8828 provides evidence for at least two groups of melted and fused beads (see further Blackmore this volume), demonstrating that they had been worn or placed onto the body or pyre prior to and during the cremation. McKinley (1989, 243) was able to identify that little movement of the body on the pyre had occurred during cremation of Saxon burials from Spong Hill owing to the fusion with bones associated with the relevant jewellery or clothes fastenings. The high level of bone fragmentation in the London Transport Museum site cremation deposits means that interpretations of burial position on the cremation pyre with associated pyre goods is somewhat limited. Further evidence from the cremation burials highlights the presence of green copper alloy fragments of metal fused to the surface of several long bone fragments (context 8570) and one rib fragment (8867), which may indicate further remnants of costume attachments ranging from buckles, fastenings, sleeve-clasps, pins, brooches or possibly amulets present on the body prior to cremation (see Lucy 2000, 25, 40).

5.0.7 Whilst demographic interpretations of the burials from the London Transport Museum site are limited due to the small number of burials, the cremation burials do provide evidence that both adults and juveniles were buried at this location in *Lundenwic*. It is of interest that one of the cremation burial contexts from the London Transport Museum contained human remains from both an adult and a juvenile, which is in line with trends established from other Saxon contexts. For example, it was noted that 4.5% of the cremation burials from Spong Hill contained a duel burial, and juveniles were predominantly found to be the second individual. Whilst a possible trend appeared to exist for adult females to be associated with the second juvenile cremation burial from Saxon burials at Spong Hill, some of the double burials also comprised adult males with a juvenile (McKinley 1989, 245; Lucy 2000, 107). The high level of fragmentation in cremation deposit 8858 however, prevented the determination of sex from the adult remains. It would be of interest to potentially determine if such a trend exists in future cremation burial deposits from *Lundenwic*.

5.0.8 The cremation deposits offer insights into the health of the individuals living in London at this point in the past. Evidence of non-specific infection or inflammation and a healed fracture from the cremation burials correlate with evidence identified from the inhumation burials. Pathological changes identified in Saxon Spong Hill cremation burials included ante-mortem tooth loss, osteoarthritis and infectious bone responses (McKinley 1989, 246; Lucy 2000, 106). Whilst small in sample size, the evidence provides a tentative insight into health, which is significant in light of the broad paucity of pathological reports that currently exists from reports of cremated burial contexts (see Roberts & Cox 2003, 166).

5.1 Comparanda

5.1.1 The inhumations from the London Transport Museum add to the growing corpus of Saxon remains recently identified from *Lundenwic*. A brief review of the known evidence for Saxon burials in this region of London is reviewed below.

5.1.2 Previous excavations at the Royal Opera House, Covent Garden, have revealed evidence for a cemetery with two *in situ* inhumations, three possible grave cuts, a number of barrow-type features (three ring ditches) and residual human bone. The skeletons were dated to AD 604-660 and AD 640-673 by radiocarbon dating (Thompson *et al* 1998). It is thought the circular gullies may be remnants of ring ditches enclosing central burials as at other 7th century cemeteries. The use or re-use of barrow and ditch features for the location of Saxon burials has been noted for other locations in England as discussed by Lucy (2000, 119, 126-128). Future investigation of the growing evidence from Saxon burials in *Lundenwic* may be able to shed further light on the adoption of such trends from this region.

5.1.3 Five inhumation burials were excavated from 45 Floral Street/51-54 Long Acre, London consisting of four adults and one juvenile. Bone preservation was poor from these remains but two of the adults were estimated to be 25-35 years and the juvenile was approximately aged 12 years. No pathological changes were evident on the remains (AOC 2006b). Evidence of clothing fittings was evident with these remains in the form of a mid to late 7th century ornate brooch as well as glass beads and twisted silver wire rings (AOC 2006b). The burials from Floral Street are thought to be among the earliest features on the site and the burial alignment was consistently east-west, suggesting a Christian context (Lucy, 2000). A concentration of burnt bone (41g) was recovered from a charcoal layer. The remains were however, too fragmentary to determine if these were animal or human bones (AOC 2006b). The cremated human bone discovered from the London Transport Museum indicates that further cremation burials are likely to exist in this region of London. The presence of animal bone integrated in the cremated human burial deposits from the London Transport Museum site also demonstrates that animal offerings were incorporated into the cremation pyres, and future investigations should consider the potential for continued recognition of pyre deposits from Saxon contexts in *Lundenwic*.

5.1.4 Nine Saxon burials have recently been recovered from St. Martin-in–the-Fields, Westminster by MoLAS, in which five adult males were identified. One of the males was buried in a stone sarcophagus, which dates from the 5th century (Powers 2006; Powers 2007, 29). Pathological changes noted on these remains may also indicate the physical lifestyle of the period with extra-spinal osteoarthritis as well as dental disease (Powers 2007, 29). Further archaeological excavations and a watching brief at 67-68 Long Acre also revealed two Saxon inhumation burials, one recovered with the remains of a belt-fitting possibly dating to the mid 7th century (Malcolm 1991). A further probable Saxon burial was also recorded from 28-20 James Street as reported by Leary (1999).

5.1.5 Two Middle Saxon inhumation burials were excavated from Cubitt's Yard, James Street, also demonstrated a variable burial alignment (one east-west and one north-south) (Powers 2005, 5), in a similar fashion to the inhumation burials recovered from the London Transport Museum. The burials from Cubitts Yard comprised two adults, one estimated to be a probable male aged 25-36 years and the other unable to be more accurately identified owing to poor bone preservation and completeness (Powers, 2005, 9). One of the burials was found contained in a basket or coffin, and was buried with a probable spear as well as a knife and shield boss (Powers 2005, 5). Saxon burials likely associated with the cemetery of St. Martin were recorded in King Street on the northern side of Covent Garden in 1775 (Greater London Historic Buildings, Sites and Monuments Record 2005, MLO22222). During the construction of the new church of St Martin, in 1722-6, a number of north-south orientated stone

sarcophagi were found. The burials were dated through their grave goods and the cemetery is thought represent the founding of the church in the middle Saxon period (Greater London Historic Buildings, Sites and Monuments Record 2005, MLO38072).

5.1.6 The lack of previous evidence for cremation burials in *Lundenwic* somewhat limits the contextualisation of the analysis and interpretations presented in this report. The remains do however, demonstrate that cremation as a burial rite was being practised in *Lundenwic* in the early Saxon period, seemingly prior to inhumation burial, which is better attested from London to date. Radiocarbon dating of two of the cremated human bone deposits from the London Transport Museum site ranged from 1580±30 years BP (uncalibrated) or AD 480-540 (one sigma 41.9%), and 1510±35 years BP (uncalibrated) or AD 530-610 (67.0%). These dates establish the cremation contexts were buried during the range of the 5th to 7th centuries AD. The deposits therefore represent some of the earliest burials identified in Lundenwic to date. Given the paucity of cremated burials from Saxon *Lundenwic* to date, the finds from the London Transport Museum excavations are of regional and national importance. The Saxons tended to bury their dead away from their settlements on higher ground, and as the site is the most southerly of excavations in the area, it is feasible that this site may represent the location where early burials took place before the settlement encroached northwards later into the Saxon and early Medieval period.

6.0 Conclusions

6.0.1 The burials from the London Transport Museum are important in providing an insight into health of individuals who lived in the early Saxon period, as well as the variation in burial rites that were practiced in the Saxon settlement of *Lundenwic*. The finds present the earliest evidence for cremation burials from Saxon London. The inhumation and cremation burials both demonstrate clear evidence for the incorporation of grave goods with the burials, demonstrating the adoption of well-established burial practices typical for the period.

Appendix C.1.

Table 1: London Transport Museum: Cremated bone weights and percentage distribution by fraction size and skeletal area, and maximum fragment size

Context number	Total	10mm	% total	5mm	% total	2mm	% total	max frag	id. wt.	% total	skull	% id.	axial	% id.	u.limb	% id.	l.limb	% id.
	wt. (g)	wt. (g)	wt.	wt (g)	wt.	wt. (g)	wt.	mm.	wt. (g)	wt.	wt. (g)	wt.	wt. (g)	wt.	wt. (g)	wt.	wt. (g)	wt.
8543	189	94	49.7	62	32.8	29	15.3	48.70	76	40.2	32	42.1	12	15.7	32	42.1	0	0
8570	462	256	55.4	115	24.8	51	11.0	48.57	246	53.2	39	15.8	59	23.9	82	33.3	66	26.8
8829	649	219	33.7	335	51.6	93	14.3	37.59	219	33.7	56	25.5	13	5.9	140	63.9	10	4.5
8840	687	498	72.4	126	18.3	63	9.1	39.57	388	56.4	85	21.9	21	5.4	160	41.2	122	31.4
8853	19	12	63.1	7	36.8	0	0	51.45	19	100	12	63.1	0	0	5	26.3	2	10.5
8855	218	131	60.0	52	23.8	26	11.9	61.75	133	61.0	18	13.5	25	18.7	38	28.5	52	39.0
8858	162	71	43.8	45	27.7	40	24.6	40.35	29	17.9	18	62.0	1	3.4	3	10.3	7	24.1
8867	660	511	77.4	103	15.6	32	4.8	60.24	393	59.5	56	94.1	145	36.8	88	22.3	104	26.4
8868	425	257	60.4	101	23.7	48	11.2	62.90	206	48.4	74	35.9	22	10.6	78	37.8	32	15.5

Eight cremation burial deposits were excavated from the London Transport Museum site, together with one fill (8829) which likely contained cremated human bone originally deriving from both cremated burials 8868 and 8867. One cremated burial (8858) contained a minimum of two individuals, one adult and one juvenile.

Figure 1. Cremated human bone excavated in spits or layers through the cremation vessel. Example from context 8867 with small bone fragments in the upper spits at top of the vessel and large bone fragments in lower spits towards bottom of the vessel. Scale in centimetres (cm).

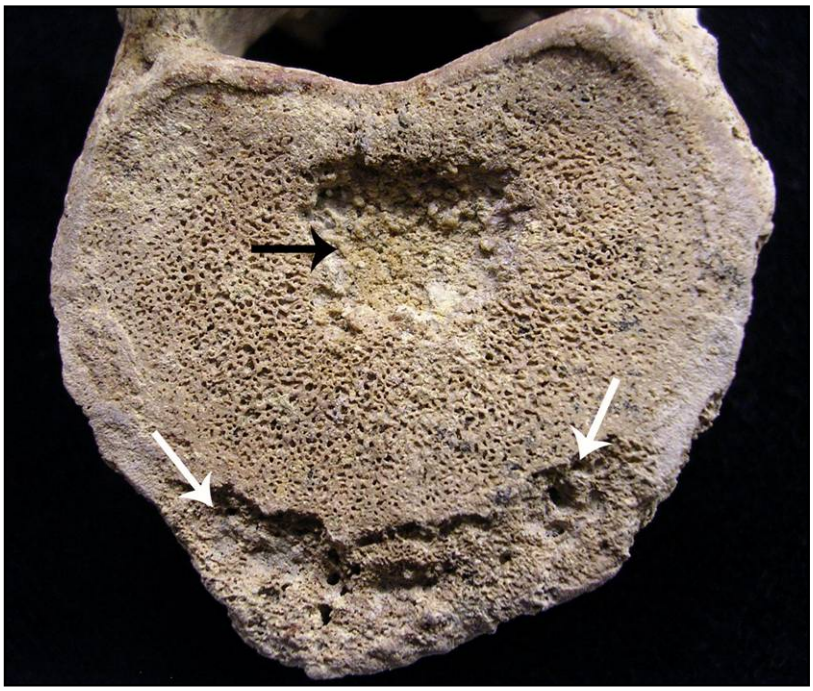


Figure 2. Superior surface of a first lumbar vertebra demonstrating two Schmorl's nodes, or concavities in the bone surface caused by herniation of the intervertebral disc. There is an oval lesion affecting the central portion of the vertebral body (black arrow) and an elongated lesion affecting the anterior margin of the vertebral body. Skeleton 8558.

Figure 3. Healed and united rib fracture in an adult female Saxon inhumation excavated from the London Transport Museum. Arrows highlight the rounded margins of the rib shaft indicating the extent of ossified callus over the fracture margins. Scale in cm.

Figure 4. A fragment of adult right sacral ala from cremated burial context 8570 with a buff/light brown to white colour and fissure fracture lines resulting from the cremation process. Scale in cm.

Figure 5. A partially preserved adult carpal bone (lunate) from the wrist of an adult individual in cremated burial context 8829.

Figure 6. A fragment of adult human patella from cremated burial context 8829 with a buff/light brown to white colour.

Figure 7. Adult human tooth roots from cremated burial context 8829. The crowns were destroyed during the cremation process. *Top*: mandibular incisor (left), mandibular premolar (right). *Middle*: maxillary premolars. *Bottom*: maxillary third molar. All figures have a scale in cm.

Figure 8. *Left*: superior view of a fragment of adult first cervical vertebra from the articulating facet for the odontoid peg of the second cervical vertebra from cremated burial context 8829. *Right*: An adult first cervical vertebra from a post-medieval inhumation burial with the region surviving from the cremated burial highlighted.

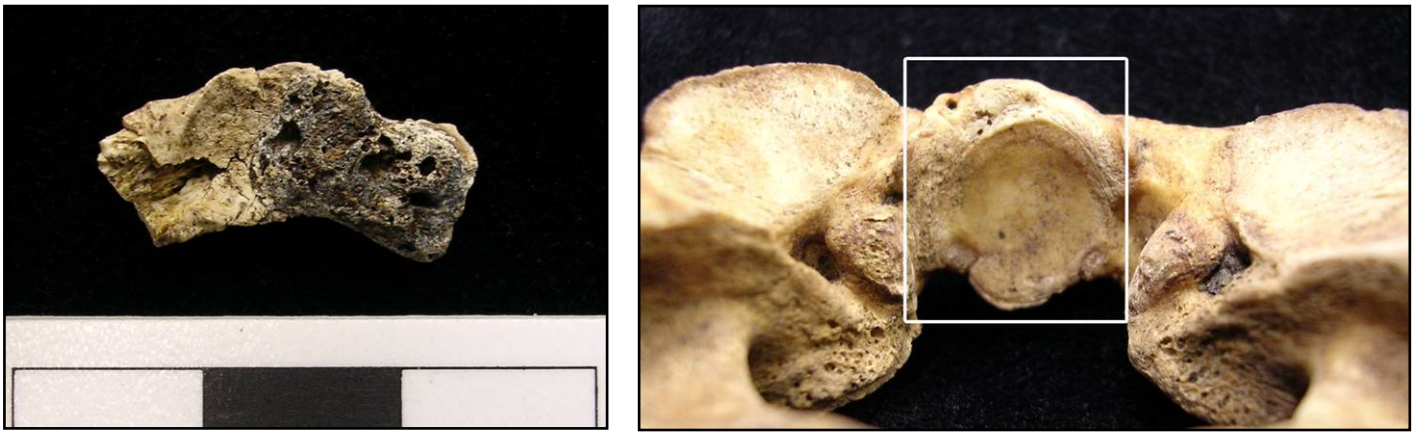


Figure 9. Left: Anterior view of the facet for the odontoid peg articulation of the first cervical vertebra from the cremated burial context 8829. The cremation process rendered part of this bone fragment as dark grey-black, whilst the remainder is a buff to white colour indicating quite high levels of oxidisation. The appearance and location of this facet is shown as complete in an inhumation burial on the right, although note the manifestation of marginal lipping of the facet surface in the latter case. Scale bar in cm.

Figure 10. A fragment of adult human long bone shaft from cremated burial context 8829. The long bone shaft is covered with non-specific periosteal new bone formation that is long-standing, remodelled and well-

integrated into the existing bone surface. The vertical, linear striations are distinct from residual fissures resulting from the cremation process.

Figure 11. Pathological changes evident in a fragment of adult upper limb, probably ulna or radius shaft, in which a healed fracture affected by the cremation is apparent. Top: superior view with appositional overlap of the lamellar bone shaft. Middle: lateral aspect demonstrating continuity of the lamellar bone surrounding the maximum area of appositional overlap of the bone fragments. Bottom: lateral aspect also demonstrating continuity of lamellar bone periosteal surface surrounding the appositional overlap of the bone fragments,

indicating an ante-mortem bone change. The bone surface at the maximum point of appositional overlap has been damaged post-mortem and likely during the cremation process. Context 8840. Scale in cm.

Figure 12. Context 8858 presented a minimum estimated number (MNI) of two individuals with both adult and juvenile human bone, including this unfused proximal femoral epiphysis. Scale in cm.

Figure 13. A fragment of juvenile proximal tibia metaphysis was recovered from the Saxon cremated burial context 8858.

Figure 14. A fragment of adult long bone shaft with evidence of non-specific periosteal new bone formation, which is porous at the margins of the new bone layer (black arrow) and striated further in the bone lesion (white arrow). The bone formation is quite active and recently formed. Context 8858. Scale in cm.

Figure 15. Bone preservation was excellent among some cremated burial contexts, allowing retrieval of some very small fragments of human bone such as this incomplete ear ossicle. Scale line in cm. Example from context 8867.

Appendix D – A Composite Keystone Disc Brooch

Lyn Blackmore

Arguably the most important find from the site is a near complete cast silver brooch with garnet settings found in well [8658] (<14>, Fig 00, No.1) that has been declared as Treasure Trove. The well cut through the upper part of grave [8699], from which the brooch may be derived. The form and decoration are typical of Kentish keystone disc brooches, which have a range of Style 1 ornament between the garnets; they are usually of silver with gilding on the front, often with niello work on the rim, and a pin of iron (Avent 1975a, b; MacGregor and Bolick 1993, 70).

As summarised by Avent (1975a, 4) and MacGregor and Bolick (1993, 70), the chronology and forms of Kentish disc brooches were considered by Aberg (1926), and by Kendrick (1933), but the first detailed study was by Leeds (1936, 115–24). This work, mainly based on finds in the Ashmolean Museum, recognised that the keystone type was the earliest in the tradition and also noted the stylistic connection with the discs on certain square-headed brooches. It divided the keystone brooches into four main types (Classes 1a–1d), in which Class 1a, most commonly set with three garnets alternating with stylised animals '*couchant*', was considered the earliest (ibid, 115, pl XXXII, nos 1–3). Brooch <14> is of this type.

Some 40 years later, a more analytical study of disc and composite brooches by Avent (1975) reconsidered the Jutish and Frankish origins of, and influences on, the Kentish tradition noted by Leeds (1936, 115; 1957; Avent 1975a, 6, 66) and presented a numerical classification for all decorative elements. This typology broadly followed that presented by Leeds, but introduced two new types and reordered some examples, making seven different Classes, of keystone disc brooch, each with a number of sub-types. The new Class 1 was considered to be the earliest in the sequence, while Leeds' Class 1a became the new Class 2 (ibid, 24–5). The variations within the animal ornament were, however, not felt to be of importance in the development of the typological sequences (ibid, 1, 57; Evison 1987, 41).

Within Avent's scheme, brooch <14> belongs to Class 2.5 or 2.6 (Avent 1975a, 24, 27-8, map 2), where the crouching body of the animal is a reversed 'Z' shape (type 7), the heads facing outwards and following each other in a clockwise direction (Leigh 1984, 69). X-ray is unclear as to whether border of <14> is plain has the typical niello decoration on the rim, but it clearly has part of a beaded outer ring. Based on size and the number of elements making up the rim, the closest match is with Class 2.6, which are slightly larger than those in class 2.5 (30mm in diameter; Avent 1975a, 28, 57–8). As is the case with brooch <14>, the central settings of Avent's three examples are missing, they have type 1 borders; the three keystones are of type 5.2, with inner rims of types 1 or 3 (ibid, figs 5, 6, 7). The outer rims (ibid, fig 4). are of type 4.1 (nielloed zig-zag, as at Deal and Westbere; Avent 1975b, 17, pl 11, no.60) or type 1 (plain, as at Faversham; ibid, 17, pl 11, no.61), encircled by a band of type 3 (Avent 1975a, fig 4).

While a consideration of the technology is beyond the scope of this note, this has been summarised by Avent (1975a, 12–18) and can be outlined here in the stages defined by him. It is generally thought that the brooches were made in a two-part mould, as the fittings on the back for the pin are an integral part of the back, not welded on. After casting, any uneven surfaces were removed and the brooch polished. Where used, the niello decoration was usually made by fusing sulphur with silver and copper and applying this in powder form to the mould, hardened by heating and then smoothed. An outermost rim, as found on Class 2.6, was probably soldered on, and the brooch then gilded, probably with an amalgam of gold and mercury that was painted over the surface; the mercury was expelled by heat. The cloisons were filled with polished slab-cut garnets, glass or paste and usually backed by gold foil. The final stage was the attachment of an iron pin to the hinge fitting on the back. Methods of garnet cutting have been described by Bimson (1985; see also MacGregor and Bolick 1993, 70), while gold foils have been studied by Avent and Leigh (1977), East (1985) and Meeks and Holmes (1985), amongst others. Those used on <14> are not clearly visible but

are of standard gridded type with four ridges and furrows per mm (Avent and Leigh 1977, 2), the most common frequency at Sutton Hoo and at many other sites (East 1985, 137, fig2). Based on analyses of German finds, the garnets are probably from India or Sri Lanka, the main suppliers of garnets in the 5th and 6th centuries (Quast and Schussler 2000, 85–7), possibly imported in a finished state from Frankish workshops (MacGregor and Bolick 1993, 70).

Brooches of Avent Class 2.5 have been found in grave 38 at Dover Buckland (Avent 1975b, 16; pl 10, no.56; Evison 1987, 226-7, fig 22, no.1) and Howletts (Avent 1975b, 16, pl 10, no.57). Class 2.6 brooches have been found at Deal, Faversham and Westbere (ibid, 17; pl 11, nos 59, 60); although none are exactly the same as the present find, the Faversham find is perhaps the best match.

Dating of these brooches is problematic, as the early dating was largely based on circular argument (Avent 1975, 5, 56; Leigh 1984, 67). Avent (1975, 7, 62, 67), felt that keystone garnet brooches continued well into the 7th century. The dating of the different types, however, was less clear cut. Sequences were observed by Avent, notably from Class 1.1 to Classes 2.1 and 2.2, and from Class 1.2 to Classes 2.5 and 2.6 (described as 'the final stage') but some aspects of his typology were governed by size as much as other features (ibid, 57, 67; tables 6, 7). It was, therefore, stressed that these sequences were not necessarily chronological (ibid, 56–7), that the chronology was relative not absolute and that the simpler examples of Classes 1, 2 and 3 could be contemporary (ibid, 57; Leigh 1984, 70, 73). The direct connection between the Class 2.1 brooches and the square-headed brooches was noted (Avent 1975a, 25), but its significance was overlooked. Instead it was argued that Class 1 started in the mid-6th century, and that Class 2 and Class 3.5 date to the second half of the 6th century. The other Class 3 forms were dated to *c* AD 575–625, with broadly similar dates for the other Classes, so that many types could have been in use contemporaneously in the late 6th century (ibid, 62, 67; table 1).

The above sequence was questioned by Leigh (1984), who critically examined the nature of the Style 1 ornament from an art historical viewpoint. While acknowledging the limited sample and lack of independent dating evidence, he argued that Avent's Classes 2.1 and 2.2 (Leeds Class 1a) were the earliest forms, deriving from the discs on the square-headed brooches and dating to *c* AD 520–560 (the earlier part of Böhner's *Stufe* III). These were followed by Classes 3.3, 3.2 and 3.1, and then by Class 1.1 (ibid, 70–5; table 1). The same views were independently expressed by Evison (1987, 41–2).

Other brooches within Class 2, however, were not considered by Leigh, and those of Classes 2.5 and 2.6 could be rather later than Classes 2.1 and 2.2, although still of 6th-century date. The only associated artefact is a glass cone beaker found in with the Class 2.5 brooch in grave 38 at Dover (Avent 1975a, 27, table 1), a burial since dated AD 575–625 (Evison 1987, 42). No other finds were associated with the Class 2.6 brooches, and it would seem that this situation cannot be improved on today. The shape of the garnets themselves may, however, be significant. Most keystone brooches have garnets that are trapezoidal, giving their name to the type. The use of triangular garnets (as seen on Avent Classes 1.2, 2.5, 2.6) was thought by Leeds to be derived from Frankish forms and thus early (Evison 1987, 41-2). They might be a later development of the tradition as those with four triangular garnets are associated with finds dating to the late 6th or 7th century and some might be taken to have Christian iconography (ibid). A further feature of the Class 2.5 and other later brooches from Dover Buckland is a greater contrast between the height of the garnets and the depth of the chip-carved animal decoration (ibid, 41). Unfortunately, while the finds from Dover Buckland are shown in side view, no sections are shown in that report, nor are any illustrated by Avent. As brooch <14> has not been fully cleaned it is difficult to comment, but the section appears to be relatively flat.

From the above it seems most likely that <14> is of later 6th-century date. It could, therefore, be derived from grave [8699], or from another in the near vicinity. Being near complete and with a measurable diameter, it is an important addition to the very limited number of brooches of this type. Production of composite disc

brooches at Faversham has been suggested (Leeds 1936, 121–3, and this may well apply to the earlier forms.

<14>, well [8658], fill [8645]; Period II, OA2 (Fig 00, No.1)

Silver disc brooch (original diameter *c* 31mm) with pin holder and catch on the back; the pin is missing. Following Avent's system of classification (Avent 1975a, figs 4–7 and 12), the design has a circular central setting (diameter 4mm); this is empty and there is no trace of any gold foil, so the original filling is uncertain. Radiating from this are three equally spaced triangular slab-cut garnets with bevelled edges (type 5.2 3.5 x 4.5mm) backed by gridded foil (4 squares per mm). The intervening panels contain Style 1 animal ornament of type 7.3 below a discontinuous border to the central setting, probably beaded (type 3). The rim comprises three bands: a narrow inner rim (type 1 or type 3, a broader band (type 1 or type 4) and a separately applied beaded outer rim (type 3) that is flush with the back but lower than the front.

Appendix E – The Copper Alloy And Silver

Introduction

Excluding coins there are 23 fragments of copper alloy (17 objects), of which eight are dated to the Saxon period; some of these are from the cremation and inhumation burials. Nine objects are of post-medieval date. All were accessioned and listed by material and object type in an Excel spreadsheet, and some items were cleaned or investigated by Antonia Craster of AOC Scotland in order to determine their shape; notes of conservation treatment form part of the finds archive. Few mineralised organics were detected. The finds are catalogued by function; within this they are ordered by period and landuse, and then by accession number.

Distribution

Six of the Saxon finds were deposited in Period II, with single finds in periods I and IV. The post-medieval finds are equally distributed between Periods VIII and XIII.

Period I: natural deposits and pre-Saxon residual material

One small fragment of copper alloy was found embedded in the natural subsoil (<40>, [8831]).

Period II: mid 6th – mid 7th century

Six objects of copper alloy were deposited in period II. Those from cremations comprise a pair of tweezers (<43>, Fig 00, No.1) and unidentifiable fragment (<149>) in fill of the cremation pit for pots <38> and <39> ([8828]), and one unidentifiable fragment (<113>) in the fill of cremation pot <10> ([8569]). Grave [8552] contained an unidentifiable fragment (<9>, [8553]), while in grave [8699] a buckle was found under the hands in the pelvic area (<19>, Fig 00, No.2) and a reused Roman terret between the thighs (<17>, Fig 00, No.3).

Period VI

Fragments of dense metal, possibly from an ingot, were found in fill [8382] of pit [8219] in OA21.

Period VIII

Eight objects were found in Period VIII deposits, of which two are from the demolition material [8002] (button <115> and coin <1>). Two spoons were found in the fill of drain cut [8120], while a farthing-sized coin was found in drain [8123]. A length of wire (<116>) and six unidentified fragments (<117>) were found in layer [8574].

Period XIII

The five finds from this period comprise one coin (<2>), one button (<114>), one coin or button (<3>), a spoon <110>) and an unidentified fragment (<11>).

Catalogue of Saxon finds

Buckle

A complete shield-on-tongue buckle was found in female grave [8699], centrally placed at hip level (<19>, [8701]; Fig 00, No.2). The form probably originated on the continent in the second half of the 5th century (Brugmann 1997, 71; Marzinzik 2003, 19, Typegroup 1.2) and remained popular for some 150 years. In Böhner's chronology it is rare in *Stufe* II (broadly AD 450–520/30), but typical of *Stufe* III (AD 520/30–600; Böhner 1958; Martin 1989, 132, note 41); the transition between the two *Stufe* might now be placed at *c* AD 510 (Martin 1989, 140). Most continental finds are from male graves, but the English examples are mainly from female graves (Marzinzik 2003, 21, 63, 81). Shield on tongue buckles are particularly common in Kent, where the production of native copies by the early 7th century or earlier was suggested by Evison (1987, 87; Marzinzik 2003, 19, 21). Most English finds, however, date to the 6th century, and the early 7th-century of some graves is debated (ibid, 21); this would place insular production rather earlier than first thought. A rounded cross-section and a delicate frame are generally considered to be early traits, while a wider frame and more 'massive' appearance are considered to be later (Martin 1989, 132–5, note 51; Abb 7–10; Brugmann 1997, 71; Marzinzik 2003, 19).

In shape and size the loop of <19> is very similar to the buckles from graves 10, 62 and 104 at Mill Hill Deal (Brugmann 1997, figs 25c, 35d1, 55a; Marzinzik 2003, 19-21, pl 1.4, right; pl 2.1, left; pl 5.4, left). Stylistically these three buckles are considered to be among the earliest finds from Mill Hill, dating to the late 5th or early 6th century (Brugmann 1997, 71), but unlike <19> the loops have noticeably bevelled sections. A closer match for the loop of <19> is an early buckle from grave 1 at Avusy-Sézegnin, near Ghent (Martin 1989, Abb 7, no.1), which, like those from graves 325 and 364, is thought to have been buried in the late 5th or early 6th century (ibid, 133). While the base-plate of the find from grave 1 is smaller than that of <19>, the larger example from grave 364 has the same unusual circular indentation in the shield (ibid, Abb 7, no.3); whether these were intended to hold a setting of glass or stone is unclear. Buckles of this general type often occur with drop-shaped or shoe-shaped belt mounts/rivets used to fasten the two thickness of the leather strap (Marzinzik 2003, 19, 62–3; Martin 1989, Abb 9, 10; Brugmann 1997, 71), but none were found in grave [8699]. From the above and given the association with amber and glass beads, it is likely that <19> is an import and that it dates to the mid-6th century.

<19> grave [8699], fill [8701]; Period II, OA2 (Fig 00, No.2)

Complete shield-on-tongue buckle (tip of tongue damaged). In cleaning, some possible mineralised organic matter was noted between the tongue and the buckle. The loop is D-shaped both in outline and in section (dimensions 32 x 20mm, radius of loop 6–7mm, height 5.5mm), with recessed copper alloy axis (diameter 2.5mm). The tongue has a D-shaped section with L-shaped return at the tip (length 13mm, width 6mm, thickness 5–6mm) and flat cello-shaped base-plate (14 x 12.5mm, thickness 3mm) decorated with a single perforation at the mid-point of the base (diameter 2mm). Part of the attachment loop on the back survives around the axis but is obscured by corrosion products. Weight 12g.

Terret

Object <17> (Fig 00, No.3), found between the thighs of the female in grave [8699], is a Roman dropped-bar terret with rectangular adjoining section, a harness fitting used for controlling the driving rein(s). Modern harness buckles retain much the same shape (Clark 1995, fig 44). A similar ring found in a Saxon context at Whitby, made of antler and with a bar for a leather strap, was interpreted as a belt fitting, but may also have been a harness fitting (Peers and Radford 1943, 72, fig 19, No.2).

Roman rings and antiquities such as terrets were commonly buried in bags in Saxon graves, probably for amuletic purposes (Brown 1977; Meaney 1981, 223; Welch 1983, 104–5; Cook 1985, 96; Geake 1997, 99), and two such parallels for <17> can be noted. The first, of almost exactly the same size, is from grave 88 at Alfriston, Sussex (Welch 1983, 374–5, fig 36f; White 1988, 144, fig 87, no.1). This is similar to a find from Roman find from Richborough (Henderson 1949, 130, no.124; pl XXXVI), the larger ring of which, like that of

<17>, appears to be thicker on one side than the other. The second reused example, from grave 13 at Kingston-by-Lewes has a more rounded extension (Welch 1983, fig 70d; White, fig 87, no.6), and more like a smaller and cruder Roman example from Balkerne Lane, Colchester (Crummy 1983, 106, fig 109, no.2543). In 1990 a total of 21 examples from Saxon burials were known (White 1990, 144–5), including finds from Brighthampton (grave 22) and Linton Hearth (grave 9). Other sites are listed by Brown (1977, 96), Meaney (1981, 223) and White (1988, 105). Precise dating is difficult as terrets of this type were used throughout the Roman period. Similar forms have been dated to between 100 BC and AD 100 (Brown 1976, 96; White 1988, 144), but the Colchester example is from a context dated to *c* AD 250–300 (Crummy 1983, 2–3, 106). The Alfriston grave was dated to the 6th century (Welch 1983, text fig 9.10), but that at Kingston-by-Lewes is of uncertain date (Welch 1983, 412–3; White 1988, 144).

<17> grave [8699], fill [8701]; Period II, OA2 (Fig 00, No.3)

Cast dropped-bar terret comprising a circular ring (now incomplete) of tapering oval cross section (diameter 38mm, maximum width 8mm, thickness 10mm; minimum width 4mm, thickness 6mm), with rectangular extension projecting from the narrower side (external dimensions 16 x 22m, width *c* 3mm, thickness 6mm). Possibly decorated with paired transverse grooves at the outer junction of the main loop and the rectangular projection. Weight 17g.

Tweezers

Tweezers are well known in burial contexts both in England and on the Continent, (MacGregor and Bolick 1993, 220–5; Hinton 1996, 46) and, whether of iron or copper alloy, are almost without exception associated with males (Evison 1987, 118; Steuer 2003, 181). The standard functional 'Roman' type of tweezer, as defined at Caistor-by-Norwich (Myres and Green 1973, 105, 243–4, figs 3, 16) is well made and robust; they typically have linear and notched decoration on the upper part of the arms, the edges of which can be nicked or faceted (cf ibid, fig 59, M28B and N28B). Later examples tend to be simpler, either parallel-sided or with a triangular outline (cf Evison 1987, fig 24, grave 41, no.5; MacGregor and Bolick 1993, 220–25). Flimsy tweezers made of sheet metal are commonly found as symbolic items in cremations (MacGregor and Bolick 1993, 220–1). The complete pair in cremation [8828] is quite robust and of elaborate form, with functional jaws; the arms, however, are so tightly folded that the object may never have been intended for use.

Direct English parallels for the decorative blades of <43> are few. Jawed tweezers with noticeably expanded blades have been found in late 6th-century or later contexts at Hamwic (Hinton 1996, fig 18, 4/5, 38/40, 169/2548) and at Whitby (Peers and Radford 1943, 62, type IV; fig 13, nos 5, 13), amongst other sites, but the blades are of simple triangular or stirrup-shaped form. Examples with expanded square blades have also been found at Whitby (ibid, 62–3, type V; fig 13, no.9) and at West Stow (West 1985, 67, 123–4, fig 264, nos 11, 12), but differ from <43> in that the blades are flat. Arguably the closest match is an undecorated pair of tweezers from a probable male burial in grave 9 at Holywell Row, Cambs (Lethbridge 1931, 4, fig 1c1), which has indentations at the top of the trapezoidal blades.

On the continent, however, several parallels for the overall form of <43> have been found in Germany (Koch 1977, 132; Siegmund 1998, Steuer 2003, 178–82), northern France and Belgium (Breuer and Roosens 1957, 278; Annaert and Heesch 2004, 238, and note 23). One of the closest matches is a find from Broechem, near Antwerp, apparently from a female grave. This is smaller than <43> but with similarly nicked arms; the blades have indented edges but are undecorated (Annaert and van Heesch 2004, 237–8, figs 13g, 14). Another find, from grave XI at Haillot, near Namur, Belgium (Breuer and Roosens 1957, 214–8, 278, fig 13, no.11; Evison 1965, fig 5, no.11) is very similar in form but quite plain. Similar tweezers have also been found in burials at Doornik (Tournai), dated to *c* 550–600 (Hubert 1963, 34, fig 9, no.3), and at Verlaine-Oudoumont (Liège, dated to the 6th to 7th centuries). There is also an unassociated find from Schretzheim, described as typical of the first half of the 6th century and thought to be from one of the earliest graves (Koch

1977a, 132; 1977b, 144, Taf 181, no.10). A typology of tweezers from the *Niederrhein* by Siegmund (1998, 113–4): places the form in group Ger2.2, ie the Niederrhein phases 3 to 7 (485-610), but notes that most finds are come from the earlier graves (Annaert, pers comm). Haillot grave XI was considered to be the oldest (*c* AD 425–450) in a cemetery was dated to *c* AD 425–500 (Breuer and Roosens 1957, 280, 284; Evison 1965, 15). The grave at Broechem, however, must be of mid- to later 6th-century date as it contained 12 Merovingian gold coins for which a deposition date of AD 542–65 is proposed (Annaert and van Heesch 2004, 242–9). To conclude, the decoration on <43> is Roman in style, but more elaborate than usual and the object is clearly of high status. From the evidence above, it would seem to be a 5th- to 6th-century Frankish import and could also be an heirloom.

<43> cremation [8828], fill [8829]; Period II, OA2 (Fig 00, No.1)

Cast pair of tweezers with incised decoration, complete but damaged at the jaws. The thickened oval bow has raised nicked sides and three longitudinal grooves down the back. The arms are rectangular in section with nicked/faceted sides and incised linear decoration creating a bead and reel effect; some segments are decorated with incised lines, either as simple or as crossing diagonals or in a cross pattern; they are fused for their entire length and only open out at the expanded blades. The latter have frilly rounded tops and trapezoidal blades with returns at 90° to form the jaws, decorated with opposed single indentations on each side and incised diagonal crosses between paired horizontal lines on the upper half. Total length 77mm; width at bow 4mm, expanding to 5mm at the base, thickness of bow and arms 2mm. Length of arms 52mm, length of blades 25mm, width across base, 13mm, probably originally 15mm; thickness 1mm. Weight 10g.

Other

The remaining finds mainly comprise fragments of folded/crumpled sheet metal. Little can be said of these or what they may derive from, although a few fragments from [8382] are rather denser and could be from an ingot (<8>).

<40>, natural [8831], Period I

Irregular sub-trapezoidal fragment of folded sheet metal (maximum dimensions 34 x 33mm; doubled thickness 5mm); now in poor condition, and with uneven surfaces, apparently with plant matter adhering. Weight 7g.

<113>, cremation [8569] (vessel <10>), fill [8570], Period II, OA2

Three larger and several small fragments of bent and/or curved sheet metal (thickness 1–2m) with cremated bone adhering. Maximum dimensions 26 x 16 x 12mm. Weight *c* 9g.

<149> cremation [8828], fill [8829]; Period II, OA2

Small irregular fragment of ?sheet metal around cremated bone adhering. Length 18mm, maximum width 10mm, thickness c 1mm (total thickness 7mm).Weight 1g.

<9> grave [8552], fill [8553], Period II, OA2

Eight small fragments curved sheet metal, maximum dimensions 19 x 15mm, thickness 1mm. Weight *c* 1g.

<8> pit [8219]/[8380], fill [8382], Period VI, OA21

One large and several small fragment dense metal with a laminated structure, possibly ore or part of an ingot. Largest fragment 28 x 18mm, thickness 13mm; weight 27g

Catalogue of the post-medieval finds

Note: where weights are quoted these include generally include corrosion products.

Buttons

Of the two definite buttons, that from period VII (<115>, [8002]) comprises the two part outer casing only (diameter 26mm), with convex upper surface and hole in the back for the loop. That from period XIII (<114>, [8047]) is complete, comprising a plain flat disc (diameter 24mm) with a loop on the back, now hidden in corrosion products. A third find, from Period XIII (<2>, [8749]) is a disc with convex surface and concave underside (diameter 20mm); no attachment loop survives, and this may be part of a mount rather than a button.

Spoons

Four complete spoons were found, two of which are from Period VII. These comprise a pair of plain fiddle pattern teaspoons from [8119] (<111>, <112>; length 140mm, weight *c* 20g); both are hallmarked on the back of the handle, suggesting that they were silver-plated, but the marks are obscured by corrosion products. This form of spoon was introduced in the 1760s and was the most popular type in the 19th century. One of the two finds from Period XIII is of also copper alloy (<110>, [8749], length 134mm, weight 13gm), with a narrow, straight-sided handle with engraved decoration comprising a linear border and cabled edge, and rounded tab at the back of the junction with the bowl. The other is a small silver salt spoon (<27>, [8749], length 83mm; weight 3g), the flat, straight-sided shovel-shaped bowl of which is typical of the period to 1740.

Wire

Two short lengths of wire were found in the period VIII layer [8574] (<116>, [8573]), both with a diameter of *c* 2mm. One is straight (length 62mm); the other may be part of a ring (diameter *c* 30mm), but it is possible that both are from the same object

Other

Four small amorphous fragments, mostly corrosion products, were found in the period VII layer [8574] (<117>, [8573], weight 4g). A roughly rectangular mass (<11>) comprising several folded layers of crumpled copper alloy sheet was found in dump [8606] (maximum dimensions 57 x 32; thickness 7–17mm; weight 18g).

Appendix F – The Amber Beads

Lyn Blackmore

Description and dating

A total of 19 amber beads of different sizes were found, together with glass bead <233>, on the chest area of the skeleton in grave [8699] (Fig 1). This is the first occurrence of a necklace of this type in the London area, a fashion that popular in the 5th and 6th centuries, peaking in the late 6th century (Brugmann 1997, 56; Geake 1997, 47; Owen Crocker 2004, 87. After this it is rare to find more than two or three beads together, and although they continue to occur well into the 7th century, these late finds are mainly from child graves (Geake 1997, 47), for example at Dover Buckland, grave 62, which is dated to c 625–650 (Evison 1987, 234). Thus, although the condition of the human remains was too poor to allow either aging or sexing (see Melikian, this report), the 19 beads would suggest that the deceased was an adult female. The only other amber bead from *Lundenwic* is from a dumped layer, probably of 7th-century date, at 21–22 Maiden Lane (Evison 1988, 122, fig 34.14), while two unworked fragments, possibly waste were found in 8th-/9th-century contexts on the Royal Opera House site (Goffin 2003, 203).

No seams of amber exist in England except in the Isle of Wight, and the latter is of insufficient quality for jewellery manufacture (A Ross pers comm). Naturally imported (ie waterborne) amber, sometimes called 'English amber' can be found along the east coast of England (Huggett 1988, 64; Goffin 2003, 203), but it is generally assumed most was imported by trade from sources in the Baltic (Huggett 1988, 64; Geake 1997, 47). Scientific analysis of locally recovered and imported amber from York has shown no chemical difference between the two types (Panter 2000, 2501; see also Huggett 1988, 64). Following importation in some quantity during the 5th and 6th centuries (Huggett 1988, 64–6) there would appear to have been a hiatus in supply between the late 6th/early 7th century (Geake 1997, 47) and the Viking period when resumption of bead production, and probably trade in amber, is well-attested from the late 9th century onwards at sites such as York (Roesdahl et al 1981, 137; Mainman and Rogers 2000, 2605, 2607; Panter 2000, 2501–9). The beads are described below; their significance is considered in the general finds discussion. Methods of manufacture have been discussed by Panter (2000, 2501–3) and not repeated here. No evidence for any cord or metal fittings was found.

Most of the amber beads can be paired, in some cases with more than one other. To facilitate their identification, they have been numbered <16a>, <16b> etc, working out from the centre; from <16b> onwards each pair is numbered sequentially. Assuming that the original sequence was graduated (which it quite possibly was not), and that the glass bead formed part of the same necklace, this means that an equivalent of the annular bead <16a> is missing. If this interpretation is correct, it might suggest that the beads were not strung when buried but simply placed on the body. Alternatively, if the amber beads were strung without the glass bead, <16a> would have been placed between the two largest beads, although this arrangement is less pleasing to the eye.

Bead <16a> (Fig xx, No.1) stands out from the others in that it is of asymmetrical disc form with wedge-shaped section, similar in both shape and size to examples from grave 41 at Mill Hill, Deal in Kent (Brugmann 1997, fig 17, type 5; fig 41, i1–i4); approximately 40% survives, giving a diameter of *c* 18mm, radius of ring *c* 5mm, diameter of perforation *c* 6mm, maximum and minimum thicknesses 6mm and 4mm respectively. This form of bead appears to be more typical of Anglian and Saxon regions of England than Kent (ibid, 56; Panter 2000, 2501–2).

All the other beads are sub-polygonal in form, but are carefully made so that each has a main flat face (the back), which in some cases was chosen to hide an obvious flaw (<16b>, <16d>), <16j>, <16o>, <16p>). Some of the front faces are sub-rounded (eg <16i>, <16k>), some are relatively flat (notably <16q>, <16s>);

some are bevelled (ie wedge-shaped section, eg <16d>, <16j>) while others have a triangular section (notably <16n>). The end faces are usually more or less perpendicular to a flat surface, but not always parallel (presumably following the demands of the raw material). Few beads are evenly proportioned on all sides (<16c>, <16f>, <16k>, <16s>). All the beads are pierced longitudinally, probably working in to the centre from each side (Panter 2000, 2502), with a bore of *c* 2mm on the larger beads, 1.5mm on the medium-sized beads, and 1mmm on the smallest examples. In the case of <16c> and <16f> the piercing is centrally placed, but on the other beads it can vary considerably. Based on maximum dimensions, the largest beads measure 12x14x11mm (<16b>, sub-triangular section) and 14x14x10mm (<16c>, sub-rectangular section). The second largest is 14x11x7.5mm (<16d>, sub-triangular/wedge-shaped section). Bead <16e> is similar but fragmented, while <16f> is similar to <16c>, with sub-rectangular section; bead <16g> is damaged at one end. The five following pairs reduce in length, but not necessarily in height. The two smallest beads measure 8x8x5.5mm (<16r>) and 7x7x5mm (<16s>, sub-rectangular section).

The beads are consistently dark golden-red in colour and would appear to be from a single source. All would appear to have been polished, but while some have a high gloss and are translucent, the more worn examples are duller and appear opaque. While it is possible that the beads derive from what was once a larger necklace, there is no real evidence that they were made from recycled larger beads, as found at Mill Hill (Brugmann 1997, 56); the possibility cannot, however, be ruled out for the smaller, more irregular examples such as <16n>. Signs of damage in antiquity mainly might include a nick at the edge of the perforation of <16m> where the beads may have rubbed together on the string and the possible smoothing of damaged end faces to obliquely sloping ones on <16i> and <16r>.

Appendix G – The Prehistoric, Roman and Saxon Pottery

Lyn Blackmore

The prehistoric pottery

Three very small residual body sherds of flint-tempered pottery, probably of Bronze or Iron Age date, were recovered (11g). One hand-collected sherd was in fill [8295] of pit [8296] in Area 1, while the others are sieved samples taken from Area 3, [8834] (natural) and [8836], the fill of pit [8837].

The Roman pottery

Scattered sherds of Roman pottery occur on most sites in Covent Garden. They can only be regarded as 'background noise', possibly derived from activity in the area of St Martins in the Fields, or from traffic between there and the city (ie along the Strand). Ten sherds of Roman pottery were found, all residual. Stratigraphically the earliest are two small sherds of oxidised and grog-tempered ware from Period II (cremation pits <46> and <47> respectively), and four small sherds from an Oxfordshire red-brown colour-coated ware bowl (OXRC, form DR38) and Soller-type mortarium ware (SOLL) from the period III grey silt layer. Three sherds are from period VI contexts, while one is from period VIII. Given the small size of the sample it is difficult to comment on these finds, but the overall bias is to the later Roman period. Seven sherds date to after 150 AD, including two from a samian bowl (form DR37) and dish (form DR31) dating to AD 150-300. Fabric SOLL dates to AD 200–300, while OXRC dates to AD 270-400. The remaining sherds can only be broadly dated to AD 50–400, but are probably also of later Roman date.

The Saxon pottery: Fabrics and forms

Lyn Blackmore, with comments on the sampled sherds by Alan Vince

Introduction

The site is centrally located in the Middle Saxon settlement known as *Lundenwic,* which covered most of the area now known as Covent Garden. Saxon pottery has been found on most sites within this area, including Jubilee Hall, Southampton Street just to the west of the site. The largest collection of pottery is from the Royal Opera House site, immediately to the north-west of the site, where a long stratigraphic sequence was investigated. From these assemblages a broad ceramic sequence has been established (Blackmore 1988; 1989; 1993; 1999; 2003; in prep, a; Blackmore and Redknap 1988), although many questions remain to be answered.

The Saxon pottery amounts to 870 sherds (366 ENV; 23.016kg, 7.73 EVEs), of which 720 were hand-collected and 150 were recovered by sieving. All the pottery was examined macroscopically and where necessary using a binocular microscope (x20). Sherds from each different vessel were then recorded by sherd count and minimum vessel count (ENV), weight percentage of rim diameter present (EVE) on an Excel spreadsheet using standard Museum of London codes (Table 1). Thin section and/or chemical analysis was carried out on 24 samples of pottery and five loomweights by Alan Vince (Table 1), while the stamp decorated sherds were examined by Diana Briscoe (Archive of Anglo-Saxon pottery stamps). Their comments are gratefully acknowledged and incorporated, where relevant, below. The illustrated sherds are listed in Table 2.

In all five main ware groups are represented, the broad distribution of which is shown in Table 3. Sherd size ranges considerably, from complete pots to tiny fragments but on the whole the sherds are of medium size and in average condition.

Table 1. List of fabric codes and samples – separate file
Table 2. List of illustrated sherds – separate file
Table 3. The broad distribution of the pottery by period and fabric (sherd count/ENV/weight) – separate file

Table 1. Expansions of fabric codes used in this report (* = new code), with date ranges and quantification by sherd count, weight (gm) and estimated vessel equivalent (EVE)

Code	Fabric	Date	Sherds	%	Gm	%	EVE	%
Chaff-tempered wares								
CHAF	Abundant organic matter, fine/inclusion-free clay	400-750	182	21.0	3068	13.3	104	13.5
CHFI	AS CHSF, with iron-rich inclusions	400-750	2	0.2	12	0.1	0	0.0
CHFQ	As CHSF with large quartz grits (up to 7mm) and some sand	400-750	12	1.4	200	0.9	7	0.9
CHFS	As CHSF, sparse to moderate organic matter with moderate to abundant sand (up to 1mm) and fine grits	400-750	39	4.5	601	2.6	20	2.6
CHSF	Sparse to moderate organic matter in fine brickearth matrix	400-750	383	44.2	9709	42.2	432	55.9
Ipswich wares								
IPSC	Ipswich coarse ware	730-850	4	0.5	116	0.5	0	0.0
IPSF	Ipswich fine ware	730-850	65	7.5	3984	17.3	61	7.9
IPSM	Ipswich medium ware	730-850	25	2.9	1106	4.8	6	0.8
Regional and non-local wares								
MISC	Miscellaneous (sieved)	600-850	9	1.0	2	0.0	0	0.0
MSCALC	Miscellaneous calcareous ware	600-850	3	0.3	7	0.0	0	0.0
MSFLA*	Flint-tempered, fine; brickearth matrix	600-850	11	1.3	516	2.2	0	0.0
MSIG	Igneous rock-tempered, general	600-850	5	0.6	115	0.5	0	0.0
MSLQA	Sand, limestone(?) and quartz-tempered	600-850	1	0.1	34	0.1	0	0.0
SGFM	Charnwood Forest-type ware	450-650	1	0.1	12	0.1	0	0.0
SHGS	Coarse sand-tempered (?Ipswich)	600-850	1	0.1	12	0.1	0	0.0
SLGS	Lower Greensand quartz-tempered, general	600-850	1	0.1	33	0.1	0	0.0
SLGSA	Lower Greensand quartz- tempered,; brickearth matrix	600-850	1	0.1	1	0.0	0	0.0
SLGSC	As SLGSA; London clay(?)	600-	1	0.1	62	0.3	19	2.5

		850						
SLGSE	As SLGSA, sparse quartz sand, fine micaeous brickearth matrix	600-850	1	0.1	32	0.1	12	1.6
SLGSF*	As SLGSA, abundant quartz sand; Reading Beds clay(?)	600-850	4	0.5	179	0.8	6	0.8
SSANB	Sand-tempered, moderate quartz sand, sparse organic matter	600-850	2	0.2	88	0.4	14	1.8
SSANC	Sand-tempered, abundant fine sand	600-850	43	5.0	1449	6.3	65	8.4
SSAND	Very fine sandy ware, sparse organic matter	600-850	8	0.9	50	0.2	0	0.0
SSTOL*	Sandstone-tempered with ooliths	600-850	1	0.1	42	0.2	0	0.0
Shell-tempered								
MSS	Shell-tempered, general	770-850	2	0.2	69	0.3	0	0.0
MSSC	Shell and sand-tempered	770-850	2	0.2	26	0.1	0	0.0
MSSD	Sparse fossil shell, Woolwich Beds clay?	770-850	1	0.1	4	0.0	0	0.0
MSSE	Abundant fossil shell, Woolwich Beds clay	770-850	8	0.9	195	0.8	12	1.6
Imports								
BADOB	Badorf ware: abundant very fine quartz sand	670-850	1	0.1	4	0.0	0	0.0
BADOH	Badorf ware, fine with sparse medium quartz sand	670-850	6	0.7	519	2.3	0	0.0
MAYE	Mayen ware	770-850	1	0.1	10	0.0	0	0.0
MSGWA	Misc imported oxidised wares	600-850	7	0.8	229	1.0	0	0.0
MSRWC	Misc imported oxidised wares	600-850	2	0.2	15	0.1	0	0.0
NFBWA	North French blackware, very fine pink-brown body	600-850	1	0.1	1	0.0	0	0.0
NFBWB	N French blackware, abundant quartz sand	600-850	5	0.6	26	0.1	0	0.0
NFBWE	As NFBWA, sparse/moderate quartz sand	600-850	4	0.5	142	0.6	0	0.0
NFBWF	N French blackware, sandy with iron/glauconite	600-850	1	0.1	19	0.1	0	0.0
NFEBB	North France/East Belgium hard greyware	600-850	3	0.3	20	0.1	0	0.0
NFGWA	North French greyware, sparse/moderate quartz sand	600-850	5	0.6	79	0.3	6	0.8
NFGWB	N French greyware, abundant medium quartz sand	600-850	2	0.2	25	0.1	0	0.0
NFGWD	N French greyware, micaceous with fine	600-	6	0.7	99	0.4	6	0.8

	quartz sand	850						
NFRWB	N French fine burnished redware	600-850	1	0.1	31	0.1	2	0.3

Table 2. Fabric samples submitted for scientific analysis

Code	TS	ICPS	Period/context
Loomweight 1a		V4611 V4612 V4631	III/[8685] IV/[8571] VI/[8292]
Loomweight 1c	--	V4614	III/[8656]
Loomweight 3	--	V4613	IV/[8747]
CHAF	V4643	V4643	II/[8543]
CHSF	--	V4640 V4642 V4644 V4645	II/[8851] II/[8570] II/[8840] II/[8829]
MSFLA	V4632	V4632	II/[8853] VI/[8757]
MSIG	V4637 V4638	V4637 V4638	III/[8657] VII/[8090]
MSLQA	V4636	V4636	VI/[8310]
SHGS	V4646	V4646	VI/[8757]
SLGSA	V4634	V4634	IV/[8362]
SLGSF	V4633	V4633	VI/[8169]
SSANB	--	V4641	II/[8855]
SSTOL	V4639	V4639	VI/[8766]
MSGWA	V4623	V4623	III/[8655]
NFBWE	V4624 V4629	V4624 V4629	IV/[8362] VI/[8155]
NFBWF	V4628	V4628	VI/[8265]
NFEBB	V4622	V4622	III/[8800]
NFGWA	V4625 V4626	V4625 V4626	VI/[8310] VI/[8310]
NFGWD	V4627 V4630	V4627 V4630	VI/[8227] VI/[8154]
NFRWB	V4621	V4621	VI/[8763]

Table 3. Concordance of illustrated sherds

No.	Per	**LU**	**CXT**	**PCXT**	**Fabric**	**Form**	**DIAM**	**Comment**
1	II	OA2	8829	8828	CHSF	URN RND	107	Acc <38>
2	II	OA2	8829 8868	8828 8868	CHSF	URN RND	100	Acc <39>
3	II	OA2	8858	8859	CHSF	URN RND	133	Acc <47>
4	II	OA2	8840	8841	CHSF	URN RND	120	slight ext burnish
4	II	OA2	8841	8841	CHAF	URN RND		

5	II	OA2	8570	8569	CHSF?	URN RND?		Acc <10>
6	II	OA2	8543	8543	CHAF	URN RND	120	Acc <243>; stamped (type A 5di)
7	II	OA2	8855	8856	SSANC	JAR SHL?	200	
8	II VI	OA2 OA18	8853 8757	8854 8758	MSFLA	URN RND?		
9	III	OA3	8851	8850	CHSF	BOWL	180	incised horizontal lines and stamps (types A 5aviii, B 1di)
10	*III*	*OA5*	*8800*	*8800*	*CHSF*	*JAR RND*	*140*	*abraded*
11	III	OA5	8804	8804	CHSF	CP RND?	200	light burnish
12	III	OA5	8657	8657	CHAF	CP?	130	internal soot
13	III	OA5	8655	8655	CHAF	JAR RND	120	light burnish
14	*III*	*OA5*	*8505*	*8505*	*CHSF*	*JAR EV*	*120*	
15	III	OA5	8657	8657	CHSF	JAR RND	160	burnished, abraded; white residue
16	III	OA5	8789	8789	CHSF	JAR	180	light burnish
17	*III*	*OA5*	*8656*	*8656*	*CHSF*	*BOWL?*	*140*	
18	III	OA5	8804	8804	SSANC?	BOWL STR?	260	light burnish, abraded
19	III IV IV	OA5 OA7 OA9	8655 8647 8385	8655 8647 8385	MSGWA	JAR BICON		burnished
20	IV	OA6	8791	8791	CHAF	JAR?	300	external burnish, internally abraded
21	IV	OA6	8737	8790	CHSF	JAR RND	140	
22	IV	OA6	8535	8536	BADOH	JAR		
23	*IV*	*S4*	*8551*	*8550*	*CHSF*	*JAR*	*140*	
24	IV	OA7	8366	8367	CHAF	JAR	180	burnished
25	*IV*	*OA7*	*8647*	*8647*	*CHSF*	*JAR*	*160*	*external burnish*
26	IV	OA7	8647	8647	CHSF	JAR	180	
27	IV	OA7	8801	8803	CHAF	JAR	120	light burnish
28	IV	OA8	8525	8526	CHAF	JAR RND	100	
29	IV	OA8	8783	8785	CHSF	JAR RND	160	everted rim, added separately
30	IV	OA8	8362	8362	CHAF	JAR	140	
31	IV	OA8	8362	8362	CHFS	CP RND	130	wiped surface
32	IV	OA8	8362	8362	CHFS	BOWL	130	light burnish
33	IV	OA8	8362	8362	SSANC	BOWL STR?	280	
34	IV	OA8	8362	8362	SLGSA	JAR NECK	100	stamped (type A 4avii)
35	IV	OA8	8646	8646	CHSF	CP RND	120	
36	IV	OA9	8385	8385	CHFQ	JAR RND	240	
37	IV	S7	8529	8530	MSSE?	JAR	200	
38	V	OA10	8503	8504	MSSE	JAR	240	
39	VI	OA18	8227	8227	NFGWA	SPP	140	
40	VI	OA18	8771	8771	CHSF	JAR EV	280	light burnish
41	VI	OA18	8771	8771	SLGSE?	JAR/BOWL	120	
42	VI	OA18	8763	8764	NFRWB	SPP	140	cordonned
43	VI	OA18	8310	8311	NFGWB?	SPP?	--	incised wavy line
44	VI	OA18	8298	8298	SLGSC	LAMP	140	crude combed decoration; carbon deposits
45	VI	OA19	8186	8187	IPSM	JAR	200	

46	VI	OA19	8169	8187	IPSF	SPP	--	2 rows stamps (F 3aiii)
47	VI	OA19	8169	8187	SLGSF?	JAR	280	oxidised
48	VI	OA20	8214	8214	BADOB	AMPH	--	applied thumbed strip
49	VI	OA21	8218	8219	IPSF	JAR	260	
50	VI	OA21	8217	8219	IPSF	SPP	180	stamped (type A 3aiv)
51	VI	OA21	8217	8219	IPSF	SPP LUG	--	incised and stamped (type A bi $)
52	VI	OA21	8114 /8395	8114/ 8395	CHSF	JAR?	110	burnished
53	VI	OA22	8154	8154	NFGWD?	JAR BICON?	200	horizontal burnish; NFGWA?
54	VI	OA22	8172	8173	IPSF	SPP	240	stamped (type A 3aiii)
55	VI	OA22	8202	8203	IPSF	SPP	--	allover stamps (type A 3aiv)
56	VIII	--	8762	8753	CHSF	BOWL?	240	burnished
57	VIII	--	8762	8753	SSANB?	JAR RND	130	abraded (CHSF?)
58	*XIII*	*B1/2*	*8237*	*8238*	*CHSF?*	*JAR RND*	*120*	*burnished, internally abraded*
59	*XIII*	*B1/2*	*8237*	*8238*	*CHSF*	*BOWL RND*	*140*	*wiped, internal sooting*
60	*XIII*	*B1/2*	*8237*	*8238*	*CHSF*	*BOWL?*	*200*	

Table 4. The broad distribution of the pottery by period and fabric (sherd count/ENV/weight)

Period	Chaff	Ipswich	Shell	Regional	Imports
II	198/13/5989	--	--	47/3/1527	--
III	153/62/2594	--	--	5/3/146	5/2/104
IV	189/86/3621	5/5/494	1/1/22	26/14/242	10/7/541
V	10/8/187	--	2/1/19	3/2/33	--
VI	36/23/687	80/61/4205	8/6/227	18/11/715	27/23/555
VII	9/3/62	2/2/60	2/2/26	1/1/21	--
VIII	10/8/307	3/3/198	--	1/1/22	1/1/7
XIII	12/8/143	4/4/249	--	1/1/1	2/1/12
	618/211/13590	94/75/5206	13/10/294	100/36/2707	45/34/1219

Chaff-tempered wares

These wares are by far the most abundant on this site, with 498 hand-collected sherds and a further 120 from sieved samples (13.590kg). Many sherds are from the same pots, but the estimated total vessel count is nonetheless over 200, with 39 rims and several profiles.

Chaff-tempered wares are long-lived, appearing in the 5th century and continuing into the mid-8th century (Blackmore 1988, 106; 1989, 104-7; 2001, 25; 2003, 229-34). They. Analysis of finds from a number of other sites in the London region suggests that there is a trend from predominantly sand-tempered wares with sparse organic matter towards greater amounts of organic temper, the latter appearing in the later 6th/7th centuries (Blackmore in prep; Blackmore and Vince in prep). Most sherds from the present site have a fine sandy fabric with moderate organic matter (CHSF; 383 sherds, 123 vessels, 9.709kg). Sherds with a sand-free matrix and added quartz sand were coded as CHFS (39 sherds, 601g), while the same with only organic temper was coded as CHAF (182 sherds, 3.068kg). This is slightly different to earlier practice, but is in keeping with the results of recent thin section analysis (Vince 2003a). A few sherds of CHSF from Period IV ([8385], [8647]) were coded as fabric CHFQ, as they have occasional larger quartz grains (up to 3m across), and one from [8385] contains a fragment of quarzitic sandstone (at least 4mm across). One sherd from the

fill of grave [8552] has a noticeably iron-rich fabric with moderate rounded quartz inclusions (*c* 1mm across), sparse organic matter and sparse sub-angular flint up to 1mm. This could be a Surrey fabric; a similar ware was found at Maiden Lane (Blackmore 1988, 84; fig 27, no.46).

Sherds from cremation vessels Nos 2, 4 and 6 (Fig 00), and from the stamp-decorated jar No.9 were analysed chemically and No.6 was also analysed in thin section (see discussion, pottery supply). The thin section (Vince 2007, sample V4643) showed 'moderate carbonised inclusions up to 4.0mm long and 0.3mm wide, usually surrounded by a darkened halo and partially filled with light brown phosphate'. Other inclusions comprise 'sparse subangular fragments of altered glauconite (up to 0.2mm across), sparse rounded quartz grains (up to 1.5mm but mostly up to 0.5mm across), sparse subangular fragments of chert with subangular quartz inclusions up to 0.2mm across and chalcedonic infill of similar-sized voids. Also present are sparse rounded pellets of clay/iron (up to 0.8mm across). These are darker in colour than, but similar in texture to the groundmass, which consists of optically anisotropic baked clay minerals, moderate angular quartz up to 0.1mm across, sparse rounded opaques *c* 0.15mm across'.

The most important finds are the cremation urns (Fig 00, Nos 1–5), of which Nos 1 and 4 are complete. These are also noted individually in the landuse report, and only the form types are noted here; dimensions are summarised in Table 4. Although differing in size, it can be seen that the slack-shouldered, rounded profiles and short upright rims of Nos. 3 and 4 are very similar, and that No.1 is of the same general type, although having a more convex shoulder and longer rim. The profile of No.3 (<47>) is rounded and noticeably lopsided, as if had slumped during the drying stage. These round shouldered/globular forms with upright rims are typical of the 5th and early 6th centuries on the Continent (Myres 1977, 6–7, figs 48–51) and the most common in 6th-century deposits across the London region (for a more detailed survey see Blackmore in prep). Inverted rims are however found in later contexts (Blackmore 1988, fig 20, no.1; Jarrett 2004, fig 19, no.5; 2005, fig 65, no.2).

Two urns (Nos 2 and 6) are variations of this type, having rounded bodies but appearing sub-biconical as they have hollow necks and the maximum girth corresponds with the mid-point of the height. The body of No.2 is also noticeably narrower than the other urns (cf Myres 1977, 5–6; fig 24, no.2440, Bledlow, Bucks; fig 28, no.3813, Mucking).

Table 5. Dimensions of the cremation pots (H = height; B = base diameter; R = rim diameter; G = maximum girth)

No	Fill(s)	Crem	Acc	Fabric	H	B	R	G	Profile	Comment
1	[8829]	[8828]	<38>	CHSF	164–165	90	107	192	Convex-shouldered	Whole; adult
2	[8828] [8868]	[8828]	<39>	CHSF	176	80	100	170	Rounded, necked	
3	[8858]	[8859]	<47>	CHSF	187–196.5	90	130-135	206	Rounded, lopsided	Whole; juvenile
4	[8840] [8841]	[8841]	<42>	CHSF	213	90	120	214	Rounded	
5	[8568]	[8569]	<10>	CHSF	--	90	--		Rounded	
6	[8543]	--	<243>	CHAF	136	65-70	130	160	Sub-biconical	
7	[8555]	[8856]	<46>	SSANC	174	70-80	200	240	Shouldered, wide-mouthed	Near whole

									bowl	
8	[8853]	[8854]	<45>	MSFL	--	80	--	250	Rounded?	

The battered small jar No.6 is rather squatter than No.2 (cf Myres 1977, fig 27, no.1201, Worthy Park, Hants). It is the only decorated cremation vessel from Period II, with a row of stamps around the neck and further stamps extending over the shoulder in vertical rows of two or three. The stamps measure 9 x 8.5mm and are of Briscoe type A 5di, a segmented negative ring (Briscoe 2007). This is 'a very common stamp with a wide distribution. There are no local comparably-sized examples, but it is possibly worth noting that there are several examples from Mucking, Essex, although of different sizes' (ibid).

It is possible, however, that the abraded sherds from No.9 (Fig.00), a wide-mouthed jar or bowl found in the period III pit [8850] in OA3, are also from a cremation vessel. The decoration is difficult to reconstruct due to the fragmented nature of the pot, but that on the shoulder comprises a band of circular negative rosette stamps with eight petals. (Briscoe type A 5aviii; diameter 10 x 9.5mm) between triple horizontal lines. Below which is a rather crude chevron or pendent triangle design defined by paired incised lines between which are quatrefoil stamps of Briscoe type B 1di, a negative upright cross with arms with rounded ends and a central positive dot. (7.5 x 8mm across; Briscoe 2007). The intervening triangles are blank. Myres felt that stamped chevron designs date to the 6th-century date and that the pendant triangle was an English development of the tradition (Myres 1977, 51–6).

Stamp type A 5aviii 'is very common, with a wide distribution; as such, is of little diagnostic use. There are no local examples of comparable size' (Briscoe 2007; and the larger example from Tottenham Court (Euston Road), originally classed as Type 5 ai, is much more irregular (Blackmore 1983, 82). Stamp B 1di 'is rare, with only 16 examples recorded in the Archive. Eleven of these stamps come from Loveden Hill, Lincs, with other examples from Spong Hill (Norfolk), Long Wittenham (Berks), West Keal (Lincs), Newnham and Little Paxton (Cambs). The closest examples in size are all from Loveden Hill; the closest stylistically is from Long Wittenham' (ibid).

Most other vessels were recorded as jars (353 sherds, 170 ENV); these include Nos 10, 13–16, 20, 21, 23–6, 28–30, 36, 40, 52, 57). At least 30 vessels, including Nos 15, 20, 24, 25, 40, 52, 57, have some form of burnish. In addition, 40 sherds from 19 vessels have traces of sooting and/or residues and were probably used as cooking pots; these include Nos 11, 12, 31, 35. and a base from Period IV, OA7 ([8803] that was submitted for C14 dating. Of the Period III rims, Nos.10, 11 and 25 are from rounded forms with short upright rims like urn Nos 1, 3 and 4, but several are from slack-shouldered jars or bowls. No.16 is similar to examples from Maiden Lane and the Royal Opera House (Blackmore 1988, fig 24, nos 14, 15; 2003, 233–4, fig 360, <P21>) while Nos 12 –14 are more everted (cf ; Blackmore 1989, fig 28, no.12); No.15 is larger, more rounded and thicker walled with a white deposit over the inner surface. Of the other forms, a very small straight-sided upright rim from Period III (No.17) is probably from a bowl.

The rims from Period IV and later deposits are generally more developed than those from Period III; Nos 20, 24 and 31 are deep everted forms, and No.24 is similar to finds from Floral Street (FLR00, [5019]; Blackmore in prep, No.5) and Long Acre (LGC00, [13]). No.20, from the green silt layer [8791] is a large thick-walled, internally abraded vessel (diameter 300mm), possibly used for some industrial process (cf Blackmore 2003, 234, fig 47, <P43>). Other jars from the same deposit have white, brown and purple residues and were probably used for boiling water and dyes such as madder. Jar No.21 has an everted, slightly collared rim (cf ibid, 234, fig 89, <P90>). Other long necked, everted forms are slightly beaded. The slack-shouldered forms of Nos 27 and 28 are similar to finds from Maiden Lane and the Royal Opera House (Blackmore 1988, fig 24, no.12; 2003, 233–4, fig 360, <P17) that may have been designed to have lids of cloth or skin. No.29 is smaller than, but similar to a spouted jar from the Royal Opera House (Blackmore 2003, 234, fig 95, <P89>). Of the bowls, Nos 27 and 59 are similar to the slack-shouldered forms noted above, while No.32 has a more

flaring profile. No.56, from Period VIII, is partly straight-sided with an everted rim. Excluding the cremation vessels, and considering the finds from all periods together, 19 of the 33 jar rims are between 120–180mm in diameter, and 12 are between 120–140mm.

Ipswich wares

Ipswich wares characterise the second main ceramic phase within Lundenwic. The fine fabric is conventionally recorded as IPSF, the medium sandy fabric as IPSM and the coarser, or 'pimply' fabric as IPSC (Blackmore 1988, 106; 1989, 104-7; 2001, 27; 2003, 234-5). Most sherds are reduced but a few oxidised sherds are also present. Current evidence suggests that the ware was introduced *c* AD 730-750 and that it dominated the London market from *c* AD 750–850. Finds from the Royal Opera House and Shorts Gardens suggest that stamp-decorated vessels are mainly of late 8th or 9th-century date (Blackmore 2003, 235; in prep). This pattern is repeated in the present assemblage, as although Ipswich wares are less common than chaff-tempered wares (94 sherds, 75 vessels, 5.206kg), they do not appear until Period IV, when they are very rare, they are most common in Period VI. One sand-tempered ware may an atypical Ipswich fabric (see below, SHGS).

Most of the forms are quite typical for Lundenwic. Jars are the most commonly recorded form, some with a white internal residue; six have traces of burnish and may in fact have been pitchers. At least eight vessels were used as cooking pots. In addition there are at least eleven spouted pitchers, one represented by a strap handle ([8865]). The latter is unusual, but another example was found at the Royal Opera House (Blackmore 2003, 235, fig 104, <P142>). Three Period VI vessels are burnished, while five have stamped decoration, all different and some new to Lundenwic. Perhaps surprisingly, none have a gridded triangle motif, the most common in Lundenwic (Blackmore 2003, 235; in prep; Jarrett 2004, 92, fig 58), but three have gridded circle stamps (the A 3a motif, sub-types of which record the number of negative squares present). This is one the more common stamp types for this ware, with a wide distribution; (Briscoe 2007). A rather larger example of the type, from Shorts Gardens, has 6 x 4 rows and measures 15mm in diameter (Blackmore in prep).

The first, from pit [8219], is a jar/pitcher with upright rim similar to that from [8172], with two rows of large stamps around the shoulder (Fig 00, No.50, [8217]). The stamps are of Briscoe type A 3aiv, a negative grid of 4x4 rows (diameter 12mm; Briscoe 2007), applied with uneven pressure on a slightly oblique alignment.

The second, a large jar/pitcher with upright rim from fill [8172] of pit [8173] has a single row of large closely spaced gridded circle stamps around the shoulder, just below the neck (Fig 00, No.54, [8172]). The stamps are of Briscoe type A 3aiii, a negative grid of 3 x 4 squares (diameter *c* 11 x 12mm; Briscoe 2007). The stamps are more obliquely aligned than those on No.50, evenly applied on one side but rather blurred on the other due to the clay being too wet and/or the stamp being lifted too quickly.

The third is a battered sherd from a jar/pitcher found in pit [8203] (Fig 00, No.55, [8202]). The stamps are of Briscoe type A 3iv, rather smaller and with a denser negative grid than those on No.50 (4x4 rows, diameter *c* 9.5 x 10mm; Briscoe 2007). The stamps are aligned on the diagonal (ie lattice rather than grid), closely, but randomly spaced all over the shoulder. Stamp A 3iv is a common motif, with over 120 stamps recorded. It has a very wide distribution and, as such, is completely undiagnostic. Examples of comparable size have been found at Eynsham Abbey and Barrow Hills, Radley (ibid).

A jar or pitcher from pit [8187] is the first example from Lundenwic to have stamps of Briscoe type F3aiii, a positive diamond with a negative circle, surmounted by a positive cross (Fig 00, No.46; [8169]; Briscoe 2007). These are in two rows one around the angle of the carination, the other some distance above it on the shoulder.

The fifth find is part of a lugged pitcher that combines simple circular stamps with incised geometric decoration (Fig 00, No.51, [8217]; cf Hurst 1976, fig 7.8). The stamps are of Briscoe type A 1bi$, a very thin negative ring that could have been made with a bird bone or a metal object (Briscoe 2007). The same form was found at the Royal Opera House (<P150>; Malcolm et al 2003, 131; Blackmore 2003, 235, in text as <P151> fig 112, but omitted from the publication).

Other regional and non-local wares

Study of several assemblages from rural sites in the London region has shown that the earliest diagnostic fabric to be used in bulk is sandstone-tempered (Blackmore and Vince in prep; Blackmore with Vince in prep). A few such sherds have been noted on other sites in Lundenwic, such as LCR99 and LGC00 at the western end of Long Acre (Blackmore et al 2004, 303–4; Blackmore with Vince in prep). No typically Early Saxon types were found on the present site, but sandstone does occur in combination with other inclusions. Most other fabrics are known types but a few new types or sub-types are represented.

Quartz sand-tempered wares: SSAN and SHGS

The 53 sherds of sand-tempered ware (SSAN) derive from up to 12 vessels (1.587kg), mostly from Periods IV, V and VI. These broadly fall into the fabric sub-types described previously (Blackmore 1988, 87; 1989, 81–2), although there are some variations.

The two sherds of SSANB comprise part of a thick-walled jar from the Period VI, OA22 (fill of pit [8203]) and a residual rim sherd from a jar or bowl with everted rim found in Period VIII (Fig 00, No.57). Both have a silty matrix with moderate to abundant very fine sand (0.05mm) and coarser sand (0.3–0.7mm) and scattered muscovite up to 1mm. The Period VI sherd is slightly coarser than usual, but not as coarse as fabric SSANH (Blackmore 2003, 236).

Fabric SSANC (43 sherds, five vessels) has a micaceous silty groundmass of abundant extremely fine quartz sand with sparse to moderate larger quartz grains, mainly under 1mm but up to 2mm across (?London Clay). The earliest example is the cremation pot <46>, which is a substantially complete wide-mouthed jar with slightly squat profile, represented by 35 sherds (Fig 00, No.7; see above). This is slightly coarser than the type sherd, with moderate coarser sand (up to 1mm), sparse fine organic matter and occasional rounded flint (up to 2mm across). This vessel was analysed chemically (Vince 2007, sample V4641). Six other sherds are from jars, while two large straight-sided bowls or jars were found in Periods III and IV (Fig 00, No.18; Fig 00, No.33).

Fabric SSAND (eight sherds, five vessels, 50g) also has a silty groundmass that is slightly coarser than that of SSANC, but contains fewer larger quartz grains than either SSANB or SSANC; some sherds contain rare flint grits. Scattered muscovite is also present, although not noted in the original description (Blackmore 1989, 82). The ware is closely related to CHSF and can be confused with it, but contains only sparse, fine organic matter. Four of the five vessels represented are from small jars, reduced throughout and externally burnished; that from Period V ([8263]) has internal carbon deposits.

Fabric SHGS is a rare type that was first recorded at Maiden Lane (Blackmore 1989, 87); it is visually similar to the medium sandy Ipswich ware (see above, IPSM) but not exactly the same. In the hope of resolving this problem, the one sherd in the present collection was analysed in thin section and chemically (Vince 2007, sample V4646). The thick-walled sherd is from just below the spout of a pitcher with oxidised body and reduced surfaces, with a close diagonal burnish externally. It contains 'moderate well-rounded quartz grains (ranging from *c* 0.2mm to 1.0mm), sparse angular unstained grains of flint (up to 0.5mm across), and sparse rounded fragments of chert (up to 1.0mm across). Also present are sparse rounded grains of altered glauconite (up to 0.3mm across), sparse well-rounded opaque grains (up to 0.3mm across; one rounded

fragment 1.5mm across with sparse angular quartz inclusions) and sparse rounded Clay/iron concretions with a variable iron content and oolitic structure. The groundmass consists of optically anisotropic baked clay minerals, abundant angular quartz grains up to 0.1mm across and sparse muscovite laths up to 0.1mm long. Some of the quartz inclusions have iron-stained veins and shapes which suggest a Lower Cretaceous origin. The range of inclusions is similar to that in Ipswich ware but the fabric is chemically indistinguishable from the local/regional wares, so that the source of this ware remains unclear' (ibid).

Lower Greensand-tempered wares: SLGS

These wares probably derive from Surrey, although they could be from Essex or the Colne Valley. The 12 sherds derive from nine vessels, three found in period IV contexts, and five in Period VI and one in Period XIII. Four sub-types are present, fabrics SLGSA, SLGSC, SLGSE (for earlier descriptions see Blackmore 1988, 87; 1989, 82; 2003, 236; in prep), and a new type, SLGSF. Two sherds were studied in thin section, both possibly made of light firing clay from the Barton Beds, which outcrop in patches in the Kingston area (Vince 2007; see discussion, pottery supply).

The five sherds of fabric SLGSA include the rim of a stamp decorated jar from Period IV, OA8 (Fig 00, No.34; see below). This was thin sectioned (Vince 2007, sample V4634) and found to be very similar to sample V4633 (SLGSF). It contains 'moderate rounded grains of quartz up to 1.0mm across, some with a dark brown coating and others with dark brown stained veins, and sparse rounded dark brown clay/iron concretions up to 1.0mm across with an oolitic structure. Also present are sparse irregular voids from organic matter up to 0.2mm across surrounded by a darkened halo. The groundmass consists of light brown optically anisotropic baked clay minerals, sparse angular quartz, sparse rounded opaques and sparse rounded dark brown clay/iron grains all up to 0.1mm across' (ibid).

The decoration on the neck of No.34 comprises a row of Briscoe type A 4avii stamps (Briscoe 2007) aligned diagonally between paired horizontal lines. 'This form of 'hot-cross-bun' stamp has straight sides with a slight curving at the corners only (it can be taken as C 3ai in some forms). It is a reasonably common, with a very wide distribution; as such, it is completely undiagnostic. There are no local examples of comparable size' (ibid). The other sherds are from the near complete base (diameter *c* 40mm) of a heat-altered small rounded jar that was probably similar in size to No.39 and could be from the same vessel as No.34.

One sherd from a thick-walled lamp with crude combed geometric pattern on the outer surface (Fig 00, No.44) was recorded as fabric SLGSC. This was submitted for C14 dating of the carbon residue (see finds discussion and C14 report) and so the fabric could not be double-checked against that of the thin-sectioned sherds. Fabric SLGSE is represented by the rim from a small thick-walled jar or bowl with oxidised surfaces that appear to have been wiped (Fig 00, No.41).

Code SLGSF was created for a fabric containing very abundant quartz sand which appears to be a coarser variant of SLGSA and is related to SSANE. Two of the four sherds are from No.48 (Fig 00), while two base sherds could be from the same vessel (thickness *c* 12mm). Thin sectioning of the latter (Vince 2007, sample V4633) shows 'abundant subangular quartz (up to 0.3mm across) and sparse rounded grains (up to 0.5mm); some of the latter appear to be of Lower Cretaceous origin. Also present are sparse carbonised organic inclusions, some straight some curved (up to 2.0mm long and 0.2mm wide), rare rounded fragments of altered ?glauconite up to (0.3mm across) and sparse rounded opaque grains (up to 1.0mm across). The larger fragments of the latter contain quartz inclusions of similar size and shape to those in the remainder of the section. The groundmass consists of light brown, highly birefringent baked clay minerals and few other inclusions, except for moderate fragments of opaque material' (Vince 2007, sample V4633).

Flint-tempered wares: MSFLA

This sand-and-flint-tempered fabric, represented by sherds from the base and lower body of cremation vessel No.8 (Fig 00; <45>) differs from the existing categories MSFG, a coarse fabric from the Hamwic area, and MSFF, which contains brown-stained flint alongside well-rounded quartz grains, probably derived from the Triassic sands of the west Midlands (Vince 2005; Blackmore in prep). Thin section (Vince 2007, sample V4632) shows that MSFLA contains 'moderate rounded quartz up to 1mm across, sparse angular flint, mainly up *c* 1mm across but some up to 7mm, and sparse rounded chert up to 1.5mm across. Some of the quartz is probably of Lower Cretaceous origin, some are probably of Triassic origin. Some of the chert brown-stained, and some is porous with ferroan calcite filling the pores. The groundmass consists of optically anisotropic baked clay minerals with abundant irregular quartz up to 0.1mm across.' The petrological composition of this ware is consistent with the use of a brickearth (ibid) and although the ware is chemically different from the other pottery fabrics it is similar to the loomweights (see discussion, pottery supply). Fabric differs from the other fine flint-tempered ware (MSFF)

Igneous rock-tempered wares (MSIG and SGFM)

Igneous rock-tempered wares are rare but occur sporadically, for example at Jubilee Hall and at the Royal Opera House (Blackmore 1988, 89; Blackmore 2003, 237; Blackmore in prep).

One sherd from Period IV, OA8, is typical of Charnwood Forest ware (fabric SGFM; Williams and Vince 1997). Five sherds, probably all from the same vessel, were recorded as MSIG, one from Period III, OA5 ([8657]), three from Period IV, OA6, and one from Period VII, OA21 ([8090]), two of which were studied in thin section (Vince 2007, samples V4637, V4638). Both contain 'moderate angular fragments of a medium-grained acid igneous rock up to 2.0mm across that contain crystals of altered orthoclase feldspar, perthite and quartz. Also present are moderate rounded and subangular grains of quartz up to 0.5mm across and sparse medium-grained sandstone consisting of interlocking overgrowth grains of quartz up to 0.5mm across. The quartz includes well-rounded grains with iron-stained veins. The groundmass consists of optically anisotropic baked clay minerals, moderate angular quartz up to 0.1mm across and moderate muscovite laths up to 0.1mm long' (ibid). A source in East Anglia is suggested for this vessel; see discussion (pottery supply).

Sandstone-and oolitic limestone tempered ware (SSTOL)

Oolitic limestone is not a common component of pottery found in Lundenwic, but four fabrics have been noted (Blackmore 1988, 89; 2003, 236–7; in prep). In addition a sherd containing sandstone and limestone (possibly fossiliferous ooliths) and acid igneous rock was found at Jubilee Hall (fabric MSIG; Blackmore 1988, 89). This is visually similar to the one sherd large thick-walled sherd from Period VI, OA18 ([8766]), which was analysed in thin section (Vince 2007, sample V4639). It contains 'abundant calcareous sandstone up to 2mm across and sparse angular sandstone. The former consist of well sorted angular grains of up to 0.2mm across in a ferroan calcite groundmass. The latter consist of overgrown quartz grains up to 0.3mm across. Also present are 'sparse angular fragments of oolitic limestone up to 1.5mm across, consisting of brown micrite ooliths *c* 0.5mm across in a groundmass of ferroan calcite. The ooliths mainly have a core consisting of ferroan micrite or a non-ferroan calcite shell fragment'. Other inclusions comprise sparse angular quartz up to 3mm across, moderate angular fragments of mudstone/relict clay and rare muscovite laths up to 1m long. The groundmass consists of 'light brown optically anisotropic baked clay minerals and sparse angular ferroan calcite up to 0.1mm across. The fabric is laminated and the laminae are mainly open but some are filled with brown phosphate, which also surrounds some of the inclusions'. The oolitic inclusions are of Jurassic origin, while the calcareous sandstone inclusions might be of Jurassic or Cretaceous origin (ibid); a source in East Anglia seems most likely for this ware (see discussion, pottery supply).

Limestone-tempered ware: MSLQA

Limestone-tempered wares are not common in Lundenwic; the first example, from Bedfordbury was recorded as MSLQ (Blackmore 1989, 84, fig 3, no.59). This has now become MSLQA, as a few examples of sub-types B and C were found at the Royal Opera House (Blackmore 2003, 237). The one sherd from Period VI, OA18) was examined in thin section (Vince 2007, sample V4636); it mainly contains 'moderate fragments of rounded quartz up to 1.0mm across, and moderate angular fragments of fossiliferous limestone up to 1.5mm across'. The former mainly have a 'coating of dark brown to opaque material and in some instances similar material fills veins in the grains'. The latter, of Lower Cretaceous origin, contains 'non-ferroan fossil fragments including bivalve shell. In one instance a rounded quartz grain *c* 0.5mm across is present'. Other inclusions comprise 'sparse rounded grains of relict clay up to 1.0mm across with a similar texture to the groundmass but slightly lighter in colour and sparse elongated carbonised organic inclusions, up to 3.0mm long and 0.3mm wide. The groundmass consists of optically anisotropic baked clay minerals, moderate angular quartz grains up to 0.1mm across and sparse muscovite laths up to 0.1mm long'.

The clay matrix and most inclusions of V4636 are very similar to those of the Bedfordbury find, although the latter lacks organic matter. In most respects the ware is also identical to fabric MSLQB/SLAGB from the Royal Opera House (Blackmore 2003, 237), which was thought to possibly contain fayalitic debris. While the limestone content is different, the latest analysis confirms the relationship of these wares and suggests that the Royal Opera House vessel contains a form of limestone rather than slag. See also discussion (pottery supply).

Calcareous ware: MSCALC

This code acts as a temporary umbrella for fabrics of uncertain origin containing calcareous inclusions (Blackmore with Vince in prep). The one example from the present site is from a thin-walled jar with a slight burnish and the edge of an incised linear design that may be of 6th-century date (found in Period III, fill of pit [8671], not illustrated). It has a dense, more or less sand-free matrix that contains ?fossil shell/plant matter/calcareous algae ranging from very fine flecks to elongated streaks between 1mm and 3mm in length and 0.7mm thick. Also present are abundant very fine glauconite, sparse very fine quartz sand (<0.1mm), moderate quartz grains up to 1mm across, mainly rounded and polished but some angular.

Shell-tempered wares

Shell-tempered wares characterise the third main ceramic phase of activity in Lundenwic, which probably started between 770-800 and continued until *c* 850 (Blackmore 1988, 88-9; 1989, 106; 2001, 26-7; 2003, 237-8). This category is not well represented on the site, with only 13 sherds from ten vessels (294g), mostly large and thick walled. Stratigraphically the earliest finds are a rim from Period IV, structure S7 (Fig 00, No.37) and two sherds from Period V, OA10, including a more everted rim (Fig 00, No.38; cf Blackmore 2003, 237, fig 104, <P137>), all of which should be intrusive. Six vessels are from Period VI contexts, while the remainder are from Periods VIII and XIII.

No scientific analysis was carried out, but a detailed study of other finds is in progress which has extended the range of known types (Vince 2005; Blackmore in prep). Three published fabrics are present (Blackmore 2003, 237-8). The first are of Woolwich Beds clay containing fossil shell (broadly fabrics MSSD, MSSE) and is probably from Kent (eg [8201], [8503], [8529], [8766], [8771]). A second type, represented by two sherds from [8130], differs in being thinner walled and much harder with sparser shell (MSSC). It has a fine sandy matrix not unlike the medieval fabric shelly sandy ware (SSW), but similar wares from Jubilee Hall (MSSC; Blackmore 1988, 88) and Bruce House (MSSG; Blackmore in prep) shows it to be of Saxon date. A third type appears to have a sandy brickearth matrix and probably contains a shelly limestone ([8154], [8202], [8757]); it may correspond with sub-type 1 of the second fabric noted in the Royal Opera House report, for which no

code was created (Blackmore 2003, 237) and fits the description of fabric MSS3 in the new survey (Vince 2005; Blackmore in prep).

Imports

The first finds of imported pottery from Lundenwic were classified on the same lines as those from Hamwic (Blackmore 1988, 89–92; 1989, 85–90). As more material has been recovered, it has become increasingly apparent that there is considerable overlap between the 'black' and 'grey' wares, not only in colour but also in fabric, complicated by the fact that similar forms occur in a range of fabric types. Recent analyses have attempted to distinguish between the French and Rhenish buff wares and to source the Tating-type ware found in Lundenwic (Vince 2003; Blackmore in prep; Blackmore and Vince in prep). Some work has also been done on the North French reduced wares (Blackmore et al 2004), but a comprehensive resorting of these wares is desirable (Blackmore 2003, 238–9). For this project, ten sherds of North French/Belgian pottery were analysed in thin section and chemically in the hope of shedding some light on these imports.
North French(?) reduced wares: NFBW, NFGW

Most of the imports fall into this group, with 33 sherds from up to 26 vessels (499g). The earliest two, including No.19, are from Period III. Ten sherds are from Period IV, including three sherds from No.19, but most are from Period VI, when 18 sherds from 17 vessels were discarded. The five remaining sherds are residual in post-medieval deposits. The sampled sherds fall into two groups, mainly following the original distinction of blackwares ands greywares, but some sherds demonstrate the problem of sorting on the basis of firing, or even microscopic identification, alone. Rather than complicate the system of classification with yet more codes, the fabrics were accommodated within existing ones pending a more comprehensive review.

The 11 blackware sherds derive from nine vessels, including samples are V4624, V4628 and V4629 (Vince 2007, grouped as his fabric 13). All three have a very fine matrix with no mica. The following inclusion types were noted: 'moderate angular quartz grains with a low sphericity to well-rounded highly spherical grains (ranging from *c* 0.2mm to 1.0mm) and moderate opaque grains *c* 0.1-0.2mm across. Many are well-rounded with high sphericity whilst others show signs of a euhedral outline. Both features suggest that these are concretions formed *in situ*. Also present in sample, V4628 are moderate rounded light brown isotropic grains. These may be altered glauconite or may be clay pellets and reflect a relatively high firing temperature. The groundmass consists of pale brown, optically anisotropic clay minerals, sparse angular quartz grains and sparse dark brown to opaque grains up to 0.1mm across' (ibid). These inclusions are similar to those in the greyware samples (below), NFRWB and NFEBD, and the difference is mainly in the colour/iron content of the groundmass and the frequency of opaques' (ibid).

Sample V4624 is texturally similar to fabric NFBWE, the coarser variant of NFBWA (originally classed with it; Blackmore 1988, 89; 2003, 230, Table 2). The quartz inclusions, however, are rather larger than usual and either more rounded or more irregular. Sample V4629 is also closest to fabric NFBWE. Sample V4628 is slightly coarser than fabric NFBWE and the possible glauconite relates it to NFBWF. Other blackwares comprise small sherds from jars/pitchers in NFBWA, NFBWB and NFBWE.

The 13 greyware sherds derive from 11 vessels, including Nos 39, 43, 53 (Fig 00). The four samples are V4625, V4626, V4627, V4630 (Vince 2007, grouped as his fabric 9). The main inclusion types noted in thin section are 'moderate rounded and subangular quartz grains (up to 0.3mm across), sparse coarse siltstone/rounded fine-grained sandstone with a brown cement and grains (up to 0.1mm across) and sparse rounded dark brown grains of clay/iron (up to 0.3mm across). Also present are rare subangular opaque grains (up to 1.0mm across) and sparse muscovite laths (up to 0.3mm long). The groundmass consists of optically isotropic (V4626) or anisotropic (V4625, V4627 and V4630) baked clay minerals, sparse angular

quartz (up to 0.1mm across), muscovite laths (up to 0.1mm long) and subangular dark brown/opaque grains (up to 0.1mm across).

Samples V4625 and V4626 were recorded as NFGWA. Samples V4627 and V4630 (No.53), however, appear contain more mica and abundant very fine quartz sand than the NFGWA type sherd (although this could just reflect a lower firing temperature) and V4627 would be grouped with the blackwares on appearance. The rim form of No.53 suggests that it belongs to fabric NFGWD, and both were recorded as this fabric type, which can be oxidised or reduced (Blackmore 1988, 90).

Other greywares comprise two sherds of NFGWA, one of NFGWB and four of NFGWD. These include a flanged pitcher rim (Fig 00, No.39) in NFGWA, similar to a blackware example from Jubilee Hall (Blackmore 1988, fig 22, no.30) but rather more everted than the blackware and greyware forms found at the Royal Opera House (Blackmore 2003, 238). Sherd No.43 (Fig 00) from a pitcher with incised decoration, is fired pale grey throughout, but the fabric very like the reduced sandy ware NFBWB. It does, however, contain sparse fine calcareous inclusions which distinguish it from this group, and so was recorded as a variant of fabric group NFGWB.

North French(?) oxidised wares: NFRWB

The battered rim from an oxidised spouted pitcher in NFRWB (Fig 00, No.42) with streaky red-grey outer surface was found in a period VI context. The form is similar to, but more biconical than, a find from Jubilee Hall (Blackmore 1988, 91; fig 22, no. 36). Thin-sectioning (Vince 2007, sample V4621) shows 'sparse subangular quartz grains (up to 0.3mm across), rare rounded grains of coarse siltstone/fine sandstone (up to 0.3mm across) and rare subangular grains of chert (up to 0.4mm across). The groundmass consists of optically anisotropic baked clay minerals with rare angular quartz inclusions up to 0.1mm across and moderate dark brown grains less than 0.5mm across' (ibid). As the inclusions are almost identical to, although less frequent than, those in the greyware samples, the two would appear to be related, if not from the same industry.

North French/Belgian ware: NFEB

Three sherds have the distinctive sandwich firing that is typical of pottery thought to be from Northern France/Belgium (Hodges 1981, 21; Blackmore 1988, 90–91; see discussion, pottery supply). Two are from Period VI, but one, from a biconical jar or pitcher with at least three rows of lightly incised wavy line decoration (not illustrated) was found in Period III. The texture of this sherd is finer than the reference sample and thin sectioning (Vince 2007, sample V4622) shows that the only inclusions are 'sparse rounded and subangular opaque fragments up to 1.0mm across'. Also present are 'sparse irregular voids up to 1.0mm across; some might result from air trapped in the potting clay, while others might have contained calcareous inclusions, but some have a darkened halo surrounding them and clearly once contained organic matter. The groundmass consists of optically isotropic baked clay minerals, abundant angular quartz up to 0.1mm across, sparse rounded dark brown grains up to 0.1mm across' (ibid).

Reduced whiteware: MSGW

Reduced whitewares are rare in Lundenwic, the main type being the later 8th- to 9th-century Tating-type ware (hitherto coded as NFBWC), which generally has a blue-grey core and reduced surfaces. A single externally burnished sherd found at the Royal Opera House has grey surfaces but a creamy body and so was classed as MSWWD (Blackmore 2003, 230, Table 2).

The present assemblage includes seven sherds (229g) from a biconical jar/pitcher (Fig 00, No.19) in a light grey with dark blue-grey surfaces and margins. Thin sectioning (Vince 2007, sample V4623) shows that it

contains 'abundant angular and subangular grains of quartz (ranging from *c* 0.2mm to 0.5mm), several of which have an extremely low sphericity, and sparse subangular opaque grains ranging from *c* 0.2mm to 0.5mm across. The groundmass consists of optically anisotropic, highly birefringent baked clay minerals with few inclusions. The outer margins are opaque as a result of carbon diffused into the body' (ibid). Although the fabric bears some resemblance to finds from La Londe, near Rouen (A Vince pers comm.), the chemical composition suggests that it may be from the Rhineland (ibid; see discussion, pottery supply). The fabric was thus provisionally classed as type A in the new MSGW category in order to distinguish it from the other North French-type wares. The vessel is from Periods III and IV contexts and should be of 7th-century date.
Rhenish/odixised wares: BADO, MSRW

Rhenish wares occur on most sites in Lundenwic but are never as common as the North French wares. Seven sherds from six vessels belong to the category of Badorf-type wares (Blackmore 1988, 92; 1989, 90; 2003, 240–1; in prep). The two sherds from Period IV include a thick-walled flat base from a large jar with internal and external knife trimming (Fig 00, no.42); from the German chronology this should date to between AD 675–775 (van Es and Ververs 1993, 223; Blackmore in prep). The fabric has a very finely granular appearance and contains large inclusions of sandy red clay/grog up to 5mm across. This was classed as BADOH (Blackmore 2003, 230, Table 42) although slightly finer and less highly fired than the five other body sherds that are more typical of this fabric type. One sherd in BADOB has an applied thumbed strip (Fig 00, No.48) and is from a small *Reliefbandamphora* ([8214]), probably the latest form present (Blackmore 2003, 241).

In addition, there is one sherd of probable Mayen ware (MAYE) with igneous/volcanic rock inclusions was found in Period VI, OA18; this is very highly fired with oxidised core and reduced pimply surfaces.

A new fabric, recorded as MSRWC, is represented by two sherds of fine oxidised redware found in Period IV (OA7, [8367]), and Period VI (OA21, [8194]), possibly from the same vessel. The very fine, micaceous silty matrix contains iron-rich pellets and white streaks, with sparse/moderate quartz sand, mainly up to 0.2mm but some up to 0.5mm. A source in or near the Rhineland, or perhaps in the Meuse valley, seem likely for this ware.

Appendix H – The Saxon Pottery: Stratigraphic Report

Lyn Blackmore

Period II: mid 6th –mid-7th century

Open Area 2

The pottery from Open Area 2 amounts to 245 sherds from 16 vessels (7.516kg). With the exception of two vessels in SSANC and one in MSFLA, all are chaff-tempered. The vessel forms, together with the datable grave goods, point to a date the mid- to later 6th century for this phase of activity. As these are the earliest ceramic finds from *Lundenwic*, two jars were analysed in thin section (Nos 6 and 8) and six were analysed chemically (Nos 2, 4–8) in order to compare them with the later wares (see below, pottery fabrics and finds discussion).

Seven cremation burials were interred in urns (see Table 4), although all but two of these (<38> and <47>) were disturbed by later activity. The chaff-tempered wares are discussed first. Only one vessel is decorated.

A larger, sub-circular cut [8828] contained two vessels of different sizes (see Table 1). One is near whole with rounded, slightly shouldered profile (Fig 00, No.1; <38>); the other is fragmented, but substantially complete (Fig 00, No.2, <39>). The profile is similar to No 1, but narrower and taller, with a more obvious neck and slightly everted rim, giving the illusion of a sub-biconical form.

Of the other pots, the rounded jar No.3 (Fig 00, <47>) from pit [8859] is complete but split in two vertically and also laterally fractured on one side; the profile is rounded and noticeably lopsided, as if had slumped during the drying stage.

The unburnished jar No.4 (Fig 00, <42>) from pit [8841] is rounded with a short upright neck and slightly sagging base; uneven firing temperatures have resulted in a grey-brown surface with red-brown patches. The feature was dug in spits; most base and body sherds from the main fill but a few are from spits 1 to 5; those from spit 3 are mainly from the shoulder, neck and rim. Much of the base is present, along with many joining sherds that give *c* 50% of the body and the profile to the shoulder; the rim sherds do not join. Four other sherds from [8841] were also given accession number <42> but are from a different pot (fabric CHAF).

Jar No.5 (Fig 00, <10>) is represented by the base and lower body only, 19 sherds of which were found in cremation pit [8569]. Some 90% of the base is present, mainly flat but curving up slightly to the edges, but the upper body and rim are missing. The surfaces are wiped but not burnished.

One cremation was very badly damaged and spread out within dumped within layer [8543] (sample number {39}). It was presumably originally contained within the fragmented stamp-decorated jar No.6 (Fig 00, <243>), the only decorated vessel associated with this period of activity, which is represented by 51 sherds. Many of these join to form approximately half of the base, lower body and part of the rim.

Of the other jars, No.7 (Fig 00, <46>) is in fabric SSANC. Represented by 35 sherds, most of which join, it is of shouldered form with complete base (slightly convex), *c* 60% of the body and 50% of the rim. Firing is patchy, the lower body being oxidised, the upper more reduced. The former has diagonal wiping and smoothing, as if the pot was rotated and smoothed while inverted; the upper body, however, is more evenly finished.

Jar No.8 (Fig 00, <45>) is in a fine sandy fabric with frequent fine flint and sparse larger flint. It is represented by seven sherds from the base and lower body from the fill of pit [8857], which join with some of the four

sherds found in the period VI well [8853]. Together these make up just under half the lower body; the other surface is wiped but not burnished.

The remaining nine sherds (73g) are all small and from the fill [8853] of grave [8552]; most are from sieved samples but it would appear that five vessels are represented, two chaff-tempered (CHSF, CHFI) and one in a sandy fabric with organic inclusions (SSANC?). The latter is from the shoulder of a rounded jar like those used for the cremations.

Period III: mid 7th – early 8th century

The start of domestic occupation in the area is indicated by 163 sherds of Saxon pottery which represent some 67 vessels (2.844kg). In addition there are two sherds of prehistoric and four of Roman pottery; 37 sherds were recovered by sieving. By far the largest amount comprises chaff-tempered wares, which total 153 sherds (62 vessels, 2.594kg), ie *c* 94% of the sherd count, and *c* 91% of the total weight. Nine rims are present, including a jar with stamped and incised decoration. External contacts are indicated by five sherds of regional or non-local origin (fabrics MSIG, MSCALC, SSANC) and five are from two imported jars/pitchers (NFEBB, MSGWA). As a group these finds indicate a date between *c* 600/650–730 for this period, and some should be early within this bracket, perhaps derived from Period II. Three sherds, including No.19, were analysed in thin section and chemically (see below, pottery fabrics and finds discussion).

.

Open Area 3

Two small sherds of flint-tempered pottery were found in the natural [8834] and in the fill of pit [8837]. With one exception all the 31 Saxon sherds (11 ENV, 403g) are chaff-tempered. Most are small, but 13 are from a jar with linear and stamped decoration, found in pit [8850] (Fig 00, No.9; see below, fabrics and forms). Andy: did this pit cut through any earlier features? Of interest is a small sherd from a thin-walled jar with incised horizontal lines in a new fabric (MSCALC) that would appear to be from an Early Saxon jar.

Open Area 5

Most of the pottery from this period is from the grey silt layer in this area, the earliest finds being four sherds of late Roman pottery (fabrics OXRC and SOLL) from the grey silt layer ([8657], [8804]). Saxon pottery amounts to 132 sherds (56 ENV, 2.441kg), of which 125 sherds from 52 vessels are chaff-tempered (2.198kg). These include the rims of six jars (Fig 00, Nos 10-15) and two bowls (Fig 00, Nos 16, 17). Two jars have short upright rims like those of the cremation pots (No.10), while two, possibly three small jars (diameter 120mm), have slightly more everted rims with slack shoulders. A larger jar has a thicker wall and more rounded shoulder (No.11). A bowl is a sand-tempered fabric (Fig 00, No 18, SSANC) is probably of local origin, but a roughly burnished sherd with sandstone and igneous rock inclusions (MSIG) is probably from East Anglia (see below, fabric descriptions). Both the imports are from this area, comprising a sherd of NFEBB and four from a biconical jar/pitcher in MSGWA ([8555]; Fig 00, No. 19) which joins with others from Period IV, OA7 and OA9.

Period IV: early – mid-8th century

The Saxon pottery from Period IV amounts to 231 sherds (114 ENV, 4.920kg), of which 56 are from sieved samples. These include three small crucible fragments found in OA6 and OA8, which are discussed separately. In addition there are four intrusive post-medieval sherds. Chaff-tempered wares amount to 189 sherds (3.621kg), or *c* 82% by sherd count, *c* 74% by weight. This period sees an increase in the number of regional and non-local wares (23 sherds, 196g; fabrics MSIG, SGFM, SLGSA, SSANC, SSAND) and imported wares (13 sherds, 587g; fabrics BADOH, MSGWA, MSRWC, NFBWA, NFBWE, NFGWA. In terms of dating, most features appear to predate the introduction of Ipswich ware, which probably reached

Lundenwic *c* AD 730, and so probably date to AD 670–730. Five sherds of Ipswich ware were, however, found in three features (S7, OA6 and OA8) and may date them to the mid-8th century. Two sherds, including No.34, were analysed in thin section and chemically (see below, pottery fabrics and finds discussion).

Open Area 6

Including 27 sieved sherds, the Saxon pottery from this area amounts to 84 sherds (38 ENV, 2.166 Kg). Most of the 40 sherds from layer [8791] are chaff-tempered, mainly from jars, but including Also present are three joining ?base sherds of MSIG, probably from the same vessel as found in Periods III and VII, and a few tiny sieved sherds (fabric uncertain). Layer [8796] contained a single sherd of chaff-tempered ware.

Wells [8604] and [8658] each contained only two sherds of chaff-tempered ware (55g and 29g respectively) that probably date to the 7th century. Pits [8397], [8617], [8663] and [8790] together contained 22 Saxon sherds, mainly chaff-tempered (16 sherds), with four small, intrusive post-medieval sherds (9g) from upper fill of the large pit [8617]. The Saxon finds include the base of a small jar in a sand-tempered fabric, probably from Surrey (SLGSA) from pit [8617]; the vessel is burnt and partially laminated, having internal blackening and external bubbling of the surface. An internally abraded sherd of the same fabric type was found in pit [8397], which also contained part of a crucible (see crucible report). Pit [8790] contained the largest group (nine sherds, 5 ENV, 237g), including the everted rim of a small jar (Fig 00, No.21). Pit [8617] contained five Saxon sherds (77g), while the others contained one or two sherds only. Two very small sherds of chaff-tempered ware were also recovered from the spread of silty sand [8811].

The latest group in this area is from the fill of well [8536], which contained eight sherds. One of these is chaff-tempered, but three large fragments are of Ipswich ware, and should date to after AD 730. Also present are the flat base of a Badorf-ware jar or pitcher (BADOH; Fig 00, No.22) that was probably contemporary with the chaff-tempered sherd, and two crucible fragments (see crucible report).

Structure 4

Two postholes associated with the structure ([8408], [8550]) contained single small sherds of chaff-tempered ware, including the everted rim of a jar or bowl from [8550] (Fig 00, No.23).

Open Area 7

The pottery from this area amounts to 61 Saxon sherds (28 ENV, 1.374kg), of which seven are from sieved samples (28 ENV, 1.374kg). The majority are chaff-tempered (57 sherds), while one is sand-tempered and four are imported.

The two clay deposits [8405] and [8367] contained two sherds (88g) and 16 sherds (555g) of pottery respectively. Most is chaff-tempered, including the rim of a long necked jar (Fig 00, No.24), but one oxidised sherd is an import (fabric MSRWC).

Layers [8647], which sealed structure 3, contained 23 sherds (493g), of which 21 are of chaff-tempered ware (including Fig 00, Nos 25, 26) and two are from No. 19, the thick-walled biconical jar/pitcher in MSGWA noted in period III, OA5, another sherd of which was found in OA9. Layer [8627] contained a single small sherd of chaff-tempered ware.

Of the pits, [8572] contained five small sherds of chaff-tempered ware, while the secondary fill of [8803] contained seven sherds, of which six, including bowl No.27 (Fig 00) are chaff-tempered, while one is of SSAND, less reduced and with more organic matter than usual.

Open Area 8

The pottery from this area totals 65 sherds (38 ENV, 982g), of which 21 were recovered by sieving. As usual, chaff-tempered wares are the dominant type (51 sherds).

Of the cut features, pit [8524] contained one chaff-tempered sherd and one of Badorf ware (BADOH). Pit [8526] contained six sherds from six vessels, of which three, including Fig 00, No.28, are chaff-tempered, two are imports (NFBWE, NFGWA) and one may be of oxidised Ipswich ware; if so it dates the fill of the pit to after *c* 730AD. The secondary fill of well [8785] contained three sherds of chaff-tempered ware, including two large sherds from a wide-mouthed jar (Fig 00, No.29).

Some 33 sherds were recovered from layer [8362], but almost half are from sieved samples and very small. Most are chaff-tempered, including jars (Fig 00, Nos 30, 31) and a bowl (Fig 00, No.32). Five sherds, however, are from three non-local or regional sand-tempered wares: a large bowl in SSANC that is similar to No.18 (Fig 00, No.32), a jar /cooking pot in SSAND and a small sherd from the neck and shoulder of a jar with unusual stamped decoration (Fig 00, No.34). Another sherd containing igneous rock is from the Charnwood Forest area of Leicestershire (SGFM). In addition there is one sherd of North French greyware (NFBWE).

In contrast to [8362], layers [8388], [8646] and [8760] contained only small amounts of chaff-tempered ware (two, eight and seven sherds respectively); these include the rim of a small cooking pot from [8646] (Fig 00, No.35) and a small rim sherd from [8760] (not illustrated).

Open Area 9

Fifteen sherds of pottery were recovered from this area (5 ENV, 276g), of which 12 are from layer [8385]. Most are from chaff-tempered jar No.36, but one is from No.19, the biconical jar/pitcher in MSGWA that was found in OA7 and also in Period III, OA5. The fill of the linear feature [8359] contained three small sherds of chaff-tempered ware.

Structure 7

Of the three sherds of pottery (108g) from posthole [8830], one is chaff-tempered, one is of Ipswich ware and one is a rim in a shell-tempered sherd ware (Fig 00, No.37). This fabric type does not appear in *Lundenwic* until the late 8th or 9th century, and so this sherd should be intrusive.

Period V

Only 16 sherds of pottery are from deposits dated to this period, one prehistoric (4g) and 15 Saxon (11 ENV, 239g). Chaff-tempered wares dominate, with ten sherds (187g); the others comprise three sand-tempered sherds (SSAND), and two sherds of shell-tempered ware (from a sieved sample), including No.38 (Fig 00). The latter are presumed intrusive. No pottery was associated with structure S7.

Open Area 10

Three sherds of pottery (2 ENV, 30g) were recovered from this area, one from a posthole [8322] (CHAF). The two sherds from pit [8504] are both from a shell-tempered jar (Fig 00, No.38, fabric MSSE) that should date to after *c* 770.

Open Area 11

One sherd of chaff-tempered pottery was found in dumped layer [8358].

Structure 8

Posthole [8315] contained one sherds of chaff-tempered ware, while another was found, together with a sherd of prehistoric pottery, in pit [8296].

Open Area 13

One sherd of chaff-tempered pottery was found in posthole [8526], while two joining sherds of sand-tempered ware (SSAND) were found in the ash layer [8282].

Open Area 14

Only one small fragment of ceramic material was found in this area, which could equally be a piece of pottery or daub ([8279]).

Open Area 15

The pottery found in layer [8263] comprises three sherds from a thin-walled chaff-tempered jar and one from a sand-tempered cooking pot with heavy carbon deposits (SSAND).

Open Area 17

Two sherds of chaff-tempered ware were found in this area, both from thick-walled jars. One was found in layer [8144], the other in posthole [8273].

Period VI: late 8th – mid-9th century

Considerably more pottery was found in this period than in period V, with 167 Saxon sherds (125 ENV, 6.389kg), plus three Roman sherds. Chaff-tempered wares are now limited to 35 sherds (*c* 22%), 679g (*c* 11%), while the amount of Ipswich ware has increased to 80 sherds (*c* 48%), and comprises *c* 66% of the total weight (4.205kg). This ware is particularly common in OA18 and OA22; stamp-decorated pieces were found in OA19, OA21 and OA22. Regional and non-local wares amount to 16 sherds (fabrics MSFLA, MSLQA, SHGS, SLGSC, SLGSE, SLGSF, SSANB, SSANC, SSAND, SSTOL), while shell-tempered wares have increased to eight sherds. Imports total 28 sherds of Badorf-type ware, various North French reduced wares and an unsourced oxidised ware (MSRWC). Twelve sherds, including Nos 42, 44 and 53, were analysed in thin section and chemically (see below, pottery fabrics and finds discussion).

Open Area 18

Just over half the pottery from period VI deposits was found in 13 features in this area (77 sherds, 50 ENV, 2.050kg).

Pit [8293] contained two sherds of Ipswich ware, but no pottery was found in well [8262]. The clay layers [8258] and [8227] at the northern end of the site contained one sherd of Ipswich ware and four imports (BADOG, NFGWA, NFGWD, NFEBB); the latter include No.39 (Fig 00). Two sherds of pottery were recovered from layer [8265], one sand-tempered (SSAND), the other an imported jar or pitcher (NFBWF). Dumped layer [8771] contained 22 sherds (ten from sieved samples). Of these, 14 are chaff-tempered, including No.40; one is probably from Surrey (Fig 00, no.41, SLGSE), five are imported North French

greywares (NFBWB, NFGWD) and two are shell-tempered (MSSE). Layer [8788] contained two chaff-tempered sherds and one of Ipswich ware.

Of the cut features, fill [8770] of pit [8764] contained one sherd of chaff-tempered ware, while fill [8640 of pit [8641] contained one of Ipswich ware. Fill [8763] of pit [8764] contained four sherds of Ipswich ware and part of a north French redware pitcher (Fig.00, No.42). Pit [8311] contained one sherd from a jar containing limestone and quartz (MSLQA) and four sherds from three imported greyware pitchers in NFGWA and NFGWB, the latter with incised zig-zag decoration (Fig 00, No.43).

Eight sherds were recovered from the silty sand layer [8298], of which two are chaff-tempered and five are of Ipswich ware. Also present is part of a probable lamp in a sandy fabric with crudely combed decoration that may be from Surrey (Fig 00, No.44).

Well [8767] contained 11 sherds (306g), with a mix of chaff-tempered and other ware groups. The former dominate with six small sherds, while Ipswich ware, non-local (fabric SSTOL), shell-tempered (MSSE) and imported wares (NFGWB, NFGWD) are represented by one or two sherds each.

The cut for, and fill of, well [8758] contained 12 sherds of pottery (523g), four of which join with one from the Period II cremation urn No.8 (Fig 00; MSFL, <45>). Five of the others are of Ipswich ware, two are sand-tempered (SSANC, SHGS) and one is shell-tempered (MSS).

Open Area 19

In all 23 sherds of Saxon pottery were recovered from this area (19 ENV, 697g). One of these is a sherd of Ipswich ware from pit [8200], while the remainder are from pit [8187]. Six are from the primary fill [8211] (one chaff-tempered, five of Ipswich ware). Of the upper fills, [8186] contained five sherds, while [8169] contained one sherd of Roman pottery and 13 of Saxon date. Taken together, four of these sherds are chaff-tempered sherds and eight are of Ipswich ware, including No.45 (Fig 00) and part of a large stamp-decorated pitcher (Fig 00, No.46). Four sherds are from jars in SLGSF (Fig 00, No.47), and one is of Badorf ware (BADOH).

Open Area 20

Of the 12 sherds of recovered from this area, 11 are Saxon (12 ENV, 415g) and one is Roman. The latter was found in the clayey silt layer [8213]/[8214]/[8215] which contained one sherd of Ipswich ware, and four imported sherds: part of a Badorf ware amphora (Fig 00, No.48) and two pitchers from northern France/Belgium (NFBWE, NFEBB). Layer [8154]/[8166] contained one chaff-tempered sherd and five of Ipswich ware, while one chaff-tempered sherd was found in pit [8246]

Open Area 21

Thirteen sherds of pottery (12 ENV, 1.197kg) were found in this area. Of the shallow pits, [8210] and [8195] contained part of an Ipswich ware jar (Fig 00, No. 49, and one of an unsourced oxidised ware (MSRWC) respectively. The larger pit [8219] contained seven sherds, six of which are of Ipswich ware, two from the primary fill [8218], and four, including two stamp-decorated pitchers (Fig 00, Nos 50, 51), from the secondary fill which also contained a small sherd of chaff-tempered ware. The linear cut [8113/8395=8114/8395] contained one sherd of chaff-tempered ware (Fig 00, No.52) and two of Ipswich ware.

Open Area 22

Rather more pottery was found in OA22, with 43 Saxon sherds (33 ENV, 2.030kg) and one sherd of Roman date. Seven sherds are from layer [8154], of which one is chaff-tempered, four are of Ipswich ware, one is

shell-tempered and one is a North French greyware (Fig 00, No.53). Pit [8245] contained one sherd of Badorf ware (BADOH), while rubbish pit [8173] contained nine sherds of Ipswich ware, one with stamped decoration (Fig 00, No. 54). Another stamped sherd was found in the primary fill of pit [8203] (Fig 00, No.55), which contained nine sherds, one chaff-tempered, six of Ipswich ware, one shell-tempered and one sand-tempered (SSANB). The secondary fill [8201] also contained Ipswich and shell-tempered wares (two sherds of each). The 12 sherds from dumped layer [8155] comprise one chaff-tempered, eight of Ipswich ware, one of north French greyware (NFBWE) and two of Badorf-type ware (BADOH).

Period VII

The 14 sherds (eight vessels, 179g) from OA23 include two residual chaff-tempered sherds found in pit [8593]. Layer [8130] contained two sherds of Ipswich ware and two shell-tempered (MSSC). One sherd of igneous rock-tempered ware was found in layer [8090] (MSIG). (check 8090 in correct period)

Period VIII

Fifteen residual sherds were recovered from this area (13 ENV, 534g), of which five sherds were found in drain [8753]. Four of these are chaff-tempered, including a bowl (Fig 00, No.56), while one is of fabric SSANB (Fig 00, No.57). Seven sherds are from the western brick wall [8080] of building B1; five are chaff-tempered and two are of Ipswich ware. A strap handle from an Ipswich ware pitcher was found in the construction cut for wall [8030] (Building 1/2? check [8865]/[8198]), while a sherd of chaff-tempered ware was found in construction cut [8126] (fill [8127]). The only import is a sherd of North French greyware (NFBWB) from layer [8574].

Period XIII

20 residual sherds of Saxon pottery were recovered from the latest post-medieval levels (14 ENV, 399g), of which ten are from construction cuts [8135] and [8238]. Taken as a single group, chaff-tempered wares dominate, with 13 sherds (including Fig 00, Nos 58, 59, 60), while four sherds are of Ipswich ware. The remainder include a tiny sherd of sand-tempered ware (SLGS type) and two sherds of North French greyware.

Appendix I – The Iron

Lyn Blackmore

Introduction

There are 34 fragments of iron (24 objects), of which 20 are from Saxon deposits, some of which are from not only inhumation burials but also cremations. All were accessioned and listed by material and object type in an Excel spreadsheet. Some items were cleaned or investigated by Antonia Craster of AOC Scotland in order to determine their shape, and notes of conservation treatment form part of the finds archive. Few mineralised organics were detected. The finds are catalogued by function; within this they are ordered by period and landuse, and then by accession number.

Period II: mid 6th – mid 7th century

Of the seven finds from period II, three are from the cremation pit [8828], while the others are from grave [8699]. The former comprise two tack-like fragments, possibly burnt wire (<118>, Fig 00, No.1) and two strips, apparently from the same object (<127>, <129>; Fig 00, Nos 2a, 2b). The three items from the grave comprise part of a chain-like object (<20>, Fig 00, No.3), a complete knife blade with tang (<69>, Fig 00, No.4), and small fragments from two objects of uncertain function, but both narrow strips and possibly associated with <20> (<121>, <125>, Fig 00, Nos 5, 6). The first two were found under the left arm at hip level, while <121> and <125> are very probably from the same group.

Period III: mid 7th – early 8th century

The two iron objects from this period were both found in the ash layer [8505]. They comprise a possible key (<130>, Fig 00, No.7) and a pair of mounts (<137>, Fig 00, No.8).

Period IV: early - mid 8th century

Two of the iron objects from this period are from layers [8362] and [8646] in OA8. The former (<122>) is small length of curved strip, but the latter (<135>, Fig 00, No.9) is a robust object of uncertain function. A complete nail and the probable shank of a smaller nail (<138>) were found in layer [8398], associated with structure S6.

Period VI: late 8th – mid 9th century

Four objects were recovered from five contexts in OA18, while two were found in OA19. The former comprise rove <237>, nail head <128>, rod-like object <123> and miscellaneous fragments <126>. The latter comprise nail head <131> and an awl, <134> (Fig 00, No.10), from fill [8169] of rubbish pit [8187].

Period VIII

Three rod-like fragments, possibly from a structural fitting (<139>) and a fragment of sheet metal <133> were found in layer [874].

Period XIII

Two objects were associated with building B1/2. The first is a bar/rod (<136>) found in the fill of drain [8577]. The second is a tack (<124>) from pit [8622].

Catalogue of Saxon finds

Awl

Awl from <134> (Fig 00, No.10) from Period VI is very similar in shape and size to the smaller examples of square or rounded cross section that were used for leatherworking at Coppergate, which range between 32m and 61mm in length (Ottaway 1992, 554, fig 222, no.2729).

<134>, rubbish pit [8187], fill [8169], Period VI, OA19 (Fig 00, No.10)

Complete awl with arms of diamond-shaped cross-section, tapering to a slightly rounded, pointed tip. Length 63mm, arm 8 x 8mm. Weight 19g (including corrosion products).

Chain/girdle group?

The various rings making up <20> were found with <69>, and probably with <121> and <125>, under the left arm at hip level and probably formed part of a chain or early form of chatelaine, a collection of personal and domestic items suspended from the girdle, usually on the left side (Cook 1985, 92–3). The date of <20> is problematic as the 6th-century fashion was for non-functional girdle hangers of copper alloy, and it was not until the 7th century that longer, more complex but less decorative combinations of functional iron objects became popular; the peak of the tradition was in the late 7th century and possibly the early 8th century (Lethbridge 1931, 83; Cooke 1985, 92; Geake 1997, 57–8). A 6th-century example has, however, been found at Dover Buckland in a grave dated to between AD 525–575 which also contained a shield-on-tongue buckle and shoe-shaped rivets (Geake 1997, 57–8)). Iron rings were also used in combination with other items, and grave 44 at Portway, Andover, had four or five of different sizes, one *c* 40mm in diameter (Cook 1985, 35–6, 93, fig 60). As for the copper alloy terret <17> that was also found in grave [8699], it is possible that these rings had an amuletic and/or symbolic function (Meaney 1981, 174–8; Geake 1997, 58).

<20>, grave [8699], fill [8701]; Period II, OA2 (Fig 00, No.3) ?publish X-ray

Five fragments from a complex iron object, of which the two most robust were cleaned; traces of organic matter and bone were noted on several elements. The largest is a ring with butt joint (diameter *c* 40mm, thickness 7mm), on which are at least two smaller rings, also butt jointed (diameter 27mm, thickness 4–5mm). The corrosion is such that it is impossible to tell (without further X-ray) whether there are any further rings. A loose ring, probably also butt jointed, has a diameter of 40mm but a noticeably flatter section than the first (width of ring 6mm, thickness 4mm, carinated edge). A third, very fragile fragment was not cleaned and has to some extent disintegrated, making it difficult to match up the remaining piece with the X-ray. It comprises a ring *c* 25mm in diameter (thickness 3mm), with at least one straight rod looped around it; two other straight rods-like objects could be parts of the same or different pieces. It is unclear whether they are attached to the ring or not, and also whether the longer piece is part of a larger object (possibly with a corkscrew twist for *c* 27mm of the 43mm length) or adjacent to a chain made up of five or six links with a diameter (from X-ray) of *c* 15mm (width of ring c 3mm, thickness up to 1.5mm). Two other pieces appear to be from one or two thin rings that appear to have a cross bar (diameter of the larger *c* 40mm, width 3mm, thickness *c* 1.5mm). The fifth piece comprises another small ring (diameter again *c* 25mm) from which other items project.

Chatelaine/key?

Object <130> may be part of a key or chatelaine component. The former would have a loop at the suspension end, while the latter can be looped at both ends). Similar rods are known from Mill Hill Deal

(Brugmann 1997, fig 53f) and Dover Buckland (Evison 1987, fig 7, no.6.5; fig 8, no.9.2a; fig 54, no.132a–e), amongst other sites.

<130>, layer [8505]; Period III, OA5 (Fig 00, No.7)

Rod with square to rectangular section, slightly bent; asymmetrically looped terminal, broken at the other end. Extant length 55mm, width 4mm, thickness 3–4mm. Weight 11g (including corrosion).

Knife

The most readily identifiable iron object from grave [8699] is small angle-backed knife (<69>, originally recorded as <64>; Fig 00, No.4) of Böhner's type C, dated to the 7th century (Böhner 1958), and Evison's group 5, which she dated to after AD 575 (Evison 1987, 113, text fig 22). For Castledyke, angle-backed knives were classed as type E (Drinkhall and Foreman 1998, 279–80); although mainly of 7th-century date, one was dated to the late 5th/6th century, while two were dated to the 6th century (ibid, 281). According Härke's study of blade length and width of Anglo-Saxon knives, three size ranges (Groups 1–3) can be defined; knife <69> falls into Group 1, which includes small blades with a length of 40–99mm and a width of 8–22m (Härke 1989, 144; 1992, 91–2). It has been suggested that blade size is a better indicator of date than form (Härke 1989, 145; 1992, 91–2; Drinkhall and Foreman 1998, 281), with small blades being most common in the 6th century (Härke 1989, 145). Blade size can, however, also reflect age and gender. While small knives do occur in male graves, they are generally found with women and children; large knives, by contrast, are confined to male burials (Härke 1989, 146–7; Drinkhall and Foreman 1998, 282). Other studies suggest that it was more common for women to be buried with knives than men (ibid, 282). Most knives were worn on the left side, either by the waist of hip, although they can be centrally placed; orientation varies considerably (ibid, 282–3; Cook 1985, 93; Evison 1987, 115). The position of <69> fits with the normal pattern and suggests that it may have been inside the sleeve.

<69>, grave [8699], fill [8701]; Period II, OA2 (Fig 00, No.4)

Small angle-backed knife (complete but in two pieces) with centrally placed tang, sloping shoulder to the back and concave choil. Rear part of back angled upwards, straight cutting edge angled upwards towards the tip. Total length 107mm. Length of tang 25mm; length of blade 82mm, maximum width 14mm, thickness of back *c* 2mm. Weight 9g,

Hinge/mount

Ash layer [8505] contained one end of a straight-sided strip or bar, pierced by two short iron nails set *c* 8mm apart, each with large sub-rounded heads and a sub-rectangular rove (Fig 00, No.8); the tip of the surviving shank is burred. Although it is uncertain which side was originally uppermost, the overall construction is typical of a clench bolt, used for joining two layers of wood (Ottaway 1992, 615–8). These, however, are much longer; similar clench bolts from Fishergate have an overall length of 30–50mm, giving a wood thickness range of *c* 10–40mm (Rogers 1993, 1412). For <137>, however, even allowing for some distortion and compression in the ground, the overall thickness of the wood cannot have been more than *c* 10mm. This is rather thin for a structural fitting, even if a scarf joint was used (Ottaway 1992, fig 257), but might be appropriate for a box, where rove-like mounts might have served as decorative features on a strap hinge (ibid, 623–5; fig 262).

<137> layer [8505]; Period III, OA5 (Fig 00, No.8)

End(?) of a thin bar-like object (extent length 48mm, width *c* 41mm, thickness *c* 1mm) pierced by two short iron nails with large sub-rounded heads (diameter *c* 13 x 15mm, thickness *c* 3mm; length of shank *c* 12mm) each with a sub-rectangular rove (28 x 30mm, 22 x 30mm) aligned obliquely to the lower plate.

Nails and roves

<138a>, <138b>, layer [8398]; Period IV, structure S6

Complete nail with large head (<138a>; length 60mm, diameter of head 23mm). Weight 34g. Also a narrower rod-like object, probably the shank of a smaller nail (<138b>; length 27mm, diameter 30mm tapering to 20mm); weight 2g.

<128> pit [8293], fill [8282]; Period VI, OA18

Nail head(?), oval; diameter 20 x 22mm; weight 5g.

<131> Rubbish pit [8187], fill [8169]; Period VI, OA19

Possible nail shank with tapering circular section; extant length 38m, diameter 9mm tapering to 5mm. Weight 12g (including corrosion products).

<237> well [8767], fill [8766]; Period VI, OA18

Complete lozenge-shaped rove in corrosion products. Length (from X-ray) *c* 55mm, width *c* 30mm; central perforation *c* 10mm in diameter. Weight 32g (including corrosion products).

Rods and strips

<127>, <129> fill [8829] of cremation pit [8828]; Period II, OA2 (Fig 00, Nos 2a, 2b)

Two flat strips of iron, non-joining but probably from the same object. No.2a, (<127>) appears to have one finished edge, while No.2b (<129>) is broken at both ends. Length of <127> 28mm, width 8mm at the slightly rounded end, 7mm at the broken end; length of <129> 52mm, width 7mm. Thickness of both *c* 1.5mm. Weights 2g and 12g respectively, (including corrosion products).

<121>, grave [8699], fill [8701]; Period II, OA2 (Fig 00, No.5)

Length of flat strip (two joining fragments), slightly curving under at one end; both ends broken. Extant length 31m, width 7mm, thickness *c* 3mm. Weight 2g.

<125>, grave [8699], fill [8701]; Period II, OA2 (Fig 00, No.6)

Narrow, slightly tapering strip (two joining fragments). Extant length 22mm, width *c* 5mm at the wider, broken end, 3mm at the terminal; thickness 1–2mm. Weight <1g.

<122>, layer [8362]; Period IV, OA8

Strip, probably with right-angled return. Dimensions at exposed end 10 x 4mm, the remainder hidden in corrosion products; estimated length *c* 17mm, return *c* 10mm. Weight 3g.

<123>, layer [8269]; Period VI, OA18

Two joining length from a rod-like object of sub-rectangular section, possibly part of a key. Extant length 56mm, width 7mm, thickness 6mm; weight 7g (including corrosion products).

Tool?

An incomplete bar-like object from Period IV (<135> Fig 00, No.9) is problematic as it could have a number of functions, although the split and distorted ends are perhaps easier to reconcile with an object that has been struck than rotated.

The first possibility is that it is part of a tangless punch. However, although appearing to have a flat, burred head, the shaft is rather long and slender, as punches are usually more robust and shorter (Ottaway 1992, 516–7, fig 197; Rogers 1993, 1239–42). Others from Lundenwic measure between 57mm and 122mm (Blackmore 2003, 253), while the largest illustrated example from Coppergate is 140mm (ibid, no.2208). An example of 180mm was, however, found at Tattershall Thorpe (Hinton 2000, fig 20, no.9). On that find the tip is a square-sectioned pointed, but on <135> it must have been rectangular, as on a chisel.

Object <135> also has elements in common with 8th- to 11th-century spoon augers, which can be over 320mm in length (Rogers 1993, 1244). The damage to <135>, which is laminated at both ends, and split and distorted at the thicker end, could easily have been caused in the drilling process, resulting in the shank splitting and the tang and blade snapping off. Most augers have a flat spatulate or lanceolate tang that tapers to the tip (Arwidsson and Berg 1982, pl.28; Ottaway 1992, 532–5, fig 208, Nos 2261, 2262; Rogers 1993, 1243–4; Morris 2000, 2112–4; fig 981). In some cases, however, the shank simply tapers and merges with the tang (cf ibid, no.2266). If <135> is an auger, it would appear to be of the latter type (Coppergate no.2266 also has a partly rectangular section). The apparently flattened burred end would thus be broken above the blade, as seen on the square-sectioned auger no.2261 from Coppergate (Ottaway 1992, fig 208; Morris 2000, fig 981). The Coppergate finds are straight-sided but taper slightly in thickness towards the tang, but X-ray of <135> suggests that although the width tapers slightly, the thickness does not. The two possible examples from Shorts Gardens are also atypical (Blackmore in prep), while that from the Royal Opera House is of uncertain form (Blackmore 2003, 254). At least three Anglo-Saxon augers were found at Flixborough (Loveluck 1998, 156–7, fig 8A), while three have been found in 8th- to 9th-century contexts at Fishergate (Rogers 1993, 1243–5). Finds from 9th-century and later contexts are more common (Ottaway 1992, 533–5; Rogers 1993, 1243–44; Morris 2000, 2112). Continental findspots include Dorestad (van Es and Verwers 1980, 176–7; fig 128) and Mästermyr, Sweden (Arwidsson and Berg 1983, 34–5, pl.28).

A third interpretation for <135> is that it is the stem of a key, the loop or bow and projecting ward(s) of which have snapped off. The burred end might argue against it being a slide key (cf Ottaway 1992, fig 289, no.3656; Rogers 1993, figs 696–7, no.5237), but might fit with a solid stem key. An example of the later from Coppergate is of broadly comparable length, measuring 194mm (Ottaway 1992, fig 286, no.3618).

<135>, layer [8646]; Period IV, OA8 (Fig 00, No.9)

Tool or key fragment. Extant length 138mm, head *c* 17 x 11–14mm. Stem/shank *c* 11 x 5mm at the burred and laminated, wider end, *c* 7 x 6mm at the laminated narrower end. Weight 67g (including corrosion).

Wire?

<118>, fill [8829] of cremation pit [8828]; Period II, OA2 (Fig 00, No.1)

Two heat-altered fragments of possible wire, one with rounded ‘head’ (length 14mm, diameter 2mm; diameter of ‘head’ 5mm), the other more amorphous (length 11mm). Weight 1g.

Unidentified

<126>, layer [8771]; Period VI, OA18

Two small fragments, mainly corrosion products, possibly from a mount or nail head (maximum dimensions 20 x 10 x 7mm). Weight 2g.

The post-medieval finds

Four iron objects (two each from Periods VIII and XIII) and one composite iron and bone knife are of post-medieval date; the latter is noted in the worked bone report.

Structural fittings?

Three fragments from one or more long rod-like objects were found in Period VIII, layer [8574] (<139>). Of the two straight fragments, the longer has a rectangular cross-section (length 165mm, width *c* 12mm, thickness *c* 9mm), while the shorter appears to have a section *c* 9-10mm square (length 100mm). The third piece has a right-angled return, with a short broad arm (outer length 30mm, inner length 20mm; width *c* 25mm, thickness *c* 9mm), that tapers towards the angle. The longer arm (length *c* 87mm) continues to taper, both in thickness and width, towards the end; this is obscured by corrosion but appears to measure *c* 8mm x 5mm. The same context contained a sub-triangular fragment of sheet metal (<133>).

A similar bar/rod-like object found in the Period XIII drain [8577] (<136>, length *c* 140mm) is covered in corrosion but appears to have a rectangular section at one end (c 20 x 10m) and a rounded section at the other (diameter *c* 15mm). A small tack was found in fill [8621] of the Period XIII pit [8622] (length 14mm, diameter of head 5mm).

Appendix J – The Ceramic Loomweights

Lyn Blackmore

Introduction

Loomweights were used on a vertical loom to maintain the correct tension of the warp threads (Walton-Rogers 1997, 1753; Leahy 2003, 66–8; see discussion, craft and industry). They have been found on numerous sites across *Lundenwic*, some of which are listed in Table 1, with evidence for several looms (Malcolm et al 2003, 85, 169, figs 75, 77, 136; Goffin 2003, 220; Leary 2004, 11). The present collection amounts to 76 fragments from 64 weights (14.039kg), found in 30 contexts (25 features). All the finds were examined and quantified by weight, overall diameter, diameter of central hole, radius of ring, height and percentage of the approximate circumference present. The forms were recorded as annular (ANN), bun-shaped (BUN), disc-shaped (DISC) or intermediate (INT), with letter codes to describe the profile. These are: U (broad with flattened upper and lower faces, usually annular); D (narrower, one flattened face, the other rounded; usually intermediate or bun-shaped forms); C (rounded profile, usually intermediate or bun-shaped forms). These abbreviations are used in the following report. Some weights have a combination of features, in which case the dominant feature was used for the classification, while some fragments are too small to assign to a group at all. The data was recorded on an Excel file, and can be consulted in the site archive. The illustrated finds are numbered according to their stratigraphic location and form.

Site	Sitecode	Fragments	ENL	Kg	Reference
Lyceum Theatre	ERT95	24	16	3.103	Jarrett 2004, 54-6
21–22 Maiden Lane	MAI86	37	31	3.891	Blackmore 1988, 114
Chandos Place, Bedfordbury	PEA87	74	-	7.925	Williams 1989, 109
2–26 Short's Gardens	SGA89	87	-	7.944	Keily in prep
Floral Street	FLR00	32	-	9.460	Blackmore in prep
55–57 Drury Lane	DRY90	75	-	11.014	Keily in prep
Jubilee Hall	JUB85	66	-	11.44	Blackmore 1988, 111–2
28–31 James Street	JES99	54	-	17.35	Riddler 2004, 19–22
Royal Opera House	ROP95	1024	-	157.4	Goffin 2003, 216

Table 1 Comparative loomweight assemblages from Lundenwic, with estimated number of loomweights (ENL) where known

Distribution

The broad distribution of the loomweights is outlined in Tables 2 and 3. The following adds a little more detail in order to put the finds in context. None were associated with a loom or a building, and only one small fragment was associated with a structure (period III, S1, [8686], <210>).

Period III

Six fragments were recovered from Period III contexts; these are in fabrics 1a, 1c and 3. Four fragments, including one from an annular weight and another from an intermediate weight, were found in the sandy silt

in OA5 ([8656], [8657], while one fragment was found in structure S1. The sixth example, of uncertain form, was found in pit [8680] in OA3, is very battered (<101>, see above, forms).

Period IV

There is a dramatic increase in the number of weights found in period IV, with up to 26 examples (34 fragments, 6.024kg). These are mainly from OA6, where 12, including <37> with finger impressions (Fig xx, No.1), were found in the primary fill [8747] of pit [8790] and one in an upper fill ([8737]). Two others, including <53>/<88> with impressed marks (Fig xx, No.2) are from pit [8604]. Two weights are from OA7, with single fragments from the fills of pits [8572] and [8803]. Twelve fragments of ten weights (2.811kg) were found in OA8, with three in pit [8526] and seven, including the bun-shaped weight <32> were found in well [8575] (Fig xx, No.3). As a whole, intermediate weights are just slightly more common than annular examples in this period, which sees the first appearance of the disc-shaped weights.

Period V

Only two weights were found in period V contexts. That from pit [8504] in OA10 is annular, while that from the silty sand in OA22 ([8155]) is bun-shaped.

Period VI

The 24 loomweights from this period were found in five different open areas, although 21 of the 28 fragments are from OA18 (17 weights, 3.957kg). Most of these are from pit fills, with seven fragments from six loomweights, including <68> and <72>/<73> (Fig xx, Nos 4, 6) in pit [8311] (1.234kg). Pits [8764] and [8293] each contained fragments from one and three respectively. One loomweight was found in the robbed well [8262], while two, including <48> (Fig xx, No.5) were found in well [8767]. The four remaining loomweight fragments were found in layer [8711]. Few weights were represented in the remaining areas, with only one fragment from clay layer [8247] in OA20, two loomweight fragments from pit [8187] in OA19, two from pit [8219] in OA21, and one each from pits [8173] and [8203] in OA22; the greatest weight in any of these areas is 650g (OA21). Taking the finds as one group, annular weights are now the least common type (two examples), while intermediate forms dominate (11 examples); bun-shaped and disc-shaped weights are more common (five and three examples respectively).

Periods VIII and XIII

These loomweight fragments are all residual and are not considered in detail, but they include two examples of note from period VIII, context [8573], one with comb-stamped decoration <103> (Fig xx, No.7), the best example of a disc-shaped weight <105> (Fig xx, No.7) and an atypical bun-shaped weight Fig xx, No.9, see above, forms).

Fabrics

Loomweight fabrics found in *Lundenwic* have been discussed in a number of reports. The first classifications attempted to distinguish between weights made principally of London Clay or brickearth, although there is a considerable merging of the different fabrics (Blackmore 1988, 111; Williams 1989, 107-8). The system was modified for the Royal Opera House (Goffin 2003, 216) and again for the finds from Floral Street and other sites in *Lundenwic* (Blackmore in prep; Keily in prep), resulting in four main fabric groups, with sub-types. Some of these are discussed below (Table 2); fabrics 2 (flint-tempered) and 4 (chaff-tempered), however, are rare in, or absent from this collection. Fabrics 1a and 1c are visually very similar, with a groundmass that contains abundant quartz and moderate muscovite silt up to 0.1mm across. All are low-fired with a light brown surfaces and margins and a dark grey core. (Vince 2007).

It would seem that almost all loomweights found in the settlement are made from the local brickearth (Goffin 2003, 216; Leary 2004, 3; Vince 2007) with the addition of, variable quantities of flint, quartz sand, organic materials, chalk, shell, bone or other calcareous material, mixed with varying degrees of efficiency. As the inclusion of domestic rubbish might point to production within the settlement, a few samples were analysed using ICPS in order to compare them with the pottery fabrics. This showed that Fabric 3 is chemically different from Fabrics 1a/1b and 1c, which are visually and chemically alike. Although visually similar, the clay source of the loomweights differs from that of the chaff-tempered and other local or regional wares (ibid; see discussion, pottery supply).

Fabric	Period						
	III	IV	V	VI	VIII	XIII	Total
1a	3/3/348	8/7/716	2/2/529	13/10/2712			26/22/4305
1c	2/2/170	13/11/3103		13/12/2550	1/1/279	2/2/421	31/28/6523
2		2/1/567					2/1/567
3	1/1/154	11/7/1638		2/2/588	3/3/699		17/13/3079
Total	6/6/672	34/26/6024	2/2/529	28/24/5850	4/4/978	2/2/421	76/64/14474

Table 2 The distribution of the weights by fabric type and period, showing number of fragments/estimated number of examples/weight in grams

Fabric 1a/1b. This is a fine micaceous fabric with some organic matter, visible as fine streaks and voids and sometimes as plant stem and woody fragments, the latter particularly visible in bun-shaped weights <29> and <48> (Fig xx, No.5), both from well [8767]). The clay matrix contains abundant very fine sand (up to 0.1mm) with moderate/abundant coarser rounded grains up to 1mm, although mainly under 0.5mm. Also present in some weights are scattered quartz grains up to *c* 10mm across and scattered flint inclusions ranging between 1mm and 30mm. These weights are usually oxidised with smooth surfaces, although some are partly reduced; weight <29> seems to have a paler coloured clay coating the sides of the central hole. Fabric 1a now also includes the former fabric 1b (Blackmore 1988, 111), a finer, harder fabric with less inclusions, as the division between the two is in many cases very difficult to determine. Three samples were analysed chemically (Vince 2007, samples V4611, V4612, V4631).

Fabric 1c. This group, which now includes the former fabric 1d (Blackmore 1988, 111), is similar to, but coarser than, Fabric 1a/1b. It contains abundant very fine quartz sand with moderate evenly sorted larger grains (*c* 0.2mm) and sparser rounded grains up to 1mm across. Also present are occasional larger quartz pebbles up to 5mm and sparse flint ranging from finely crushed to large rounded pebbles up to 25–30mm across, the latter seen in larger intermediate weights such as the comb-stamped weight <103> (Fig xx, No.7), <30> ([8247]), <55> ([8217]) and <57> ([8247]). The surfaces of these weights are usually unwiped and feel rough to the touch. The textural difference between fabrics 1a and 1c can be compared to that between the medieval fabrics London-type ware and coarse London-type ware, and weights <30> and <74> (both [8310], INTU) also have sparse calcareous matter, a feature that is also noted in some coarse London-type wares (LCOAR CALC). Weight <95> ([8527], INTC) includes thin flakes of bluish-white material up to 10mm across that are probably from the outer surface of animal bones (A Pipe pers comm). Annular weights in this fabric include <37>, which has an impression (Fig xx, No.1) and <72>/<73> (Fig xx, No 4). The bun-shaped forms include the crudely formed weight <32> (Fig xx, No 3) and <54> (Fig xx, No.9) while <68> is a rare example of a disc-shaped weight in a non-calcareous fabric (Fig xx, No 6). One sample was analysed chemically (Vince 2007, sample V4614).

Fabrics 2a/2b. These two fabrics are now combined. They are characterised by the use of a much coarser brickearth clay with abundant evenly sorted quartz sand *c* 0.3mm across and more abundant flint (ranging from fine to coarse) giving an abrasive surface. The one example recorded in the present assemblage is <53>/<88> (Fig xx, No 2, [8613]).

Fabric 3. This group is distinguished by the presence of calcareous inclusions ranging from 0.5m to 15mm across. The clay matrix appears to be the same as that of 1c, with sparse to moderate fine flint (up to 5mm), and occasional fragments of flint and quartz pebbles up to 15mm and 10mm respectively. Weight <63> ([8310]) also contains a rounded fragment of quartzitic sandstone, while several (notably from [8573]) have elongated voids up to 20mm long and 6mm wide. The nature of the calcareous content is uncertain, but the larger inclusions mainly have a crumbly texture. In some cases the calcareous matter contains quartz sand, eg (<77> ([8771], DISC) and in one period III weight (<209>, [8657], ANN) it is hard enough to resemble grog or possibly a slag-like material. One sample was analysed chemically (Vince 2007, sample V4613).

Most weights in fabric 3 are of disc form, eg <105> (Fig xx, No.8), although some are of intermediate and possibly annular form (see below). This fabric is generally rare in *Lundenwic*, and six of the 14 examples from the present site were clustered in pit [8790], while four are residual in a period VIII context. Single examples were noted at the Peabody site (Williams 1989, 108) and the Royal Opera House (Goffin 2003, 216). Others have been found at Floral Street (sitecode FLR00), Shorts Gardens (SGA89), Bruce House (BRU92) and Southampton Street (SOT89; Blackmore in prep; Keily in prep).

Forms

Most weights fall into three main categories, as summarised in elsewhere (Hurst 1959; Blackmore 1988; Williams 1989; Goffin 2003; Leahy 2003, 70–1) and below (Table 3). In terms of dating, it has long been accepted that there is a progression from the Early Saxon annular form to bun-shaped and biconical weights (Wheeler 1935, 154–6; Hurst 1959, 23–5; Blackmore 1988, 112; Hamerow 1993, 66). It should, however, be stressed that most weights are asymmetrical, so that the classification of fragments should be treated with caution, and that different types were used concurrently (Goffin 2003, 218; Jarrett 2005, 63). The illustrated examples are listed in Table 4.

Form	Period						
	III	IV	V	VI	VIII	XIII	Total
Annular	1	5	1	2	0	0	9
Intermediate: C	1	6	0	4	0	0	11
Intermediate: D	0	3	0	5	1	0	9
Intermediate: U	0	3	0	2	0	1	6
Bun-shaped	1	3	1	5	0	1	11
Disc?	0	2	0	3	3	0	8
Unknown	3	4	0	3	0	0	10
Total	6	26	2	24	4	2	64

Table 3 The distribution of the weights by period and form type

Annular weights are usually associated with the Early Saxon period. They are defined by a central hole that is greater than the width of the ring itself and the height is usually the more or less the same as the radius, giving a flattened profile. The ten examples all have a 'D'-shaped section. They include two period IV weights with possible brand marks (<37>, <53>/<88>, Fig xx, Nos 1, 2; see below) and <72>/<73> (Fig.xx, No.4). Two atypical examples are placed with the bun-shaped forms.

Bun-shaped weights are here taken to be taller and generally smaller in diameter than the above, with a height that is more or less the same as, or greater than, the radius (49–66mm in this collection); the profile is rounded or sub-biconical. In Wheeler's classification the illustrated bun-shaped example was noticeably thicker than the annular ring, with a much smaller central hole (Wheeler 1935, fig 31). Those illustrated by Hurst, however, appear rather squatter (Hurst 1959, fig 6) and this has perhaps led to some such weights being classified as bun-shaped instead of intermediate forms (Riddler 2004, figs 21.5, 21.5). The taller forms have elsewhere been described as tall D-shaped intermediate weights (Goffin 2003, 218; fig 152, L584). Here they are grouped with the bun-shaped forms, although several examples have holes that are roughly equal to the radius and rather large in proportion to the size of the weight, eg <61> ([8155]; fabric 1a), <98> ([8801]; fabric 1a). Indeed, weights <54> (Fig.xx, No.9) and <29> ([8766]; fabric 1a) are technically annular as the diameter of the central hole exceeds the radii of the rings (*c* 33–40mm and *c* 37–39mm respectively), but their heights of 59mm and 60mm and profiles are otherwise more consistent with those of the bun-shaped, rather than the intermediate weights. The 10 weights assigned to this category also include the crudely formed <32> (Fig.xx, No.3; [8778], fabric 1c) and <48>, the smallest weight from the site (Fig xx, No.5), which has a diameter of 94mm.

Intermediate weights fall between the annular and bun-shaped weights (Hurst 1959, 23–5), and are listed in Table 2 by their profile; they are generally squatter than the bun-shaped forms, with holes that are smaller than the radius of the ring. The category also includes some fragments that are too small to classify with certainty, such as weight <51> from period 3 ([8656]; fabric 1a), which may well have been of annular form. Examples include the comb-stamped weight <103> (Fig.xx, No.7; [8573]), a near complete weight with C-shaped profile (<94>/<95>/<97>, [8525]), a large asymmetrical weight with D-shaped profile and radius of 42–54mm (<64>, [8525]) and another with U-shaped profile ([8747] <22>/<86>).

Biconical weights are not represented on this site, and although one appears to be biconical on one side, the other is quite rounded, and so it is grouped with the intermediate forms ([8217] <55>).

Disc-shaped weights are a new category, comprising up to eight flattened intermediate weights, up to seven of which are in the calcareous fabric 3. These generally have a broad flat base with rounded edge and flat, sloping or slightly rounded upper surface, eg <68> (Fig xx, No.6), <24> ([8747], fabric 3) and <105> (Fig xx, No.8) respectively. The height is usually *c* 10mm less than the radius, which for the present examples mostly ranges between 50mm and 60+mm. The three weights from [8573] (<102>, <104>, <105>) have radii of *c* 54-56mm with heights of *c* 34–37mm. Those from [8747] comprise one with a radius of 51–59+mm (<25>/<91>, extant height 34mm) and a battered weight with radius of 54mm and height of 40mm (<24>). The smallest and probably the most asymmetrical example is <68> (Fig xx, No.6), which has a radius of 33–50mm and height of 31mm. This weight does not appear to be damaged, but the surface is abraded and a broken edge could conceivably have been smoothed off in antiquity.

Uncertain weights of indeterminate form include part of large, battered weight, <101> ([8680], fabric 1a), of which only the upper outer edge survives. The weight is too tall to classify with the disc-shaped forms, and although it could originally have been bun-shaped, insufficient survives to be sure of this. The closest parallel for the surviving fragment is a find from Bedfordbury (Williams 1989, fig 36.129).

Manufacture

There are no complete weights, but two are near complete: <48>, found in well [8767] (Fig xx, No.5, [8766]) and <28>/<76>, from pit [8764] ([8763], INTC). Several others are *c* 40-50% complete. As the width of the ring varies from side to side it is difficult to be precise when measuring small pieces. Some 38–40 weights, however, are between 120mm and 140mm in diameter, with a least 16 examples at *c* 140mm, nine or ten at *c* 120mm and 11 at *c* 130mm. This fits with other sites in Lundenwic (Goffin 2003, 221; Jarrett 2004, 56; Riddler 2004, 21) and the London area (Blackmore in prep), and with the national pattern (eg at Mucking;

Hamerow 1993, 66-68). The smallest weight is <48> (diameter 95mm), while four weights appear to have diameters of *c* 100mm <50> [8626], INTU; <29> [8766], BUN; <85> [8747] and <99> [8656] form uncertain). At the other end of the scale, six of the disc-shaped weights in fabric 3 are between 150–160m in diameter. None of the weights are unfired, but <66> ([8292], INT; fabric 1a) is very soft and barely fired.

In making the loomweights the main concern was that the weight and proportions were fit for purpose, with appearance being a secondary consideration (Keily in prep). From the more complete examples, it would seem that the majority in the present collection were originally between 600g and 800g, in keeping with other contemporary sites (Goffin 2003, 220; Riddler 2004, 21; see finds discussion). Some examples are very symmetrical and have smooth surfaces, such as <98> ([8801], BUN) and <28>/<76> ([8763], INTC), which was made using a flattened piece of clay that was folded to the required profile; additional clay was added to smooth over the central perforation; the same technique was probably used on [8766] <29> ([8766], BUN). Others, however, are very crudely formed, especially those in fabric 3. The most irregular weight is <32> (Fig xx, No.3; [8778] BUN, fabric 1c), which has many finger impressions and varies both in height and diameter; unusually, this weight was finished by wiping it horizontally. Weights <33> ([8778], INTC; fabric 1c) and <102> ([8573] DISC; fabric 3) also have obvious finger impressions on their undersides. Weight <59> ([8266], BUN; fabric 1c) is overfired and has cracked along the lines where the rings of clay were joined. In most cases means of the shaping the central hole is unclear, but those of weights <34> ([8784], BUN; fabric 1c) and <54> (Fig xx, No.9, [8575], fabric 1c) was clearly formed by a series of thumb impressions from each side, leaving a slight ridge between them. The diameter of the hole varies from 21mm to *c* 60mm, but usually seems to fall between *c* 30–40mm. A few weights, notably <60> ([8217]), <103> (Fig xx, No.7; [8573]) and <29> ([8766]) have a white coating inside the central perforation, a feature that has been noted elsewhere (Blackmore 1988, 114). This may, however, be a result of the clay or the firing technique, as the same white layer occurs inside the comb impressions on weight <103> (Fig xx, No.7, [8573]).

Marks and decoration

A small number of weights from across the settlement have impressed features that have generally been taken as ‘brand’ marks or maker’s marks (Pritchard 1984, 65; Goffin 2003, 221; Leahy 2003, 71). They may also have had some amuletic function; while stab marks may have aided firing, this is harder to accept for stamps (Jarrett 2004, 96–7; Keily in prep) or the dimpled impressions that occur on a number of weights from across the settlement. These include <37> (Fig xx, No.1; [8747]), which has a deep irregularly oval impression on the upper surface (12 x 16mm) and two small finger impressions on the side, although the latter could be accidental. Weight <53>/<88> (Fig xx, No.2; [8613]) has a large oval impression (15x8mm) in the upper surface that could perhaps also be classified as an intentional mark. Weight <87> ([8613]) has an irregular linear groove around the upper edge, possibly accidental rather than intentional (cf Goffin 2003, fig 152, L842, but less pronounced).

Loomweight <103> from [8573] (Fig xx, No.7) has a row of 12 impressions made up by a three-toothed implement, each tooth with a diameter of just over 1mm. In each of the four groups the impressions are set 6mm apart; the gap between the different sets is just over 7mm, while the overall length is 75mm. Similar decoration has been found on single weights from Jubilee Hall (Blackmore 1989, fig 29, no.1) and Bedfordbury (Williams 1989 fig 37, no.130) and on ten examples from the Royal Opera House (Goffin 2003, 221, fig 151).

Illustration

No	Acc	Per	LU	Feature	Form, section	Dec	Fabric	Gm	Diam	Radius	Hole	Height
1	53/88	IV	OA6	8604, pit	ANN, D?	IMP	2	462	140	50-55	55	50

2	37	IV	OA6	8790, pit	ANN, D	IMP	1c	512	140	43	60	42
3	32	IV	OA8	8785, well	BUN, C		1c	279	120	50	34	58-66
4	72/73	VI	OA18	8311, fill	ANN, D		1c	298	130	42	44	45
5	48	VI	OA18	8767, well	BUN		1a	567	95	33-39	21	50
6	68	VI	OA18	8311, fill	DISC, U		1c	322	130	33-50	34	31
7	103	VIII		Void	INTD	COMB	1c	225	140	42-49	42	45
8	105	VIII		Void	DISC, U/D?		3	379	160	51-56	36	37
9	54	XIII	B1/2	8577, drain	BUN, C		1c	301	120	33-40	41	59

Table 4 Details of the illustrated loomweights

Appendix K – The Roman and Saxon Glass

Lyn Blackmore

Distribution

Period II

The earliest glass finds are from period II, OA2, when a number of glass beads were buried in funeral rites. Most are from cremation [8828], which contained 23 fragments from up to 19 beads (<146>, <147>, <148>, <236>; Fig 00, No.1: photo). The other finds comprise a complete bead (<233>; Fig 00, No.2), a fragment of Roman vessel glass (<144>) and a fragment of apparently modern window glass (<18>) from fill [8701] grave [8699].

Period III

Two fragments of vessel glass were found in period III contexts: a fragment of Roman bottle (<143>) and a fragment of Roman/Saxon vessel glass (<142>), both from the sandy silt [8656] in OA5.

Period IV

One small fragment of Roman vessel glass was found in the fill of stakehole [8390], which is part of structure S6 (<141> [8389]).

Period V

One fragment of Roman or Saxon vessel glass was found in the fill of posthole [8291] in OA14 (<140>, [8290].

Period VI

A fragment of vessel glass with reticella decoration was found <142>, Fig 00, No.3).

The Roman and possible Roman glass

Four fragments of Roman glass and two of Roman or Saxon glass were found in five different contexts. That from grave [8699] was found in a sieved sample and so its original position is unknown. Although the sherds are small, the glass is in relatively good condition. The finds, which include a bottle, a bowl, a jar and two vessels were discussed with John Shepherd and Angela Wardle.

<144>, grave [8699] fill [8701]; Period II, OA2

Outwardly folded rim from a bowl in dating to the 1st-3rd centuries. Natural green; diameter of mouth 120mm, length 30mm, thickness of body 1mm.

<143> sandy silt [8656]; Period III, OA5

One battered fragment of thick glass from a square-sectioned prismatic bottle dating to between the late 1st and early 2nd centuries (Isings 1957, type 50). Turquoise blue with iridescence; maximum dimensions 34 x 28mm, thickness 6–7mm.

<141>, stakehole [8390] fill [8389]; Period IV, structure S6

Rim of a bulbous jar dating to between the late 1st and early 2nd centuries (Isings 1957, type 67c). Turquoise blue; diameter of mouth 140mm, length 27mm, thickness of body 1.5mm.

<140>, posthole [8291], fill [8290]; Period V, OA14

Body sherd with slight curvature, possibly from a bowl; Roman or Saxon. Natural blue; maximum dimensions 17 x 12mm, thickness 2.5–3mm.

<145> well [8767], fill [8766]; Period VI, OA18

Body sherd with slight curvature, possibly from a bowl; Roman or Saxon. Natural blue with iridescence; maximum dimensions 33 x 17mm, thickness 2mm.

The Saxon glass

The Saxon glass mainly comprises beads from burial contexts: a complete example from the centre of the necklace in grave [8699] and the remains of up to 15 beads from cremation [8828]. A fragment of the window glass from grave [8699] is modern, not Saxon, but two sherds of vessel glass with reticella decoration were found in a domestic context. In addition there are two fragments that could be Roman or Saxon (see above). The burnt beads were analysed by David Dungworth at English Heritage, Centre for Archaeology.

Beads

Up to 19 beads are represented by the molten glass fragments from the fill of the pit that contained cremations <38> and <39> ([8829]); they are illustrated as a group in Fig 00 (No.1). Some fragments were collected by hand (<146>) while others were recovered by sieving. The latter were sorted as far as possible by colour (<147>, <148>). All fragments were analysed using XRF. It was found that none contain the high levels of soda that might be expected for beads of this date, but this could be due this their being melted and weathered. The five hand collected fragments and ten of the sieved fragments (<147>) probably represent the remains of blue-green and yellow-green beads, although one seems to have been blue and yellow; the six fragments in <148> are blue.

As they are burnt it is impossible to quantify or classify the beads accurately; several fragments in <148> are certainly from the same bead, while in other cases two or more are fused together, creating a larger lump. Most, however, were probably small and of cylindrical form or annular form (Hirst 2000, fig 1, types A and B). One, however, may have been a larger annular bead, while one appears to be of double drawn globular form (Evison 1987, fig 11, type C06; Hirst 2000, fig 1, M2) or Brugmann's 'Constricted Segmented' type (Brugmann 2004, 75; cf fig 17, centre; figs 77, 84). This is a type that was popular in the Roman period and may be a 6th-century Continental import; most English finds are from the south-east and mid- west of the country (ibid, 30, 37, 75). The central perforation is visible in this bead and in two of the probable cylindrical beads (<146>, <147>).

The one complete bead (<233>; Fig 00. No.2) is a large 6th-century drum-shaped polychrome bead with reticella, or herringbone decoration. The manufacturing technique has been described by Evison (1987, 65) and Guido (1999, 65), amongst others; it can comprise three or five rows. While the term 'reticella' is well established and generally accepted, even if not correct, this terminology was not favoured by Guido (1999, 64–5), who preferred the terms twist (either single or double) or herringbone.

A source in Ireland was originally suggested for such beads, which was favoured by Guido (1999, 65), but <233> is almost certainly of Continental, if not Mediterranean, origin (Brugmann 2004, 37–8, 42). It belongs to Koch's type 48, which includes a range of biconical, rounded and cylindrical forms (Koch 1977a, 20–21, 71; 1977b, 310-11, col pl 4; 1997, 147, col pl 11; 2001, 75–9, 162). In English typologies, it belongs to Guido's schedule 8xviia (Guido 1999, 66, 283) and Brugmann's group 8.3.3 (Brugmann 2004, 78). It is from the same group as Evison's types D67, D68 (Evison 1987, text fig 12) and similar to, but different from, Hirst's group P27 (Hirst 2000, 124–5, fig 2). Among the finds from Germany, several examples of the general type are known from the cemetery at Schretzheim, on the Danube (Koch 1977a, 20–21, 71; 1977b, col pl 4, nos 48.6–48.14). These include one with five reticella bands found in grave 515 that is almost identical to <233> (type 48.13; ibid, 111; fig 133 and col. Pl 4). Others are known from the cemetery at Wurttemberg, Nordbaden (Koch 1997, 147, col pl 11, 48.15–48.18). Here the closest match in terms of decoration is type 48.17, although this has a more rounded profile. At Pleidelsheim, in southern Germany some new types were found (48.15–48.18, of which the closest match with <233> is type 48.17, although the colour scheme is reversed (Koch 2001, col pl 7).

In England there is a cluster in Kent, but other findspots of reticella beads are widely distributed across the country (Guido 1999, 66, 313–6; Brugmann 2004, 37, 78, fig 50). The four examples from the 6th-century cemetery at Portway, Andover (Hants) all have three reticella bands and three have a rounded profile (Cook 1985, 83–4, group 7). That from Mucking is cylindrical but again has three bands (Hamerow 1993, 60, fig 117). Examples with five alternating bands, as on <233>, include finds from Mill Hill, Deal (Brugmann 1997, 60, fig 19, no.2), Sarre (Brugmann 2004, 78; fig 127, left) and Dover Buckland, all in Kent. Two examples were found at the latter site (Evison 1987, 65, text fig 12; tables XI, XV; col pl IV, D67, D68; Guido 1999, 66; plate 7, 8xviia). One is from female grave 92 (ibid, 228–9, D67; fig 42.3d); the other, from male grave 93, is larger and possibly from a sword (ibid, 237–8, D68; fig 43.1). Dating is considered further in the discussion.

Vessel glass

Two fragments are from a thin-walled vessel, probably a bowl, of dark green-brown glass with marvered reticella-style decoration in yellow, found in Area 2 (<142> [8656]; Fig 00, No.3). Two other fragments of blue-green glass could be of Roman or Saxon date (see above, [8290] <140>, [8766] <145>).

Both dark green-brown glass and reticella decoration are uncommon in Lundenwic. Two fragments of opaque brown glass and one of olive glass were found at Maiden Lane (Evison 1988, 123, nos 21, 22) while one fragment of light olive window glass was found in Bedfordbury (Evison 1989, 115, no.135). The Royal Opera House finds include two dark brown fragments (<G9>, <G45>), one dark green-brown (<G30>; Stiff 2003, 247–50). Reticella decoration, which mainly dates to the 8th and 9th centuries, has been discussed by various writers, including Evison (1988, 121–2, fig 34, no.10; 1989, 113; 2000, 84–5), Hunter and Heyworth (1998, 37–8) and Stiff (2001, 46–8). Finds from Lundenwic include a green and yellow vertical trail, probably from a bowl of the type found at Valsgärde, Sweden, found at Maiden Lane (Evison 1988, 121–2, fig 34, no.10). Three further fragments with pale blue and yellow trails from the National Gallery (Evison 1989, 113, 115–16, nos 162–164). Five fragments from three or four Valsgärde-type bowls were found at the Royal Opera House site (Stiff 2003, 242, 245; fig 158, <G27>); of these, <G9> and <G45> are dark brown with yellow, and yellow and white reticella decoration respectively (ibid, 247, 249). One of the most impressive finds is a fragment from a Valsgärde-type bowl, which has five contiguous parallel trails, found at a possible glass-working site at Hare Court (between Lundenwic and the city) and dated to the 8th- or 9th-century (Butler 2005, 19, Fig 24). This piece, like others from Whitby, may have been kept for reuse as a setting, possibly in a chalice or similar (Evison 2005, 60).

Finds from settlement sites outside London include examples from Hamwic (Hunter and Heyworth 1998, fig14, no.169/1185 and fig 16, no.7/28), where the number of funnel beakers with reticella rims suggests insular manufacture (Stiff 2003, 246). It is generally agreed that this form of decorative glass does not occur

in England before AD 700 (Evison 2005, 60). The use of coloured marvering also appears to be an 8th-century trend (Hunter and Heyworth 1998, 37). Vessel <142> is of interest in that it combines both techniques, the yellow glass clearly overlying the green glass of the vessel itself. It would appear to have been broken and discarded towards the end of period III, if it is not an intrusive later 8th- or 9th-century piece.

Catalogue of Saxon glass

<146>, <236> cremation pit [8828], fill [8829], Period II, OA2 (Fig 00, No.1, group photo)

Six molten glass beads, all bubbled and distorted; one with perforation (c 12 x 7mm). The largest fragment has small fragments of burnt bone adhering (<236>, 28 x 21mm). Weight 8g (including bone), original colour uncertain, but probably blue-green; one fragment may be from a blue and yellow bead.

<147> cremation pit [8828], fill [8829], Period II, OA2, sample {114} Fig 00, No.1, group photo

Nine molten glass bead fragments, several with cremated bone adhering, all bubbled and distorted; largest *c* 16 x 13mm. Original colour probably blue-green, but two fragments are from the blue/yellow bead noted above. Also one double drawn globular bead, length 6mm, diameter 3mm, original colour probably white (use this one in group photo). Total weight 8g (including bone).

<148> cremation pit [8828], fill [8829], Period II, OA2, sample {114} Fig 00, No.1, group photo

Six fragments blue glass, probably from three beads, one perhaps originally annular. Weight 3g.

<233> grave [8699], fill [8701]; Period II, OA2 (Fig 00, No.2)

Cylindrical reticella bead, diameter 19–20mm, height 12mm. Red and yellow core, twisted to give a spiral effect, overlaid with five rows made of twisted constrasting rods. Three trails, twisted anti-clockwise ('S' twist), comprise broad bands of black with narrow bands of red and black between narrow bands of yellow. These alternate with two broader and simpler rows of red and yellow, twisted clockwise ('Z' twist). The entire bead was then marvered to give a drum-shaped form and a herringbone pattern around the wall. A thin black deposit inside the large circular perforation (diameter *c* 5mm) probably derives from a reaction of the glass and the iron rod used in the manufacturing process.

<142> sandy silt [8656]; Period III, OA5

Two non-joining fragments translucent olive green-brown glass, one plain, the other with raised self-coloured rib (probably horizontal) overlain by diagonal lines in yellow that giving the effect of a regular 'S' twist reticella trail with a festoon on either side. Maximum dimensions 25 x 17mm, 21 x 17mm; thickness 1mm (slightly thicker towards the base); width of rib 4mm.

Appendix L – The Worked Stone

Lyn Blackmore

Introduction

Five stone tools and 42 quernstone fragments were recovered from 13 contexts (11 features) on the site. In addition, two fragments of dense quartzitic sandstone were recovered, of which <214> ([8202]) is unworked and <229> ([8791] is worked; the latter is included in the building materials report. Although small, the assemblage adds significantly to the corpus of finds from *Lundenwic*. The finds were examined macroscopically and petrologically by David Williams and Ian Betts, and recorded, with details of their dimensions, on an Excel spreadsheet that can be consulted with the finds archive. Where measurements are given below they refer to the maximum extent unless otherwise stated. The illustrated finds are numbered according to their function and stratigraphic location.

The hones, burnishers and possible touchstone

Following accepted terminology, objects purposely made for use as sharpeners are described as hones (whetstones), while secondary hones are objects that originally had another function (Ellis and Moore 1990, 870; Goffin 2003, 197).

Touchstone?

A possible touchstone, <221>, made of an indurated black siltstone/mudstone (Fig xx, No.1) was found in the Period III sandy silt [8657]. Parallel-sided with rounded edges and corners, one end is oblique while the other is broken (extant lengths 70mm and 50mm, width 31mm, thickness 11mm). Both the upper and lower faces are flat, although the former is pitted with numerous circular impressions *c* 0.75–1mm in diameter. The underside is damaged at both ends and also along one edge. Similar stones from Dorestad, also thought to be touchstones, were identified as lydite (otherwise known as basanite, a black flinty jasper; van Es and Verwers 1980, 167). XRF analysis of <221> at English Heritage tested negative for gold (D Dungworth pers comm), but the same applies to other possible touchstones from Southampton (D Williams pers comm).

Burnisher/secondary hone

Burnisher <49>, apparently reused as a hone, was also found in the Period III sandy silt [8657] in OA5 (Fig xx, No.2). Made of a grey siltstone/mudstone, probably of riverine origin, it is sub-rectangular in plan; one end is slightly rounded on all faces, while the other is damaged (extant length 100mm, width 29–35mm, thickness 14–24mm). All the surfaces are highly polished, with slight bevelling on both faces of the surviving end suggesting that different areas of the stone were used for burnishing larger or smaller surfaces. The presence of numerous fine longitudinal grooves *c* 0.2mm wide along both sides suggests that <49> was also used for sharpening the points of needles and/or awls.

The hones

Stratigraphically the earliest of the three hones is <220>, an incomplete hone from the Period IV burnt layer [8646] in OA8, which is of fine-grained sandstone (length 58mm, width 35mm, thickness 16mm). One of the main faces has a good polish and is also slightly concave, suggesting use for sharpening knife blades. The other faces are more regular and less worn.

The most complete find is hone <6> (Fig xx, No.3), from the Period VI silty sand deposit [8155] in OA22, which is made of a hard fine-grained sedimentary rock with a good surface polish. It is unusual in that it is not

only the largest found in *Lundenwic* to date, but also in pristine condition. The hone is trapezoidal in plan with slightly convex sides (lengths 199 x 212, width 33–39mm, thickness 23–29mm); the bevelled edges and corners on all four sides of both faces are 7–9mm deep, giving surface widths of 23–28mm on the main faces and 18–21mm on the sides. Although well stratified, the striking symmetry and overall quality of this find suggest that it could be a post-medieval artefact.

The third hone, found in fill [8169] of the Period VI rubbish pit [8187] in OA19 (<65>, Fig xx, No.4), is made of fine-grained sandstone. It is very worn, although more so on one side than the other (extant length 150mm). The somewhat tongue-shaped form tapers both in width and thickness from 45 x 21mm at the wider end to 34 x 12mm at the narrower end. Both the main faces and one of the side faces have two adjacent concave areas, while other side face has one, indicating considerable use for sharpening knife blades.

The querns

Sandstone quern

One edge fragment from a quern made of medium-grained ferruginous sandstone was found in the Period VI pit [8764] (<223>; diameter of 320mm). The lower face is present and the thickness exceeds 62mm, suggesting that this is a lower stone.

The lava querns

The remaining 41 fragments are of Niedermendig lava, or nepheline-tephrite, from the Eifel hills (Cologne Vorgebirge) of Germany (Parkhouse 1976; Kars 1980; Peacock 1980; Williams 1988, 133; Williams 1989, 129–30; Goffin 2003).

Lava was by far the most popular material for querns during the Middle Saxon period and a major import, either in finished or semi-finished form, or as raw material (Blackmore and Williams 1988, 132; Williams 1989, 130–1; Rogers 1993, 1329; Goffin 2003, 204–5). In all 42 fragments from 18 or 19 quernstones were recovered from the site (26.156kg). These vary considerably in size, ranging from a tiny chip of 8g to a large fragment of 2.562kg. The assemblage is of importance in that it includes both finished and unfinished examples; it is of average size for *Lundenwic*, where by far the largest collection is that from the Royal Opera House site; this and other useful collections are listed in Table 1.

Site	Site code	Fragments	Kg	Reference
28–31 James Street	JES99	5	4.26	Riddler 2004
21–22 Maiden Lane	MAI86	21	4.203	Blackmore and Williams 1989
Southampton Street	SOT89	23	5.025	Keily in prep
Chandos Place, Bedfordbury	PEA87	24	4.33	Williams 1989
Jubilee Hall	JUB85	34	8.895	Blackmore and Williams 1989
Bruce House	BRU92	70	7.870	Keily in prep
2–26 Short's Gardens	SGA89	96	6.634	Keily in prep
Royal Opera House	ROP95	316	155.0(?)	Goffin 2003

Table 1 Comparative lava quern assemblages from Lundenwic

Study of the lava querns from Dorestad (Parkhouse 1976), which are broadly contemporary with those from Lundenwic, defined two main types, rotating and oscillating, with a range of different components (Blackmore and Williams 1985, 132). So far all querns found in *Lundenwic* are of the small rotary type, ranging in

diameter from *c* 260mm to *c* 480mm (Riddler 2004, 24; Goffin 2003, 207). In the present collection they fall between *c* 320mm and 400mm. The Dorestad stones are rather larger than those from Lundenwic, measuring between 425–485mm in diameter; those less than 460mm, however, are from the earliest deposits, while the 8th-/9th-century examples mainly cluster between 475–485mm (Kars 1980, 410–11). Diameter may, however, depend on function, and upper stones were usually wider than lower stones (cf Parkhouse 1976, fig 5). The central holes in the upper stones are larger than, and often at least twice the size of, those in the lower stones; at Dorestad the average size of the former is 80mm, while the latter is 25–35mm (Kars 1980, 412).

Quern thickness is problematic and governed by a number of factors. For Dorestad (Parkhouse 1976, 183) and *Lundenwic* it has been inferred that the lower stones were slightly thicker than the upper ones, with ranges of *c* 70–90mm and 30–60mm respectively (Blackmore 1988, 133). Thickness, however, inevitably reduces as wear increases and at the Royal Opera House a range 35–78 was noted for the lower stones (Goffin 2003, 207). A second study of the Dorestad querns found that new lower stones are usually *c* 60–70mm thick, and upper ones a little thicker still (Kars 1980, 412); used stones, by contrast, cluster between 25–35mm. Stones of 30mm or less were considered to be at risk of breaking, if not broken, while the thickest examples could be waste from finishing roughouts (ibid, 412). For the present collection the stones are described below according to their thickness, as possible upper or lower querns or as uncertain. Several fragments have one or two flat surfaces, but only two have a definite outer edge. The finds are summarised below by type, while evidence for manufacture is considered further in the general finds discussion. Tooling of the surface is noted where appropriate (for a general discussion see Goffin 2003, 207–8).

Upper stones

Upper stones of rotary querns were operated by a wooden handle in a socket, and have a relatively large or hopper, either unflanged (Parkhouse 1976, 184: type II) or flanged (ibid, 184: type III) through which the grain was fed. Both types occur in Lundewic (Goffin 2003, 207). At Dorestad the central hole ranges between 60–135mm (Kars 1980, 412), the larger examples having a rynd (a bridge of wood or stone) across the central hole to facilitate rotation on a spindle (Parkhouse 1976, 185, fig 4b: types IV, V; Kars 1980, 412). Querns operated by a thong passed through a channel between the upper surface and the outer edge may have been of oscillating type (Parkhouse 1976, 182; Rogers 1993, 1322, 1324, no.4512).

From its profile and the size of the central hole <12> (Fig xx, No.1) should be an upper stone. The heaviest single piece from the site (2.672kg), found in the Period IV pit [8617], it is from the central area of a quern with flat underside and upper surface sloping in to the central hole, or hopper, half of which survives (diameter 66mm); thickness tapers from *c* 68mm at the broken edge to *c* 60mm thick at the centre. There is no obvious evidence for tooling on the underside, and while it could be that this has been worn down though use, the surface is not particularly polished; a small area of the finished surface survives on the outer edge of the upper side, but this surface is otherwise damaged. It is, therefore, difficult to determine whether the stone was finished or not, although the former seems likely.

The most diagnostic find is <216>, a Period IV find from structure S3 (Fig xx, No.4; [8606]), which is an edge fragment with both upper and lower surfaces and a diameter of 300–320mm (thickness *c* 45mm). Toolmarks are visible on the slightly convex upper surface is rough, while the underside is well worn and smoothed through use.

Lower stones

The six possible lower stones (24 fragments) are considered in their chronological sequence. Of the four examples from Period IV, <218> (Fig xx, No.2) comprises three non-joining fragments; both surfaces are present, giving a thickness of *c* 71-75mm. The largest piece is from the central area, with *c* 30% of the

central perforation (original diameter probably *c* 40mm). This was drilled through from both sides, but is more or less straight-sided. Evidence for rough tooling on one side but not the other; again there is no real evidence for wear and the tooling is not that of a finished quern.

Arguably the best example of an unfinished lower quern is <219> (Fig xx, No.3), which comprises three joining fragments making up *c* 25% of the central area (4.688kg). This is the thickest find from the site (*c* 83–89mm), with two more or less parallel surfaces; the outer edge is missing, and the piece has split along its diameter. The central perforation was mainly bored from one side (width at top 40mm, at base 15mm, depth 45mm). The smaller boring ranges from 28mm to 15mm and is *c* 35mm deep. The shallow tooling on the upper surface is entirely diagonal and while that on the underside is very rough, as might be expected in quarrying, rather than the finishing process.

Some of the eleven fragments from <227> (from the silt layer [8719]), are also large (5.638kg), and two pieces join to make up a large section *c* 375mm across (thickness 85mm); two small pieces also join. There is rough tooling in at least two directions on both the upper and lower faces and on the very roughly shaped outer edge, all of which suggest that this quern is unfinished. The other possible find from Period IV find is <215>, from well [8613], a small fragment with one apparently unworn flat face (thickness 70+mm).

The finds from Period VI comprise <224> and <225>, possibly from the same quern, found in fills [8763] and [8770] of pit [8764] in OA18. Fragment <224> is a large fragment *c* 86mm thick, with one bevelled side suggesting that it may be from the near the edge of an unworked block. Rough tooling, probably chisel marks, are present on both surfaces, with no evidence of any wear. The same applies to <225> (Fig xx, No.5), which is represented by five large joining fragments with what appears to be the unfinished outer edge giving a diameter of *c* 460mm (thickness 86mm).

Upper/lower stones

From their thickness, three fragments could be from upper or lower stones. From Period IV, <228> is a burnt edge fragment from quern with a diameter of *c* 400mm and thickness 65mm. Small areas of the upper and lower surfaces are present, both similar to those on the underside of <12>. The edge itself has diagonal tool marks along the sides, working to the centre. These are shorter and clearer on one side (length *c* 25mm), and longer (*c* 42mm) and less obvious on the other side where they are obscured by apparent fire damage. It is likely that this is from a finished, but possibly unused quern. Fragment <217>, from well [8613] has one flat face and one with evidence of deep tooling (thickness 68mm); one of the broken edges is vertical, while the other is irregularly rounded, suggesting that this is waste from near the edge of a quern that split during the course of dressing.

The one quern from a Period V context, layer [8279], is also is from the central area of an unfinished quern with a thickness of 64–67mm (<231>, Fig xx, No.5). One surface is flat but the other is extremely irregular. As with <219> there is an unfinished perforation bored from both sides, giving a waisted profile in section (extant width at the centre 12mm, original diameter at the surface 35mm). These dimensions suggest that this was intended to be a lower stone, but it could represent the first stage of making the larger hole of an upper stone.

Miscellaneous fragments

A number of fragments are too small to tell what form of quern they are from and, in some cases, if they were finished or not. Fragment <234>, from Period IV stakehole [8367], has one roughly flat face with diagonal score marks (width 2mm) at intervals of *c* 8mm cross it and a maximum thickness of 23mm. This would appear to be waste, but fragment <222> from the Period VI pit [8764] has even surface and appears to be from a finished quern (maximum thickness 40mm).

One of the most intriguing finds from Period VI is the hemispherical fragment <226> (Fig xx, No.7; [8771]), as it is quite unclear what the origin of this is. While it could have been an integral handle for rotating the upper stone, no other examples of such a form are known. Similarly, no lower stones are known that have a projection over which the hole in the upper stone would fit, and the rounded surface is neither smoothed nor polished. Alternatively, the hemispherical area could be derived from the forming of the central hole in an upper stone, but this seems unlikely, partly because of the rounded shape but also because it is not a true hemisphere but only part of an otherwise quite irregular fragment. More plausible, perhaps, is that a rounded projection was left on the surface of the quern to mark the point at which a hole should be bored through, and to give something to grip onto while the preliminary chiselling was carried out. Similar, although flatter, projections have been noted on unfinished querns at Dorestad (Parkhouse 1976, 185, fig 6; Kars 1980, 412).

The remaining Period VI finds all comprise small chips of lava that could be from finished querns or waste (<212>, [8169]; <213>, [8199]; <226>, [8771]; <230>, [8292]; <235>, [8771]).

Distribution

The broad distribution of the querns is outlined in Table 2. The following adds a little more detail in order to put the finds in context. None were associated with a building, and only one small fragment was associated with a structure (Period III, S1, [8686], <210>).

Form	Period			
	IV	V	VI	Total
Upper	2/2/3070	-	-	2/2/3070
Lower	18/4/14875	-	6/2/4713	24/6/19588
Upper/Lower	2/2/606	1/1/1126	-	3/3/1732
Unknown	1/1/121	-	11/6/1054	12/7/1175
Total	23/9/18672	1/1/1126	17/8/5767	42/18/26156

Table 2 The distribution of the querns by possible form type and period, showing number of fragments/estimated number of examples/weight in grams

Period IV: early - mid 8th century

In all 23 fragments from nine querns were found in Period IV deposits (18.672 kg), of which four are possible lower stones. The majority were found in OA6, the main group being from fill [8615] of pit [8617], which contained seven large fragments from three querns, <12>, <218>, <219> (Fig xx, Nos 1, 2, 3), amounting to 11.828kg. A smaller concentration of twelve fragments from two querns was found in the silt layer [8791] (total 5.667kg), of which the edge fragment <228> is burnt/sooted. Two pieces were also found in different fills of well [8604] (658g). In addition, single fragments were found in OA7 (weight 121g) and in a posthole of Structure 3 (398g), the latter, one of the few definitely finished pieces (<216>; Fig xx, No.4; [8667].

Period V: mid – late 8th century

The one fragment discarded in this period, <231> was found in layer [8279] in OA14; this could be from an upper or lower stone (Fig xx, No.5).

Period VI: late 8th – mid 9th century

Six of the eight querns that are represented in this period were found in OA18 (5.568kg), and of these 15 fragments from three querns are from pit [8764]. Two of these are lower stones (<224>, <225>; Fig xx, No.6), while one fragment (<222>) cannot be assigned to a type. Three small chips of lava were found in pit [8293] (<230>), while two querns were found in layer [8771]. Of these, <235> comprises four small fragments, one of which has a roughly rounded edge. Fragment <226> (Fig xx, No.7) is one of the most interesting finds from the site, having a hemispherical form.

Appendix M – The Worked Bone

Lyn Blackmore

Introduction

There are 45 bone accessions and one of bone and iron, of which 42 are Saxon; 37 of these are stratified in Saxon contexts. Most of the Saxon finds comprise waste, but six objects were also found. In addition to three post-medieval objects there is a composite knife with bone handle. All the finds were recorded on a general Excel spreadsheet; dimensions are noted where relevant in the following. The finds are described, and numbered where appropriate, in chronological order by function and stratigraphic location.

Site	Site code	Objects	Waste	Weight (waste)	Reference
28–31 James Street	JES99	3	0		Riddler 2004, 23–4
21–24 Maiden Lane	ECT96/ EXC97	3	2		Laidlaw 2005, 84
Jubilee Hall	JUB85	8	3		Blackmore 1988, 134–5
Chandos Place, Bedfordbury	PEA87	7	5		Blackmore 1989, 131–2
National Portrait Gallery	NPG97	2	10		Riddler 2005, 101–2
Lyceum theatre	ERT95	6	22	1.37	Riddler 2005, 52–58
21–22 Maiden Lane	MAI86	36	29		Blackmore 1988, 135–7
Royal Opera House	ROP95	103	460	18.24kg	Blackmore 2003, 302–15

Table 1 Comparative assemblages of worked bone, waste and objects, from Lundenwic

Distribution of the finds

Saxon

The broad distribution of the Saxon finds is outlined in Table 2, which shows that most was discarded in Period VI. The following adds a little more detail in order to put the finds in context. With the exception of one antler pedicle (<167>), one sawn sheep bone (<188>) and one goat horncore (<203>), all the waste comprises antler tines.

Period III: mid 7th – early 8th century

The two finds (306g) from Period III are both from the sandy silt [8657] in OA5. They comprise spindlewhorl <15> (Fig 00, No.1) and a large piece of antler waste (<194>; Fig 00, No.2).

Period IV: early - mid 8th century

Seven fragments of worked bone are from period IV contexts (489g). The four pieces found in OA6 comprise waste fragments <195> and <196> (pits [8662] and [8790] respectively) and two modified tines: wedge <13> from gravel layer [8639] (Fig 00, No.3), possible tool <244> from the second fill of well [8658] (Fig 00, No.4)

and. The three finds from OA8 comprise comb fragment <186> from pit [8526] (Fig 00, No.5) and antler waste <185> and <202> (pit [8524] and well cut [8783] respectively).

Period V: mid – late 8th century

The two finds from period V (21g) comprise pin <107> from pit [8504] in OA10, and one fragment of antler waste, <70> (gravel layer [8294], OA13).

Period VI: late 8th – mid 9th century

Most of the worked bone was discarded, or redeposited, in this period (28 frags, 867g). Of these, two comb fragments and six pieces of waste are from OA18. The former comprise <200> (Fig 00, No.6) from layer [8771] and <182>, a piece of connecting plate from pit [8293] (Fig 00, No.7). The waste, which includes a gnawed tine with knife cuts on it (<184>, Fig 00, No.8), is mainly from general layers (<180>, [8227]; <183>, <184>, [8298]; <201> [8771]; <203>, [8788]), but one small tine fragment was found in well [8767].

A pin, a needle (<7>, Fig 00, No.9) and three fragments of waste (<166>, <167>, <171>; Fig 00, No.10) were recovered from rubbish pit [8187] in OA19. In OA20, five waste fragments (<173>–<177>) were found in the clay silt layer [8213] and two in the silty sand [8215] (<178>, <179>); a single tine (<172>) was found in pit [8195] in OA21. A comb fragment (<168>, Fig 00, No.11) and six fragments of waste were found in OA22. Of these, <169> and <170> are from pit [8173], while <181> (Fig 00, No.12) is from pit [8245]; the others are from layers [8154] (<163>, <164>) and [8155] (<165>).

Form	Period						
	III	IV	V	VI	VIII	XIII	Total
Comb		1		3			4
Pin			1	2			3
Spindlewhorl	1						1
Other		2					2
Waste	1	4	1	23	3	4	36
	2	7	1	28	3	4	46

Table 2 The distribution of the Saxon worked bone and waste

Period VIII: late 17th to early 18th century

One fragment of antler waste (<187>), presumed to be of Saxon date, was found in layer [8594], while two others (<188> and <189>, Fig 00, No.13) were found in [8573]. The other finds comprise the back of a post-medieval brush (<197>) and button (<198>), both complete. In addition, the handle of a knife with iron blade was found in soakaway [8795].

Period XIII: 19th century

Four fragments of antler waste, presumed Saxon, were found in pit [8601] (<190>–<193>), while <162>, a complete post-medieval button, was found in dumped layer [8047].

Saxon finds

Combs

Combs made of bone and/or antler are among the most common bone artefacts found in *Lundenwic*, and fragments of four examples were found, the smallest piece from a period IV context, the others all from Period VI. Nos <168> [8172] and <200> [8771] are both from the central parts of double-sided combs that are typical of the period and common on other sites in the area (cf Blackmore 1988, 137, fig 38, nos.4, 5; 1989, 131; fig 45, nos.286-288; 2003, 310–12; Riddler 2004, 22–3; 2004, 53; 2004, 101–2). The teeth on <203> are missing but those on <168> survive, showing that they are closely spaced (ten per 10mm) and quite short (*c* 10mm). From the size of the connecting plates it would appear that <200> was a smaller comb than <168>. The connecting plates on <168>, <186> and <200> are rounded, but <182> is bevelled (cf ibid, fig 175, <B100>). The latter type is less common in *Lundenwic* but has been found at the Royal Opera house (Blackmore 2003, 311, fig 175 <B100>). Lattice decoration, when confined to the ends of the connecting plate, is considered by Riddler to mainly date to the 7th and first half of the 8th centuries (Riddler 2004, 53, fig 38, no.2). In the case of <200> the fragment is too small to tell whether design was continuous or not, but the latter seems likely (cf Malcolm et al 2003, fig 96, <B114>).

<186> pit [8526], fill [8525]; Period IV, OA8 (Fig 00, No.5)

Small fragment from the end of a connecting plate with rounded section, part of a rivet hole and decoration of five incised transverse lines. A projection on the end face where the antler plate was sawn and snapped, and the fact that the plate has snapped at the point where the rivet hole was drilled through the innermost transverse line suggest that this is a waste fragment. Extant length 7–11mm, width across outer end 10mm, thickness 3mm.

<182> pit [8293], fill [8292]; Period VI, OA18 (Fig 00, No.7)

Small fragment from the edge of an antler connecting plate with bevelled section, part of a rivet hole and zig-zag decoration of paired incised lines along the side. Saw marks from the cutting of the teeth indicate that this is from a finished comb. Extant length 28mm, width 8mm, thickness 4mm.

<200> layer [8771]; Period VI, OA18 (Fig 00, No.6)

Section from a (now distorted) double-sided composite comb with toothplate (teeth missing) between two connecting plates with rounded cross-section and incised decoration of diagonal lines forming a asymmetrical lattice pattern on both sides, overcut along the edges by saw marks for the teeth. The three components are secured by two chunky rivets *c* 8–10mm apart. Overall length 25mm; maximum width of toothplate 17m, thickness 4mm. Maximum width of connecting plates 12mm, thickness 4mm.

<168> pit [8173], fill [8172]; Period VI, OA18 (Fig 00, No.11)

Section from an undecorated double-sided composite comb with parts of two adjacent toothplates (teeth partly missing); the spacing of the teeth is the same on both sides (10 per 10mm). The connecting plates are slightly rounded in cross-section with saw marks for the teeth along both sides. The rivets are set at intervals of *c* 9–11mm; one survives *in situ* at the junction of the toothplate, one survives on one side only, while third is represented by the rivet hole only. Overall length 35mm; width of toothplate 36m, thickness (including connecting plates) 16mm. Maximum width of connecting plates 12mm, thickness 4mm.

Pins/needles

Three pins/needles made of pig fibulae were found; for recent discussions see Blackmore (1988, 134; 1989, 132; 2003, 306, 309) and Riddler (2004, 54) and references therein.

<7>, pit [8187], fill [8211]; Period VI, OA19 (Fig 00, No.9)

Needle with roughly rounded head and round eye (diameter 3mm); part of shaft missing; extant length 65mm, width across head 9mm.

<106>, pit [8187], fill [8186]; Period VI, OA19

Complete juvenile pig fibula, unmodified but slightly polished at the tip; possibly used as a pin. Tip missing, extant length 101mm.

<107>, pit [8504], fill [8503]; Period V, OA10

Pin made of a pig fibula, highly polished; head missing, but probably unperforated. Extant length 102mm.

Spindlewhorl

Spindlewhorls were wedged on the lower end of the spindle in order to give the necessary momentum to the spinning of the thread; the central hole thus tapers in diameter toward the base and hemispherical whorls were used with the flat face uppermost. The size, weight and decoration of <15> are quite typical for *Lundenwic* (Blackmore 2003, 168, 304; cf Malcolm et al, fig 90, <B166>; Laidlaw 2004, 84, fig 49, no.1) and other broadly contemporary sites (Walton Rogers 1997, 1731–43).

<15>, layer [8657], Period III, OA5 (Fig xx, No.1)

Turned, slightly flattened hemispherical whorl made from the ball of the femur of a cattle-sized animal, with horizontal ridges and grooves around the shoulder (abraded; weight 20g, diameter 42mm, height 12mm; diameter of spindle hole 8.5mm tapering to 7mm).

Modified tines

Two modified tines were found, <13> and <244> (Fig 00, Nos 3, 4); for discussion see Blackmore (2003, 173–4). This is closely paralleled by a find from the Royal Opera House which has four facet cuts at the tip (Blackmore 2003, 174, fig 138, <B86>). The various knife cuts and notches suggest that <13> was initially used for testing the readiness of the antler for working, and then adapted as a functional object. No exact parallel has been found for <244>, but it is not impossible that, although not a conventional stamp (Hodges 1981, 13; West 1985, 125), it was used to form linear decoration in pottery manufacture; a similar find with three grooves was found at *Hamwic* (Timby 1988, 106–8, fig 18, no.2). Alternatively, <244> may have played a part in the textile manufacturing process, although if this were the case other examples might be expected.

<13>, gravel layer [8639]; Period IV, OA6 (Fig 00, No.3)

Tip of a tine, sharpened to a point by two facet cuts (lengths 29mm and 32mm), with two lateral notches, one deep, one shallower, on one of the untrimmed faces near the point and a series of short parallel knife cuts on one side and closer to the sawn end; length 64.5mm.

<244>, well [8658], fill [8639]; Period IV, OA6 ((Fig 00, No.4)

Curved tine shaped to a point by a series of facet cuts and with a deep groove centrally placed on the upper side of the tip. Sawn with a rotating motion, creating a stepped edge at the proximal end. Length 133mm, slight polish at the tip.

Waste material

Red deer antler waste is the dominant category on this site, with 34 fragments (1.730kg); single fragments of sawn goat horncore (<203>, [8778]; 36g) and sawn sheep bone (<188>, [8573]; 5g) were also found. The various processes involved in bone- and antlerworking have been discussed elsewhere (eg MacGregor 1985; Blackmore 1989, 138; 2003, 170–6, 302–3; Riddler 2004, 56–8; 2004, 145–6) and are not repeated here.

The present collection mainly comprises antler tines, amounting to 32 fragments in all (1.507kg); almost without exception the fragments were removed by sawing most of the way through and then snapping (Blackmore 2003, 171–3). Modified tines, which are included in the weights quoted here, are noted above. The majority of the other pieces are single tines/tine fragments, but <165> ([8155]) and <195> ([8659]) are double tines. The largest fragment is <194> ([8657]; Fig 00, No.2), a cup/crown from a deer at least 8 years old (A Pipe pers comm). One of the four tops is complete, while one is incomplete; parallel saw marks (width *c* 2mm) on one side of the latter suggest that attempts to detach it were abandoned after the second try. Another, however, was successfully removed on the second attempt, which involved both vertical and horizontal cuts. The fourth has broken off.

Seven tines are complete; in some cases they were presumably discarded because they were too small, curved or crooked to be useful, or damaged by fighting or subsequent gnawing (eg <170>, [8172]; <176>, [8213]; <178> [8215]; <181>, [8244], snapped at tip; <184>, [8298]; <187> [8573]; <201>, [8771]). Tine <173> ([8213]), however, appears to be quite usable. Of these, <170> is *c* 175mm long; <173> is *c* 140m, <178> is *c* 160m, <181> is *c* 145mm long, <184> is *c* 160mm, <187> is 138mm. Tine <183> ([8298]) is also almost complete (sawn at base, tip missing; length *c* 166mm). Tine <201> ([8771]) has been removed from the palm by lateral sawing and longitudinal splitting. Tine <176> ([8213]) is complete and *c* 60mm long; it has been detached from the palm by sawing laterally and near vertically on the inner side. Gnawing is evident on tines <184> ([8298]) and <190> ([8600]).

Several of the tine fragments are cut off *c* 80mm from the tip (eg <164>, [8154]; <169>, [8172]), but some are longer, such as <172> ([8194], 100mm), <179> ([8600], 117mm), <180> ([8227]; *c* 120mm). The shortest is <199> ([8766]), which is only 26mm. Fragment <175> ([8213]), which is sawn at both ends, is one of the few pieces that are from the proximal part of the tine and lack the tip. Some of the smaller tines were sawn from the beam longitudinally (rather than laterally), and then snapped off. These include <166> ([8169]), and <174> ([8213]); tine <171> ([8186]) was cut both longitudinally and laterally. Where the tips are missing or altered it can be difficult to determine whether this is pathological, occurred as post-depositional damage or during the manufacturing process.

Two fragments of beam are present. Of these <202> ([8785]) is cut from near the base and has three sawn faces, one lateral and two oblique, while fragment <185> ([8523]), which has a smaller branch projecting from it and three cut faces. A palm fragment (<196>, [8738]) was sawn laterally and split longitudinally, with an oblique cut to remove a tine; one complete tine remains.

Other than the modified tines <13> and <244>, very few pieces have evidence for working. Fragment <195> ([8659]), however, is bleached and slightly flaking, suggesting that it had been boiled (Blackmore 2003, 171), while several tines, including the possible wedge <13> (Fig 00, No.3), have scooped facet cuts or fine knife marks suggesting that they were tested to gauge whether the bone had been adequately soaked prior to working (ibid, 171). These include <187> ([8573]), which has been cut obliquely across the tip and <171> ([8186]), which has three facet cuts along one side of the tine (Fig 00, No.10). The complete tine <184> ([8298], Fig 00, No.8) also has cut marks along the edge and facet cuts at the tip. The same applies to <181> ([8244], Fig 00, No.12) which has numerous broad knife cuts along the outer edge and a series of fine cuts on the inner edge. There is also a small saw mark just a little in from the cut edge, as if the point of cutting was moved from that first selected. Tine <189> ([8594], Fig 00, No.13) has two lateral saw marks

(width 2mm) on one side and finer knife cuts near the tip, part of which has been sliced off. In addition to saw marks, a series of fine parallel knife cuts (width 0.1mm) are present on the cup/crown fragment <194> ([8657], Fig 00, No.2).

Post-medieval finds

Three objects were found, all complete and in good condition. Two buttons are both simple discs with a central perforation; <162> ([8047]) is 16mm in diameter, while <198> ([8745]) is 15mm. The third find is back of a brush (<197>, [8745]) measuring 106 x 38mm; as this lacks a handle it was probably used for scrubbing or polishing. In addition there is a complete knife handle (<132>, [8745]). This is of 19th-century type with rounded terminal (width 23mm, thickness 15mm), the sides tapering slightly towards the junction with the blade; the latter is now missing but the iron tang is visible

Appendix N – The Crucibles and Mould Fragment

Marcos Martinón-Torres and Lyn Blackmore

Description

Four crucible fragments were recovered from the site, three of which are from period IV deposits in OA6. These comprise <238>, a small body fragment from fill [8396] of pit [8397], and <239>, two body fragments from fill [8535] of well [8536]. The latest fragment, <233> (Fig xx, No.1), was found in the period V silty sand [8155] in OA22, which also contained Ipswich ware pottery. Despite lacking a rim, this externally thickened crucible is one of the largest fragments found in *Lundenwic* (Blackmore with Dennis 2003, 271–3), measuring 73mm x 55mm across. The original crucible was made of a fine dense sandy fabric with a wall thickness of *c* 5mm and internal diameter of *c* 35mm; where exposed the original external surface is slightly vitrified. The outer skin is made of a coarser, less refractory clay which is deeply vitrified due to fluxing of the surface by the ash from the fire used to heat it (ibid, 755); it is mainly green but has patches of reddish colouring. This thickening might have been intended to protect the crucible itself and also to help prolong the temperature necessary to pour the contents once the crucible was removed from the heat source (ibid). Relatively large prills of metal, one 5mm across and quite green, are still visible on the uneven inner surface, which is coated with dull glassy grey-black crucible slag, formed by the combined reaction of the metal oxides, the clay matrix and fuel ash. The original form of the crucible is uncertain, but while it might appear to be the base of an oval-shaped crucible, this form was not normally used in the Anglo-Saxon period (ibid; Leahy 2003, 138–9). It is more likely, therefore, that <233> is from the base/wall of a deep narrow thumb pot, a larger version of those described as Type A at Coppergate (Bayley 1992, fig 323, no. 2333).

The mould <232> (Fig xx, No.2), was found in a period VI burnt deposit in OA20 [8166]. It is made of extremely fine reduced clay and is *c* 29mm thick; the extant dimensions of the inner face, which is gently curved, are 55mm x 66mm. The purpose of the mould is unclear but from its diameter it must have been used for a flat object such as a frying pan, or a large object such as a bell (cf Bayley 1992, 778, fig 338). This find is an important addition to the few that have so far been recognised in *Lundenwic* (Blackmore 1989, 128–9; Blackmore with Dennis 2003, 273).

Analysis

The five sherds were non-destructively analysed by ED-XRF for their qualitative compositions. Both inner and outer surfaces were analysed, paying special attention to traces of copper alloys and/or noble metals. The inferences made from the traces left in the ceramic to the possible original alloys are based on experimental work by Kearns *et al* (in press).

All the crucible fragments showed low concentrations of copper, moderate amounts of lead, and relatively high concentrations of zinc. This is the typical trace of an ordinary leaded brass. Regarding tin, this was only detected at significant (although very small) levels in crucible <238> ([8396]), which would suggest a leaded gunmetal (as opposed to leaded brass). However, the absence of detectable traces of tin in crucibles <233> ([8155]) and <239> ([8535], both fragments) is not evidence of its absence in the original alloys. Because of its particular thermochemical behaviour, tin may leave no detectable traces in crucibles and moulds, even if it is present in the original alloy in significant concentrations. Therefore the possibility of gunmetal in the other crucibles cannot be ruled out.

The suspected mould fragment <232> contains traces of copper, zinc, tin and lead, all of them rather faint but reliably detected, suggesting that leaded gunmetal was cast on it or, alternatively, successive casts of different binary or ternary alloys.

Appendix O – The Slag

Lyn Blackmore with Lynne Keys

Five contexts contained small amounts of slag (Table 1), which was examined macroscopically, weighed and recorded on an Excel spreadsheet. The earliest find, from a period II cremation <38> ([8867]) was first thought to be a molten bead (weight 1g), but XRF analysis suggests it is a form of fuel ash slag (D Dungworth pers comm). It may be a by-product of the cremation process rather than of industrial origin

The other finds are by-products of metalworking, with four complete smithing hearth bottoms. The earliest evidence for metalworking is from the period V silty sand [8155] in OA22, which contained the smallest smithing hearth bottom, weighing 246g, together with crucible <233> and Ipswich ware pottery. The other finds are all from period VI, OA18, which contained three smithing hearth bottoms. Two of these are from the primary fill of pit [8311] (one with part of the rounded edge), while the third was found in pit [8260]. The largest example, this weighs 831g and is quite irregular. A fragment of hearth lining was found in the overlying demolition dump [8306], while an undiagnostic fragment was found in the silty sand [8298]. Three undiagnostic pieces, possibly fragmented smithing hearth bottom, were found in fill [8186] of pit [8187] in OA19.

Period	Area	Cxt	Undiag	FAS	SHB	VHL	Gm	L	B	D	Comment
II	OA2	8867		1							
VI	OA18	8259			1		831	140	90	55	
VI	OA18	8298	1				111	64	58	36	
Vi	OA18	8310			1		383	95	79	43	part rounded edge
VI	OA18	8310			1		320	110	78	46	
VI	OA18	8306				1	77	57	45	35	
VI	OA19	8186	3				215	49	47	33	

Table 1 The distribution of the slag by period and area, giving maximum dimensions for length (L), breadth (B) and depth (D)

Appendix P – The Building Material

Ian M. Betts

PART 1: Chronological narrative.

PERIOD 1: Natural and pre-Saxon

No building material recovered.

PERIOD II: mid 6th – mid 7th century

Open Area 2

The only building material present was 19 extremely small fragments of abraded daub.

PERIOD III: mid 7th – early 8th century

Open Area 3

From the various pit fills came a few fragments of daub, one of which has a withy (round wooden rod) impression (Context 8842) indicating it comes from some sort of wattle and daub structure. Two pieces of Roman tile are also present, a brick and what may be either a brick or roofing tile.

Open Area 4

A Roman brick with a paw print in the upper surface was found in the redeposited brickearth or gravelly silts (Context 8710).

Open Area 5

A number of residual Roman tiles were recovered from Open Area 5. This is mainly brick and tegula roofing tile, although a couple of imbrices are also present. One of the bricks has a worn edge indicating use as paving. Associated with the brick and tile were a number of fragments of daub some of which have withy impressions, whilst another is part burnt suggesting it comes from a structure subject to heat or damaged by fire. One daub fragment, with a withy mark 9 mm in diameter, has what appears to be a crudely smoothed surface.

PERIOD IV: early – mid 8th century

Considerably more daub was recovered from Period IV which reinforces other evidence suggesting there was increased human occupation of the site during this period.

Structure 3

The only building material associated with this structure were two pieces of daub, one with a 16 mm diameter withy mark, from the fill of a post-hole (Context 8664).

Open Area 6

Daub and residual Roman ceramic building material were found scattered in various deposition layers, well and pit fills and a shallow liners feature. Three daub fragments (Context 8396) have a burnt and slightly vitrified upper surface, suggesting they may have formed part of some kind of hearth or oven structure.

Other daub shows evidence of less severe heat damage, suggesting it derives from a wattle structure destroyed or damaged by fire. Withy marks are present of certain fragments, generally 13-19 mm in diameter, which often have an exceptionally crudely smoothed top surface (Fig 1). One fragment (context 8654) has what may be a coat of limewash on its upper surface. More unusual are two wedge shaped daub fragments, the purpose of which is uncertain (Fig 2).

The residual Roman material comprises roofing tile and brick. Two have signature marks present, one of which also has part of a hob nail boot print. Both types of marks were added at the tilery before the tiles were fired. Also possibly residual Roman is a small fragment of fine grey coloured sandstone with a 28 mm deep hole (Fig 3). This appears to have been originally circular (33 mm in diameter), suggesting it could be a socket hole. This stone may have been used as paving in either the Roman or Saxon period.

Structure 4

A small quantity of daub was recovered from the fill of various stakeholes and small postholes (Contexts 8407, 8464, 8466, 8468 and 8551). Most shows evidence of burning and withy marks are present on certain fragments. One piece has a crudely flattened upper surface (Context 8464), whilst another has a white deposit attached, possibly limewash (Context 8407).

Open Area 7

Only a small quantity of daub was recovered along with a few Roman bricks and roofing tiles. Some of the daub, which shows evidence of burning, has withy marks 11-17 mm in diameter and a crudely smoothed top surface.

Structure 6

A few small abraded daub fragments were recovered from the compacted silty brown clay layer (Context 8398).

Open Area 8

Substantial quantities of daub were recovered from a sub-circular well (Contexts 8772, 8778) and a mixed layer of gravels and clays (context 8760). A small quantity of residual Roman tile was also present in both features. The well infill material comprises some 114 daub fragments, some showing evidence of burning. The latter includes a fragment with a 25 mm diameter withy impression and a curved outer surface (Context 8778), suggesting it may be from the corner of a wattle and daub structure. Other daub shows evidence for interwoven wattle work with individual withies between 10 mm and 23 mm in size (Fig 4). There is also an unusual wedge shaped piece of daub similar to that found in Open Area 6.

The 127 fragments of daub from the gravel and clay layer are much less well preserved. Some of the daub, most of which is abraded, again shows evidence of burning. Only one piece has a withy impression surviving.

Open Area 9

Most of the daub from Open Area 9 is small and abraded, and most is grey and black in colour indicating it has been burnt. Two, from an irregular cut feature, have 12 mm diameter withy marks (Context 8359). A Roman roofing tile and brick were also recovered from Open Area 9.

PERIOD V: mid – late 8th century

Open Area 10

The material from Open Area 10 comprises a mixture of Roman roofing tile, brick, combed box-flue and daub. The latter is mostly abraded and shows evidence of burning. A number of daub fragments have what may be a layer of limewash attached (Context 8362)

Open Area 11

A total of 29 fragments of daub were recovered from a layer of sandy gravels (Context 8357), some with withy marks 18-19 mm in diameter. Some of the daub shows evidence of burning and, as with the material in Open Area 10, there is what appears to be limewash attached to the top surface of certain fragments.

Structure 8

A small quantity of daub was recovered from post-hole fills (Contexts 8312, 8316). Again two have what may be limewash attached, together with what appears to be mortar. Some of the daub is partly burnt, and there is a curved piece with part of a withy impression.

Open Area 14

A solitary small burnt black lump of daub was present in the brown sandy silty layer (Context 8279).

Open Area 15

From a burnt clay and charcoal spread (Context 8327) was an unusual Roman brick with a chamfered and bevelled edge (Fig 5). The brick was made to this shape prior to firing, so presumably represents some sort of special commission for a particular Roman building.

Structure 9

A Roman brick was recovered from the closely packed stone layer (Context 8147).

PERIOD VI

Large quantities of daub and residual Roman tile were found dumped in Period VI, particularly in Open Area 18.

Open Area 18

Daub and Roman ceramic tile was found in a number of pit fills and dump deposits. Withy marks are found on some of the daub, which often shows evidence of burning. The top surface, where present, is normally crudely smoothed flat, although occasional curved fragments are present.

There are clear withy marks on the three pieces of daub recovered from a silty sand layer (Context 8257). This has withies between 9-22 mm in diameter, and may come from a pre-formed wattle panel between

vertical posts (Fig 6). Some of the daub from a dump layer has what may be limewash on the upper surface (Content 8272).

The Roman material present is similar to that found in earlier groups, mainly roofing tile and brick, but there are is wider range of fabric types present, suggesting it may derive from a different source. Signature marks are present on certain tiles.

Open Area 19

A small quantity of daub and Roman tile was recovered from a pit fill (Context 8169). The daub is part burnt and has withy marks *circa* 20 mm in diameter with a flattened top surface. The residual Roman tile comprises tegula, brick and a combed box-flue. One of the bricks has ridges in the base, possibly the impression of wooden racking on which the brick was laid out to dry prior to firing.

Open Area 20

Open Area 20 has a similar building material assemblage to that found in Open Area 19. There is a small quantity of daub present and a few Roman roofing tiles, bricks and a single combed box-flue. The daub from a clay silt layer (Contest 8213) includes a few burnt examples and a fragment with both vertical and horizontal 13 mm diameter withy marks.

Open Area 21

The only building material collected comprised two tegulae, a fragment of Hassock sandstone rubble, probably from the Maidstone area of Kent, and fine grained sandstone. The latter, which was probably quarried in the Weald, may have been used as roofing or paving material. Both stone types are probably Roman in date, but were presumably reused in the Saxon period.

Open Area 22

The building material comprises the same mixture of Roman roofing tile and brick and Saxon daub see elsewhere. The latter is partly burnt and there are the remains of withy marks *circa* 15-19 mm in diameter. A number of curved pierces were found in a large rubbish pit (Context 8202), including an unusual concave area, probably from round a vertical circular post.

PERIOD VII: mid-late 17th century

Open Area 23

Found in the earliest post-medieval deposit on the site were a couple of brick fragments, a peg tile and a fragment of residual Roman brick. The post-Roman material is not easy to date, but one of the bricks is in fabric 3032, suggesting a post-Great Fire of 1666 date.

PERIOD VIII: late 17th – early 19th century

The red bricks in the drain are slightly underfired examples of post-Great Fire date measuring 222-224 x 100-103 x 57-60 mm in size. Underfired and overfired bricks were often used in more minor brick structures, such as well, drains and cess pits, along with reused earlier bricks. The latter were used in the construction of Buildings 1 and 2.

Associated with the two small drains was a brick with a clay pipe stem in the clay matrix (Context 8753), and a reused brick with both white and hard grey mortar adhering (Context 8759). Bricks with clay pipe stems and occasional bits of the pipe bowl are not uncommon in London. It is unlikely their incorporation was accidental; rather they were added, along with other household waste, as an aid to firing. This addition of soil, town ash and other material, known as 'Spanish' was a unique feature of post-1666 London brickmaking (Cox 1989, 4).

The soakaway was lined with frogged yellowish-red coloured bricks measuring 221 x 97 x 62 mm (Context 8595). These may be London stocks, made in north Kent and to a more limited extent in south Essex, or paler versions of London-made bricks. If they are London stocks then they probably date to the period 1725-1900.

From the top of the well came a couple of brick fragments and part of a peg roofing tile (Context 8573).

Building 1

The bricks used in the construction of Building 1 are a mixture of darker red bricks of post-Great Fire of 1666 type (fabric 3032) and lighter red and orange coloured pre-Great Fire examples (fabric 3033, 3046). The latter, based on there size, are probably mid 16th-mid 17th century in date. It was relatively easy to reuse bricks salvaged from destroyed or damaged pre-Great Fire buildings as they are generally of similar size, although those reused in Building 1 are fractionally larger: 224-231 x 104-105 x 61-63 mm - pre-Great Fire) compared with 212-224 x 95-107 x 60-65 mm - post Great Fire. A slightly overfired brick in fabric 3032 is slightly smaller still (209 x 102 x 61 mm).

Certain post-Fire bricks (Contexts 8068, 8075 and possibly 8076) also show evidence of reuse from an earlier brick structure. Two bricks (Contexts 8068, 8075) have a white mortar layer which is covered by a grey and a light brown mortar layer respectively. Another brick (Context 8076) appears to show cream mortar above a white mortar layer.

The apsidal structure (Context 8032) contained almost complete peg roofing tile measuring 270 x 155-158 x 12-13 mm. There are two small distorted nail holes near the upper edge; their small size suggests a mid 17th-18th century, or later date.

The brick from the wall blocking (Context 8026) has a shallow frog, which indicates an eighteenth century AD or later date.

The tiled floor (Context 8044) is made from unglazed floor tiles measuring 251-254 mm square by 27-32 mm in thickness. They could be of either English or Dutch manufacture, and probably date to the seventeenth-eighteenth century AD. Almost identical tiles were found in context 8083.

A plain unglazed floor tile was recovered from floor 8083. This measures 245-251 mm square by 29-31 mm in thickness, and is in the same fabric (a sandier version of 2317).

The tiled floor (context 8007) is made up of plain unglazed floor tiles. The presence of a distorted (square?) nail hole in the retained sample suggests these tiles were imported into London from the Netherlands, probably in the seventeenth or eighteenth centuries AD. They are quite large in size, measuring 299-302 mm square by 45 mm in thickness.

The bricks in wall 8011 were rendered in whitewash (or possibly white paint).

Building 2

In contrast to Building 1, there seems to be less reused earlier brick in this building. The only probably pre-Great Fire brick noted was a broken fragment from Context 8560. The remaining brick was mainly of dark red type dating to after 1666. The only exception was a frogged London stock brick from Context 8350. This is probably mid-late eighteenth or nineteenth century AD in date.

PERIOD IX: mid 19th century

Open Area 24

Two blue on white tin-glazed delftware wall tiles (Fig 7) were recovered from the substantial demolition deposits sealing Buildings 1 and 2 (Context 8002).

PART 2: Specialist Building Material Report

Introduction

The large ceramic building material assemblage from London's Transport Museum, Covent Garden comprised 177 kg (2387 fragments) of ceramic building material from 164 contexts. There are also two fragments of stone and a solitary weathered fragment of mortar. The building material is of Roman, middle Saxon and post-medieval date, there is no evidence of medieval building activity on the site.

Fabric type

The fabric numbers given in the text refer to type examples housed in a fabric reference collection at the Museum of London. This is available for consultation on request.

Roman

Ceramic building material

Fabric types: 2815 group, 2453, 2454, 2459B, 2459C, 3023, 3024?, 3029, 3060, 3226, 3238

The Roman building material is chiefly of second– mid third century AD date, although there are a few imported roofing tiles which may be slightly later (fabrics 2453, 3029). Only one fragment of first century AD fabric type 2454, from north-west Kent, was present on the site. Most of the remainder of the building material is in London area fabric group 2815, dating to around AD 50-160, and fabric group 2459B/2459C, believed to be from north-east London or Essex, dating to around AD 120-250. Both are very common on Roman sites in London.

A variety of other fabric types are present, in addition to those mentioned above. These are fabrics 3023 and 3060 from Radlett, Hertfordshire, fabric 3226, probably from a tilery in north Kent, and slightly silty fabrics 3028, 3238 from unknown production sources.

The majority of the Roman tile present is brick and roofing tile: mainly tegulae with a smaller quantity of imbrices. A few combed box-flue tiles are present, one of which is keyed with a five tooth comb.

The Roman material has the usual range of marking applied, either accidentally or deliberately, before firing. These include a number of bricks and tegulae roofing tiles with signature marks applied by the tips of the fingers on the top surface. One brick has part of a hob nail shoe imprint (Open Area 6, Context 8747), whilst a further example has a paw print (Context 8719). More unusual is a brick from Open Area 19 (Context

8169) with what may be the impression of wooden racking in its base, and a brick from Open Area 7 (Context 8765) with shallow pits in the edge.

Stone

Two stones were found associated with a Roman roofing tile in a pit fill in Open Area 21 (Context 8217) are probably Roman in date, although middle Saxon pottery is also present. The stones comprise Hassock sandstone rubble, probably quarried in the Maidstone area of Kent, and a fine grained laminated sandstone, probably from the Weald. The latter, which is 18 mm thick, may have been used as roofing or paving in a late Roman building.

Daub

It is possible some of the daub could be Roman in date, but most is undoubtedly from middle Saxon wattle and daub structure located on or near the site.

Discussion

Excavations in the vicinity of the Royal Opera House produced clear evidence for the reuse of Roman building material in middle Saxon London. According to Smith (2003, 222) 'many of the fragments show signs of burning, in the form of blackened surfaces or surface cracking'. The Roman material most commonly reused was tegula and imbrex roofing and brick. These are also by far the most common types of tile found associated with middle Saxon occupation on LTM03. What does differ markedly is the almost total absence of burnt and cracked tiles which could have been reused in Saxon hearths. This begs the question as to what purpose, if any, the Roman tile at LTM03 served. There is no evidence for use in hearths or oven structures, or as a paving or flooring material. Some tile could have been used in post-packing, but the majority of came from general occupation layers or pit dumps. There is a solitary brick in Open Area 5 with a smoothed edge, indicating reuse as paving, but this came from a midden deposit which was spread out as a levelling layer. The bricks reuse as a paving material would appear to have taken place before its arrival on the site.

More puzzling still is the scatter of Roman tile found in Period III, when the site was outside the main area of occupation. This raises the question as to where the Roman tile came from. There is no evidence for Roman occupation on the site, so it is safe to assume it was brought on to the site during the middle Saxon period. However, if the tile is just general dumping, rather than deliberate reuse, then it seems unlikely to have travelled far. Smith (2003, 222) speculated that the reused tile found at the Royal Opera site was deliberately salvaged from the ruins of the Roman city to the east, but this would seem a less likely explanation for the tiles dumped on LTM03. Here the material is highly fragmentary; there are no complete tiles (only one part complete brick) which would be expected if the material had been deliberately salvaged for reuse.

An alternative explanation is that the Roman material brought in as general dumping represents the remains of Roman structures nearer to Lundenwic. Evidence for late Roman activity, in the form of a tile kiln and stone sarcophagus has been found at St Martin's-in-the-Fields to the south-west of Covent Garden (Betts 2006) and an earlier possible Romano-Celtic temple is located near the Old Bailey (Perring 1991, 82).

The counter argument again Roman occupation nearby is the lack of other building material types which would be expected: such as tessera and wall plaster, which are not normally selected to be reused. However, tessellated pavements and painted wall may not have existed in lower status domestic buildings situated in open countryside on the western fringe of Lundinium. This still leaves the question as to the location of the hypocausted building which originally contained the small number of box-flue tiles found on the site.

We will probably never know for sure where the Roman material from LTM03 originated, or its reason for its presence on the site in the middle Saxon period. What we cannot assume it that all this material was deliberately brought in from the ruins of Lundinium, at least some may represent the remains of Roman structures situated nearer to Lundenwic.

Middle Saxon

Although a large quantity of middle Saxon daub was recovered, very few large fragments survived. The surface of the daub is often only crudely flattened to an approximate flat surface. There are also a number of fragments with a slightly curved top surface. These may be from the junction between floors, ceilings, walls or windows.

Much of the daub clearly comes from wattle and daub structures, as a considerable number of fragments have at least one or two withy rod impressions preserved. These range in size from 8 mm to 25 mm in diameter, although the majority are only 11 mm to 20 mm in diameter. Regrettably, although daub with withy marks is common they give little, if any information, as to wattle construction methods. An exception is a daub fragment from Open Area 18 which shows evidence for horizontal interwoven withies held in place at the front by two or more vertical withies rods. The back of the horizontal withies is held in place by another withy which may be pegged in to what could be a large vertical post (Fig 6). It this interpretation is correct, then the daub could have covered the edge of a pre-formed wattle panel similar in appearance to that illustrated by Hughes (2005 132, fig 73). The use of horizontal withies of similar thickness to the vertical members has been noted as a construction method at Jubilee Hall (Goffin 1988, 117).

The daub from Open Area 8 show similar interwoven wattle construction methods, although here there is evidence they may have been held in place by horizontal withies which may have formed part of the supporting framework (Fig 4). Similar wattle marks were found on the daub from Maiden Lane (Goffin 1988, 118). Further daub showing that the horizontal withies were held in place by vertical round withies was recovered from Context 8237 (Fig 8), although it is not certain if the latter came from a free standing or pre-formed wattle panels.

Of particular interest are a number of daub fragments with a white deposit on their surface. This may be the remains of some sort of limewash, or whitewash coating. The same coating was also noted on middle Saxon daub from the Jubilee Hall and Maiden Lane sites (Goffin 1988, 115). There is no indication where this white coating was applied, although it is unlikely to have been applied externally, as it would soon have washed off or become discoloured. It is more likely to have been applied internally to lighten the inside walls of wattle and daub buildings, very much as white paint is applied to lighten the wall of many modern buildings.

Possibly reused in the middle Saxon period, although almost certainly originally Roman in date, is a 70 mm thick grey coloured fine grained sandstone from Open Area 6 (Context 8791). This has a smoothed or worn edge, and a smoothed top surface with part of what appears to be a round hole 33 mm in diameter by 28 mm deep. The base of two similar holes are present in the damaged underside, along with what appears to be a fossil animal track. The upper surface may have been used as paving with the hole representing some kind of door socket.

Post-medieval

Brick

Fabric types: 3032, 3033, 3034, 3035, 3046

Almost all the bricks described below relate to building development in the area from the late eighteenth to the ninetieth century AD. A number of brick samples were collected from Buildings 1 and 2, and other post-medieval brick structures found on the site. These bricks fall into one of three main groups, the first two of which are almost certainly the products from brickyards situated on the outskirt of London. The earliest (fabrics 3033, 3046) are generally red and orange in colour and date to around 1500-1666. The second, which form the majority of bricks recovered from Buildings 1 and 2, are generally dark red, although underfired examples can be brown or orangey-brown (fabrics 3032, 3034). These date to the period 1666-1900, with the shallow frogged and sharp edged examples no earlier than around 1700. The last group comprises frogged yellow London stock bricks (fabric 3035) from brickyards in north Kent, or possibly south Essex (Cox 1989, 11). They were first used in the capital around 1725-1750, but became more fashionable in the late eighteenth and nineteenth centuries AD.

All the bricks recovered from the site have been measured (Table 1). Those of earlier type (fabrics 3033 and 3046) are slightly larger in size, but within each fabric group there is a high degree of uniformity. This may well reflect the various Acts of Parliament which were introduced in the eighteenth century AD to regulate the minimum size of bricks made 'within 15 miles of London' (Lloyd 1925, 48-50).

In should be noted the there is clear evidence for the reuse of red and orange coloured bricks in fabrics 3033 and 3046 in later structures, particularly Building 1. This is also evidence, in the form of two different coloured mortar layers, for the reuse of post-1666 brick in Building 1 (Contexts 8068, 8075).

A particular feature of certain bricks is the presence of white paint or, more likely whitewash on the stretcher or header face. This coating is found on a number of mid seventeenth- eighteenth century AD bricks (fabric 3032).

Brick flooring

Fabric type: 3047

From Context 8102 is a brick floor slab which appears to be have been broken in half before in was placed into a floor. It is in a brick fabric (type 3047) and the straight sides indicate it was probably made as a thin brick which was subsequently used, or possibly reused, as a paving slab. It measures 227 mm by 42 mm in thickness and was found in a dump deposit with pottery dated 1850-1900.

Floor tile

Fabric types 2317? (sandier variant), 2850

The floor tiles, all unglazed, are of two sizes (Table 3). The tile of larger size is made from a silty clay (fabric 2850) and has part of a square nail hole in the top corner. There may be another hole obscured by mortar in the diagonally opposite corner. Both features, fabric and nail hole, indicate the tile was imported into London from the Low Countries.

The smaller tiles are in two fabric types: the same silty fabric as the large tile and what appears to be a slightly sandier version of fabric 2317. The silty tiles have a distorted nail hole in two diagonally opposite corners. In contrast, the tiles in the sandier version of fabric 2317 would appear to lack such holes. The silty tiles are also of Low Countries origin and it is possible, based on the close similarity in size, that the other smaller tiles are from the same source, although perhaps not from the same manufacturing site.

Neither size of tiles can be dated with precision, although it would seem likely that they were brought over sometime during the mid seventeenth- eighteenth century AD. Tiles of both sizes were used in the tiled floors in Building 1 (Contexts 8007, 8004 and 8083)

Wall tile

Fabric types: 3064, 3067

Two Dutch delftware wall tiles were found in the demolition deposits sealing Buildings 1 and 2 (Context 8002). It is possible these came from a fireplace surround or kitchen in one of the two buildings. Both show landscape scenes in blue on white but are painted in different decorative styles (Fig 7). One tile has the so-called 'spider head' corner motif and shows certain similarities to a set of Dutch tiles illustrated by van Dam (1991 101, no. 112) dating to 1740–1760. The other, which shows a landscape set in a circular border, has 'barred ox-head' style corner decoration.

Landscape tiles with these borders are not easy to date. The first tile, which measures 124 mm in height by 8 mm in thickness, probably dates to late seventeenth- mid eighteenth century AD, whilst the second, which measures 7 mm in thickness, is probably eighteenth century AD.

Roofing Tile

Fabric types: 2271, 2276, 2816

A number of peg roofing tile were recovered, including one complete and two almost complete examples (Table 2). All have small distorted nail holes, which on one tile are 7 mm in diameter. They are difficult to date precisely, but the small nail hole size suggests a mid seventeenth - eighteenth century AD date. These tiles were almost certainly made at a tilery somewhere in the London area.

Table 1 Brick size (in millimetres)

Fabric	Date	Length	Breadth	Thickness
group 1:	circa 1550-1666			
3033		222-234	101-111	56-63
3046		228-231	105-106	58-63
group 2 :	1666-1900			
3032		211-226	95-107	58-67
3034		-	102	61
group 3:	1725/50-1940			
3035		214-223	93-105	60-63

Table 2 Peg tile size (in millimetres)

Context	Fabric	Length	Breadth	Thickness
008	2816	-	156-157	12
8032	2271	270	155-158	12-13
8748	2276	267	157-160	13

Table 3 Floor tile size (in millimetres)

Context	Fabric	Length	Breadth	Thickness

8007	2850	302	299	45
8044	2317?	254	251	27-32
8083	2317?	251	245	29-31
8074	2850	250	246	28?
8074	2850	253	249	30

Appendix Q – The Animal Bones

Kevin Rielly and Alan Pipe

1. Introduction

This report quantifies, identifies and interprets the hand-collected and wet-sieved animal bone recovered from the Saxon and post-medieval periods. Constraints on time identified during the assessment report (Rielly 2006) required use of a modified, 'scanning' method to record the Saxon assemblage whereas the smaller post-medieval group was recorded in accordance with usual MoLAS procedure. This discrepancy, although resulting from the attempt to optimise data retrieval, has inevitably created two datasets that are not completely compatible and considerable fine detail recorded in the post-medieval tables is not shown for the Saxon bones. It should be stressed that, overall, the report and accompanying tables represent an attempt to provide the maximum range and depth of data with the resources available, and to interpret the main occupation phases at least in terms of the characteristic features of the meat diet, industry and local habitat.

2. Methodology

Although the great majority of these bones were recovered by hand-collection, a much smaller assemblage derived from soil samples washed through a 1mm flexible nylon mesh and then visually sorted. Identifications referred to the MoLAS Environmental Archaeology reference collection; Cohen & Serjeantson 1996; Schmid 1972; and Wheeler 1978. Antler terminology was taken from Page 1971, 56. Fish distribution was discussed with reference to Wheeler 1978 and 1979.

The Saxon assemblage was recorded, 'scanned', directly onto Excel spreadsheets without the intermediate stage of database entry and using codes and conventions devised specifically for this group (Rielly 2006). This method, devised to allow maximum inspection of the assemblage in limited time, effectively recorded species representation, epiphysial fusion, mandibular tooth wear, sex determination and the measurement of selected bones. There was no recording of unidentifiable fragments not assigned to species, genus or family level, and only very selective recording of toolmarks and other modifications.

In contrast, the smaller post-medieval assemblage was recorded onto the MoLAS Microsoft Access animal bone post-assessment database in terms of standard parameters:- species, skeletal part, fragmentation, sex, age, dental eruption and wear, epiphysial fusion, butchery, burning, gnawing, working, pathological change and measurements. Fragments not identifiable to species, genus or family level were assigned to an approximate category; 'chicken-sized', 'ox-sized', 'sheep-sized' or 'deer, unidentified', as appropriate. Recording of dental eruption and wear follows Grant 1975 and 1982; measurements follow the sequences and techniques of von den Driesch 1976. Well-preserved longbones were measured if complete or, if incomplete, they included a late-fusing epiphysis. Mandibles were measured if they included a third molar in wear. Approximate ages for tooth eruption and epiphysial fusion sequences are taken from Schmid (1972, 75-77) and Amorosi (1989, 98-99).

Estimated statures were calculated as withers (shoulder) heights for ox, sheep/goat, pig, horse and dog with respect to conversion factors summarised by Driesch, von den & Boessneck, 1974.

A large proportion of these data will be detailed in the following text and tables; all are available complete in the AOC archives and in the MoLAS external site Access database.

For the Saxon and post-medieval groups, Tables 1 - 12 show the complete catalogues and the detailed recovery in terms of carcase-part, evidence for age at death, sex, modification and measurement.

3. The bone assemblages

Saxon

Hand-collection and wet-sieving produced approximately 6000 fragments assignable to at least family level identification. The group derived largely from largely from ox *Bos taurus,* sheep/goat *Ovis aries*/*Capra hircus* and pig *Sus scrofa* with a relatively minor contribution of domestic poultry derived from chicken *Gallus gallus*, goose, probably *Anser anser* and mallard/domestic duck *Anas platyrhynchos*. Associated domestic mammals, horse *Equus caballus*, dog *Canis familiaris* and cat *Felis catus* were recovered only very sparsely; dog from [8647] and Phase III Open Area 5 [8800]; horse from [8154], Phase III Open Area [8836] butchered scapula, [8166], [8186], Phase IV Open Area 9 [8385], Phase VI Open Area 18 [8766], [8789]; and cat from [8186] , [8266] and Phase IV Open Areas 6 [8654] and 7 [8801] {104}. A horse scapula from [8836] showed clear, heavy chop marks, and perhaps also knife cuts, perhaps indicative of disarticulation and defleshing for either human or dog consumption.

Evidence for exploitation of wild 'game' birds and mammals was sparse with recovery of single fragments of dove, probably stock dove *Columba oenas* or rock dove *C. livia* from Phase III Open Area 5 [8800] {108}, and woodcock *Scolopax rusticola* from Phase VI Open Area 20 [8167]; and occasional recovery of red deer *Cervus elaphus* from Phases IV Open Areas 6 and 7; Phase V Open Area 10 and Phase VI Open Area 18 mainly as fragments of worked antler but very occasionally as skull or longbone fragments, probably indicating some very limited exploitation of venison as well as collection of shed antler for manufacture. Recovery of roe deer *Capreolus capreolus* was shown only by a single fragment from Phase III Open Area 5 [8800] and another from Phase VI [8169]. Non-consumed commensal birds and mammals were indicated only by raven *Corvus corax* from Phase VI Open Area 22 [8154] and occasional finds of unidentifiable small rodent.

Human bones were recovered from Phase I [8852] {121}, Phase II Open Area 2 [8553] {43}; Phase III Open Area 5 [8800]; Phase IV Open Area 6 [8655]; and Phase IV Open Area 7 [8801].

Numerical abundance of the hand-collected bone fragments varied considerably between phases; from 966 fragments in Phase III and 2049 in Phase VI, the relative abundance of the major domesticates, cattle, sheep/goat and pig, remained rather uniform. When together expressed as 100 per cent of the fragment count (Table 5); cattle varied between 57.6 % (Phase VI) and 70.2 % (Phase III); sheep/goat between 11.8% (Phase III) and 22.7% (Phase VI); and pig between 15.0% (Phase V) and 19.7 % (Phase VI) suggesting no distinct and definite change in dominance when sample size is considered.

Evidence for the major domesticates from epiphysial fusion and dental eruption and wear (Tables 7 and 8) indicates a mixed population derived largely from subadults and adults with relatively very few foetal/neonate, infant or aged animals, probably an indication of consumption of good quality meat from animals of a range of ages but mainly including those reared for meat production rather than those likely to have fulfilled a primary role such as dairying, traction or wool production. The relative scarcity of very young animals tends not to imply dairying or stock rearing in the immediate vicinity.

Stature estimates for cattle ranged between 1.038m (Phase IV [8801]) and 1.285 m (Phase VI [8766]); for sheep between 0.540 m (Phase VI [8766]) and 0.686 m (Phase VI [8186]); sheep/goat between 0.564m (Phase III [8789]) and 0.600m Phase VI [8169]; goat 0.669 m Phase IV [8616]; pig between 0.718m (Phase VI [8169]) and 0.764 m (Phase III [8800]); and horse 1.274 m [8385]. The ranges for cattle and sheep lie firmly towards the centres of the estimated stature ranges for Early Saxon West Stow (Crabtree 1989), and Middle and Late Saxon London (Rielly, pers. comm.); the median value for cattle, 1.162 m, also corresponds very closely with the mean stature of approximately 1.140 m given by Armitage 1982 for 7th-10th century AD

cattle. The horse stature is compares to a modern riding pony and lies in the centre of the stature range for London medieval horses (Rackham 1995, 170).

Post-medieval

The small but very well-preserved post-medieval assemblage comprised a total of 649 bones largely dominated by ox *Bos taurus* and 'ox-sized' fragments but with only slightly smaller components of sheep/goat *Ovis aries /Capra hircus* and 'sheep-sized' and pig *Sus scrofa*. There was a relatively minor contribution of domestic poultry; chicken *Gallus gallus*, goose, probably domestic goose *Anser anser*, mallard/domestic duck *Anas platyrhynchos* with two fragments of the New World introduction, turkey *Meleagris gallopavo*. As with the Saxon assemblage, associated domestic mammals were sparse being confined only to two fragments of horse *Equus caballus* and no recovery of dog *Canis familiaris* or cat *Felis catus*. Fragments of wild 'game' included only two fragments of fallow deer *Dama dama*, with fragments of unidentifiable deer antler, probably fallow or red deer *Cervus elaphus*, and very occasional fragments of rabbit *Oryctolagus cuniculus* and hare, probably brown hare *Lepus europaeus*; there were no game birds. There was no recovery of commensal, 'scavenger' birds or mammals and no human bone.

The small assemblage of wet-sieved fish bone included only marine/estuarine examples; cod *Gadus morhua* and cod family Gadidae, plaice *Pleuronectes platessa* and plaice family Pleuronectidae, all perhaps derived from one example of each identified species. Each species is abundant in the tidal Thames and its estuary and has a long history of exploitation throughout London and environs.

Numerical abundance of the hand-collected and wet-sieved differed noticeably from that seen in any of the Saxon phases in that the abundance of sheep/goat is larger relative to ox than seen in the earlier periods, whereas pig appears little changed. Here ox produced 49.8%, sheep/goat 33.5 %, and pig 16.7% of the major domesticates when expressed together as 100% of the assemblage. It should be stressed that these proportions also include the fragments identified only as 'ox-sized' and 'sheep-sized' and therefore may be skewed by the relatively greater fragility and potentially larger fragment count shown by sheep/goat longbones relative to those of ox.

Evidence for the major domesticates from epiphysial fusion and a limited dataset for dental eruption and wear (Tables 3 and 10) indicates a broadly similar age-group distribution to that shown in the Saxon phases; a mixed population derived largely from subadults and adults with relatively very few juveniles and virtually no foetal/neonate, infant or definitely old animals, probably an indication of consumption of good quality meat from animals of a range of ages but mainly including those reared for meat production rather than those likely to have fulfilled a primary role such as dairying, traction or wool production. The relative scarcity of very young animals tends not to imply dairying or stock rearing in the immediate vicinity. Dental evidence indicates an ox in at least the third year; a sheep/goat in the four year; and pigs in the first, second and at least the fourth year.

Stature estimates for cattle ranged between 1.134m [8025] – 1.180m [8573]; for sheep between 0.539m [8762] – 0.611m [8573]; sheep/goat between 0.567m [8880] - 0.621m [8573]; and goat 0.565 m [8573]; all within the Saxon ranges for London and in the lower half of the ranges of statures for post-medieval cattle and sheep from the City of London and Southwark. No stature estimates were possible for pig or horse.

4. Evidence for industrial activity

Saxon

The hand-collected and wet-sieved Saxon bone groups provided limited but definite evidence for working of red deer antler and ox and goat horn.

Unphased context [8157] produced an offcut of red deer antler which had been sawn proximally and distally through the beam, and through one of the tines. This would have detached the tine tip, perhaps for use as a toggle, and produced straight sections of beam suitable for further manufacture.

Phase IV Open Area 6 [8737] {83} produced a fragment of chopped red deer antler.

Phase IV Open Area 7 [8525] {39} produced 11 fragments of chopped red deer antler.

Phase IV Open Area 9 [8385] produced a fragment of red deer skull with attached antler base (pedicle). The antler had been removed by repeated chops from the anterior and lateral sides. The skull also showed superficial chop marks on the skull below the pedicle, probably an indication of detachment of the hide from around the base of the antler during skinning.

Phase VI Open Area 18 [8292] {9}, [8771] {95} and [8766] {91} produced chopped fragments of red deer antler, probably representative of initial reduction of antlers to produce tines and beam sections for further manufacture. The largest group, at least 60 fragments, derived from [8771] {95}.

An ox horncore from Phase III Open Area 5 [8800] had been transversely sawn through immediately above the base; a large male goat horncore from Phase IV Open Area 8 [8646] had been chopped through transversely at the base.

Post-medieval

Tool mark evidence from the post-medieval assemblage, although sparse, provided clear evidence for preliminary working of deer antler and ox, sheep and goat horn.

Contexts [8090] and [8600] produced fragments of unidentifiable deer antler beam which had been sawn through transversely at the proximal and distal ends. The fragment from [8090] had also been sawn lengthwise. These antler pieces may probably be interpreted as off-cuts during the primary preparation of long straight sections of beam prior to sawing lengthwise into slices for further manufacture. There were no missed or altered cuts and it is therefore impossible to comment on the thicknesss or quality of the blade(s) in use. Examination of the post-medieval catalogue (Table 3) indicates considerable use of saws, as well as cleavers and knives, for butchery within this group in comparison with the virtual or probably total absence of evidence for this technique, for butchery, in the Saxon assemblage. Although this change reflects that usually seen in London assemblages, it should also be acknowledged that some of the sawn limbone midshafts, particularly of cattle, recorded from the post-medieval group are not distinguishable from bone-working waste and may derive from such activity as well as from butchery alone.

Horncores showing clear proximal transverse chop marks were recovered from ox [8606]; sheep [8573] and [9381]; and goat [8188]. These marks were probably produced during initial removal of the horn sheath, perhaps after preliminary preparation such as soaking in water, for further manufacture elsewhere.

In summary, for the Saxon and post-medieval assemblages, although some involvement in at least primary antler and horn working is indicated, there is no evidence for larger scale organised activity *in-situ*. The absence of damaged blanks and groups of smaller off-cuts derived from post-preliminary preparation also strongly supports this.

6. Tables

Table 01: Hand-collected animal bone from LTM03 Saxon contexts/fragment counts

CONTEXT	ox	sheep/goat	pig	horse	chicken	goose	mallard	dog	cat	deer, unid.	deer, roe	deer, red	raven	cod	human	TOTAL
8143	2	1	1													4
8145	3	1	1													5
8146	10	0	5		1	1										17
8149	10	2	0													12
8151	4	2	0													6
8154	160	103	59	1	8	9	1						4			345
8155	107	57	26		1	1										192
8166	78	18	23	1	1	5	1							1		128
8169	139	55	57		6	8				1	1					267
8172	118	24	26			1										169
8186	257	88	117	1	12	6			1							482
8217	58	25	16		1											100
8255	2	0	6													8
8263	1	0	0													1
8266	9	4	3			2			1							19
8279	3	3	2													8
8282	4	1	1													6
8295	12	0	0													12
8319	1	1	0													2
8327	6	2	2													10
8329	2	0	2													4
8336	3	0	0													3
8355	2	1														3
8357	10	1	0													11
8358	21	1	1													23
8362	179	33	37			3										252
8366	28	7	7		1											43
8367	57	19	16													92
8385	20	0	1													21
8385	9	0	2	1						1						13
8388	17	0	4													21
8405	3	0	0													3
8406	3	0	2													5
8464	1	0	0													1
8503	12	15	3									1				31
8505	27	2	5													34

8525	52	12	21									1				86
8571	46	27	11		1											85
8613	16	2	3													21
8616	105	20	51													176
8618	76	10	30													116
8639	47	12	17													76
8646	3	1	0													4
8646	32	9	10			1										52
8647	52	11	10					1								74
8654	72	12	3						1							88
8655	33	4	3												1	41
8656	56	15	15													86
8657	91	16	23													130
8659	60	6	12		1							1				80
8662	13	0	0													13
8670	33	1	13													47
8737	20	5	11													36
8738	7	8	8													23
8747	20	12	10													42
8757	110	28	26			2						1				167
8760	66	4	13													83
8765	16	3	5													24
8766	62	33	20	1		1										117
8771	47	18	18													83
8778	14	16	11			1						1				43
8783	24	5	12													41
8789	122	40	56	1												219
8791	10	3	0													13
8799	77	5	17													99
8800	218	29	33		1	1		1			1				1	285
8801	44	4	4			1									1	54
8804	32	4	5													41
8832	4	0	1													5
8834	2	0	1													3
8836	11	1	4	1												17
TOTAL	**3071**	**842**	**902**	**7**	**34**	**43**	**2**	**2**	**3**	**2**	**2**	**5**	**4**	**1**	**3**	**4923**

Table 02: Wet-sieved animal bone from LTM03 Saxon contexts/fragment counts

PHASE	LANDUSE	CONTEXT	SAMPLE	TAXON	NOS.	COMMENTS
I	0	8852	121	ox	1	atlas
I	0	8852	121	human	2	slull/longbone/very young
II	0	8701	73	ox	1	
II	OA 2	8553	43	sheep/goat	1	
II	OA 2	8553	43	pig	3	
II	OA 2	8553	43	ox	4	
II	OA 2	8553	43	human	1	mandible
III	OA 3	8533	32	ox	1	
III	OA 3	8533	32	pig	1	metapodial
III	OA 3	8670	66	ox	2	
III	OA 3	8683	69	ox	2	skull
III	OA 3	8683	69	sheep/goat	1	tooth
III	OA 3	8683	69	pig	1	skull
III	OA 3	8693	71	pig	6	metapodial/phalange
III	OA 3	8834	117	ox	3	
III	OA 3	8834	117	ox	1	
III	OA 3	8834	117	sheep/goat	1	
III	OA 3	8836	118	ox	3	
III	OA 3	8836	118	chicken	1	
III	OA 3	8836	118	sheep/goat	2	
III	OA 3	8836	118	pig	1	metapodial
III	OA 3	8836	118	fish, unidentified	1	
III	OA 5	8656	67	frog/toad	1	
III	OA 5	8656	67	ox	1	
III	OA 5	8656	67	ox	2	
III	OA 5	8656	67	carp family	1	vertebra
III	OA 5	8656	67	sheep/goat	1	tooth
III	OA 5	8656	67	rodent, small	1	femur
III	OA 5	8656	67	pig	1	
III	OA 5	8799	106	ox	9	
III	OA 5	8799	106	ox	12	
III	OA 5	8799	106	sheep/goat	8	
III	OA 5	8799	106	pig	3	
III	OA 5	8799	106	pig	1	
III	OA 5	8800	108	ox	8	teeth/calcaneum/tarsal/phal
III	OA 5	8800	108	dove	1	tibia
III	OA 5	8800	108	pig	7	
III	OA 5	8804	107	ox	20	skull
III	OA 5	8804	107	chicken	1	metatarsal
III	OA 5	8804	107	fish, unid.	1	skull
III	OA 5	8804	107	sheep/goat	3	
III	OA 5	8804	107	pig	5	mandible/fibula/metapodial
IV	OA 6	8396	20	ox	2	skull
IV	OA 6	8396	20	sheep/goat	2	
IV	OA 6	8396	20	pig	1	phalange
IV	OA 6	8396	20	goose	1	sacrum
IV	OA 6	8520	30	ox	5	skull/phalange
IV	OA 6	8520	30	chicken	1	humerus
IV	OA 6	8520	30	sheep/goat	3	
IV	OA 6	8520	30	pig	5	
IV	OA 6	8613	50	ox	8	
IV	OA 6	8613	50	pig	2	tibia/foetal/neonate
IV	OA 6	8618	51	ox	17	skull/mandible/phalange
IV	OA 6	8618	51	pig	4	
IV	OA 6	8654	62	ox	1	skull
IV	OA 6	8654	62	chicken	1	coracoid
IV	OA 6	8654	62	sheep/goat	3	maxilla
IV	OA 6	8655	63	ox	1	tooth
IV	OA 6	8655	63	chicken	1	ulna
IV	OA 6	8655	63	sheep/goat	1	
IV	OA 6	8655	63	pig	2	metapodial
IV	OA 6	8737	83	ox	1	innominate
IV	OA 6	8737	83	sheep/goat	5	head
IV	OA 6	8737	83	pig	5	head
IV	OA 6	8737	83	ox	10	
IV	OA 6	8737	83	deer, red	1	worked antler
IV	OA 6	8737	83	chicken	1	tibia
IV	OA 6	8737	83	sheep/goat	12	skull
IV	OA 6	8737	83	pig	6	

IV	OA 6	8738	84	ox	3	
IV	OA 6	8738	84	chicken	1	
IV	OA 6	8738	84	sheep/goat	4	
IV	OA 6	8738	84	pig	2	
IV	OA 6	8791	101	ox	5	
IV	OA 6	8791	101	chicken	1	femur
IV	OA 6	8791	101	chicken-sized	1	
IV	OA 7	8405	24	ox	2	
IV	OA 7	8525	39	ox	3	
IV	OA 7	8525	39	deer, red	11	antler fragments
IV	OA 7	8525	39	cod family	1	vertebra
IV	OA 7	8525	39	carp family	4	vertebra
IV	OA 7	8525	39	roach	1	pharyngeal
IV	OA 7	8525	39	sheep/goat	1	phalange
IV	OA 7	8525	39	plaice/flounder	1	vertebra
IV	OA 7	8525	39	pig	1	tooth
IV	OA 7	8571	57	sheep/goat	2	skull
IV	OA 7	8571	57	pig	1	skull
IV	OA 7	8801	104	ox	2	tooth/phalange
IV	OA 7	8801	104	cat	1	skull
IV	OA 7	8801	104	goose	1	scapula
IV	OA 7	8801	104	pig	3	
IV	OA 8	8760	90	ox	12	
IV	OA 8	8760	90	herring family	3	vertebra
IV	OA 8	8760	90	sheep/goat	4	
IV	OA 8	8760	90	pig	4	
IV	OA 9	8385	17	ox	2	
IV	OA 9	8385	17	chicken	1	vertebra
IV	OA 9	8385	17	sheep/goat	1	phalange
IV	STR 4	8407	26	frog/toad	1	
IV	STR 4	8407	26	ox	3	
IV	STR 4	8407	26	pig	1	skull
IV	STR 4	8551	44	ox	2	
IV	STR 4	8551	44	sheep/goat	1	radius/burnt
IV	STR 4	8551	44	pig	1	
IV	STR 6	8398	23	ox	1	
V	OA 10	8362	16	frog/toad	1	
V	OA 10	8362	16	frog/toad	5	
V	OA 10	8362	16	ox	6	
V	OA 10	8362	16	ox	3	tooth
V	OA 10	8362	16	sheep/goat	1	tooth
V	OA 10	8362	16	sheep/goat	3	tarsal/phalange
V	OA 10	8362	16	sheep/goat	3	tooth
V	OA 10	8362	16	rodent, small	1	tooth
V	OA 10	8362	16	pig	2	teeth
V	OA 10	8362	16	fish, unid.	1	
V	OA 10	8503	29	ox	6	
V	OA 10	8503	29	chicken	1	tibia
V	OA 10	8503	29	goose	1	sternum
V	OA 10	8503	29	sheep/goat	4	
V	OA 10	8503	29	pig	1	
V	OA 12	8295	7	ox	8	
V	OA 12	8295	7	sheep/goat	3	
V	OA 12	8295	7	pig	1	phalange
V	OA 17	8145	6	pig	2	metapodial/tooth
V	STR 8	8312	10	ox	1	phalange
V	STR 8	8312	10	pig	2	metapodial/phalange
V	STR 8	8314	11	pig	1	
V	STR 8	8316	12	ox	1	carpal
VI	OA 18	8292	9	ox	13	
VI	OA 18	8292	9	deer, red	1	worked antler
VI	OA 18	8292	9	chicken	1	metatarsal
VI	OA 18	8292	9	goose	2	vertebra/scapula/tibia
VI	OA 18	8292	9	sheep/goat	12	
VI	OA 18	8292	9	pig	7	
VI	OA 18	8756	88	ox	3	
VI	OA 18	8756	88	cat	1	
VI	OA 18	8756	88	sheep/goat	2	
VI	OA 18	8756	88	pig	1	
VI	OA 18	8756	88	ox	1	
VI	OA 18	8756	88	sheep/goat	1	
VI	OA 18	8757	89	ox	6	
VI	OA 18	8757	89	plaice/flounder	1	vertebra

VI	OA 18	8757	89	carp family	1	vertebra
VI	OA 18	8757	89	pig	1	maxilla
VI	OA 18	8763	93	carp family	2	vertebra
VI	OA 18	8763	93	ox	2	
VI	OA 18	8763	93	sheep/goat	4	teeth/calcaneum/tarsal
VI	OA 18	8763	93	pig	2	
VI	OA 18	8766	91	ox	1	
VI	OA 18	8766	91	deer, red	1	worked antler
VI	OA 18	8766	91	sheep/goat	1	
VI	OA 18	8766	91	pig	1	
VI	OA 18	8770	94	sheep/goat	4	phalange
VI	OA 18	8770	94	ox	2	tooth/phalange
VI	OA 18	8770	94	pig	3	skull/tooth/metapodial
VI	OA 18	8771	95	frog/toad	5	
VI	OA 18	8771	95	ox	11	
VI	OA 18	8771	95	ox	5	skull/phalange
VI	OA 18	8771	95	deer, red	2	worked antler
VI	OA 18	8771	95	deer, red	10	worked antler
VI	OA 18	8771	95	deer, red	40	worked antler
VI	OA 18	8771	95	eel	20	vertebra
VI	OA 18	8771	95	plaice/flounder	1	vertebra
VI	OA 18	8771	95	salmon family	1	vertebra
VI	OA 18	8771	95	carp family	180	vertebra
VI	OA 18	8771	95	goose	1	humerus
VI	OA 18	8771	95	sheep/goat	1	
VI	OA 18	8771	95	sheep/goat	7	
VI	OA 18	8771	95	pig	1	
VI	OA 18	8771	95	pig	2	phalange
VI	OA 19	8228	3	ox	2	
VI	OA 19	8228	3	sheep/goat	3	
VI	OA 20	8167	1	herring family	28	vertebra/calcined
VI	OA 20	8167	1	herring family	7	vertebra/charred
VI	OA 20	8167	1	eel	1	vertebra/charred
VI	OA 20	8167	1	roach	1	pharyngeal
VI	OA 20	8167	1	goose	16	
VI	OA 20	8167	1	chicken	12	
VI	OA 20	8167	1	ox	12	
VI	OA 20	8167	1	sheep/goat	6	
VI	OA 20	8167	1	pig	10	
VI	OA 20	8167	1	woodcock	1	ulna
VI	OA 22	8202	2	ox	1	
VI	OA 22	8202	2	chicken	1	ulna
VI	OA 22	8202	2	sheep/goat	2	
VI	OA 22	8202	2	pig	1	
VI	OA20	8167	1	salmon family	4	vertebra/charred
VI	OA20	8167	1	salmon family	2	vertebra/calcined

Table 03: Hand-collected and wet-sieved animal bone from LTM03 post-medieval contexts/catalogue

CONTEXT	SAMPLE	TAXON	BONE	NOS	SIDE	SEX	AGE	FUSION (P/A)	FUSION (D/P)	COMMENTS	GNAWED	BURNT	WORKED	BUTCHERED	C	Dpm4 (G)	P4 (G)	M1 (G)	M2 (G)	M3 (G)	Dpm4 (P)	P4 (P)	M1 (P)	M2 (P)	M3 (P)	Meas 1	Meas 2	Meas 3	Meas 4	Meas 5	Meas 6	Meas 7	Meas 8	Meas 9
8606	0	ox	metacarpal	1	left		juvenile	fused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	ox-sized	rib	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	ox	phalange 1	1			adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	ox	mandible	1	left										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	ox	scapula	1	right										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	ox	metacarpal	1	left			fused						split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	ox	phalange 1	1			adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	ox	phalange 1	1			juvenile	unfused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	ox	metacarpal	1	left			fused						split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	ox	calcaneum	1	right		adult	fused							0	0	0	0	0	0	0	0	0	0	0	122.5	31.3	0	0	0	0	0	0	0
8606	0	ox	horncore	1	right		adult			shorthorn			chopped dorsal/proximal		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	ox	tooth, maxillary	1	right		adult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	ox	tooth, maxillary	1	right		subadult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	ox	humerus	1	right				fused					chopped medial transverse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	ox-sized	rib	4											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	ox	metacarpal	1	left		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	25	0	0	59.5	0	34	0	24.8	62.5
8606	0	ox	innominate	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	pig	humerus	1	left				fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	ox	scapula	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	ox	tooth, maxillary	1	left		subadult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	ox	skull	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	ox	horncore	1	right		adult								0	0	0	0	0	0	0	0	0	0	0	115	120	45	31	0	0	0	0	0
8606	0	pig	innominate	1	right		adult	fused	fused					chopped medial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	pig	vertebra, thoracic	1			juvenile	unfused	unfused					chopped anterior	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	ox-sized	longbone	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

8606	0	ox	astragalus	1	left										0	0	0	0	0	0	0	0	0	0	0	61.6	55.4	0	0	0	0	0	0	0
8606	0	pig	femur	1	left		subadult	unfused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	ox	humerus	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	sheep/goat	radius	1	right			fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	sheep-sized	rib	5											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	pig	mandible	1	right		adult								0	0	11	17	12	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	pig	maxilla	1	right		subadult								0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	sheep/goat	tibia	1	left		subadult	unfused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	sheep	metatarsal	1	left		adult		fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11.6	0	9.4	22.3
8606	0	pig	metacarpal 3	1	left		subadult	fused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	pig	metacarpal 3	1	right		subadult	fused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8606	0	ox-sized	vertebra	2			subadult	unfused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	ox	calcaneum	1	left		adult	fused						chopped lateral	0	0	0	0	0	0	0	0	0	0	0	135	36.5	0	0	0	0	0	0	0
8594	0	ox	mandible	1	right		subadult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	sheep-sized	rib	3											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	ox-sized	rib	3											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	pig	scapula	1	right		adult		fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	pig	innominate	1	right		adult							chopped acetabulum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	pig	maxilla	1	left		youngadult								0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	ox	maxilla	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	sheep-sized	vertebra, lumbar	2			adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	sheep-sized	vertebra, lumbar	1			subadult	unfused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9381	0	sheep-sized	rib	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9381	0	ox-sized	rib	1										chopped transverse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9381	0	ox-sized	rib	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9381	0	sheep	horncore	1			adult						chopped proximal		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

8621	0	ox	scapula	1	right		adult		fused					split lateral medial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	0	ox	mandible	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	0	ox	femur	1	left		adult	fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	0	ox	innominate	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	0	ox	radius	1	right			fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	0	pig	femur	1	left		juvenile		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	0	pig	metatarsal 3	1	left		subadult	fused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8177	0	ox	scapula	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8177	0	ox	radius/ulna	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8610	0	ox	ulna	1			subadult		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8610	0	pig	femur	1	left		subadult	unfused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8610	0	pig	radius	1	left		subadult	fused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8610	0	sheep-sized	rib	2											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8610	0	sheep-sized	rib	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8610	0	pig	fibula	1			subadult		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8610	0	pig	innominate	1										chopped transverse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8610	0	goose	ulna	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8188	0	ox-sized	rib	4											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8188	0	ox	innominate	1	right										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8188	0	ox	mandible	1	right		adult								0	0	0	0	15	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8188	0	ox	scapula	3											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8188	0	ox-sized	rib	2											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8188	0	ox-sized	rib	2											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8188	0	ox	skull	1										chopped transverse/split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8188	0	sheep/goat	calcaneum	1	right		adult	fused						chopped lateral	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8188	0	ox	skull	4											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8188	0	ox	maxilla	1	right		subadult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8188	0	ox-sized	vertebra, thoracic	1										split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8188	0	goat	horncore	1	left		adult						chopped		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

													proximal																										
8188	0	goat	horncore	1	right		adult						chopped proximal		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	0	ox	scapula	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	0	ox	innominate	2											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	0	ox	maxilla	1	left		adult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	0	pig	scapula	1	left				fused					chopped distal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	0	pig	femur	1	right		subadult	unfused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	0	pig	atlas	1			adult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	ox	radius	1	left		subadult		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	ox	radius	1	right			fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	pig	scapula	1	left		adult		fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	pig	femur	1	left		adult		just fused					midshaft knife cut	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	deer, unidentified	antler	1		male	adult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	ox	maxilla	1	left		adult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	pig	scapula	1	left		adult		fused					chopped distal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	pig	humerus	1	both		juvenile		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	pig	innominate	1	right									chopped acetabulum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	pig	vertebra, thoracic	1			subadult	unfused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	ox	vertebra, thoracic	1			subadult	unfused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	ox-sized	rib	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	pig	innominate	1	left		adult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	pig	femur	1	right		juvenile		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	pig	innominate	1	right									chopped posterior	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	pig	vertebra, lumbar	2			subadult	unfused	unfused					lateral knife cut	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	pig	innominate	1	left									chopped midshaft	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	ox-sized	vertebra, thoracic	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	pig	innominate	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	0	sheep-sized	rib	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

8621	53	pig	mandible	1	right										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	53	ox	sternum	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	53	ox	phalange 3	1			adult	fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8594	53	sheep/goat	tibia	1	right				fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	53	ox	mandible	2											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	53	ox	innominate	1										chopped anterior	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	53	pig	metapodial	1			subadult	fused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	53	pig	tarsal	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	53	sheep/goat	metapodial	1			subadult		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	53	pig	femur	1	right		subadult		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	53	ox	skull	2											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	53	ox	mandible	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	53	pig	phalange 1	1			adult	just fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	53	ox-sized	vertebra	2			subadult	unfused	unfused					split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	53	pig	mandible	1	left		youngadult								0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	53	pig	phalange 1	1			adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	53	pig	phalange 3	1			adult	fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	53	pig	metapodial	1			subadult	fused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8621	53	sheep-sized	vertebra, cervical	1			subadult	unfused						chopped midshaft	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8094	0	ox	scapula	1	left										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8094	0	pig	ulna	1	right		juvenile	unfused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8094	0	pig	metatarsal	1			subadult	fused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8094	0	pig	phalange 3	1			juvenile	unfused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8094	0	ox-sized	vertebra, thoracic	1			subadult	unfused						chopped midshaft	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8626	0	ox	innominate	1	right		juvenile	unfused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8626	0	ox	ulna	1	right		subadult	unfused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8626	0	ox	ulna	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8626	0	ox-sized	rib	3											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8626	0	ox	scapula	1										chopped lateral	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8626	0	sheep/goat	femur	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

8626	0	ox	metatarsal	1	left			fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8626	0	sheep/goat	innominate	1	left	female	adult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8626	0	ox	calcaneum	1	right		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8626	0	ox	astragalus	1	right		adult								0	0	0	0	0	0	0	0	0	0	0	0	57	51	0	0	0	0	0	0	0	0	0	0
8626	0	ox	metatarsal	1	left		adult		fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8626	0	ox	metapodial	1			adult		fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8626	0	ox	vertebra, lumbar	1			adult	fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8626	0	sheep-sized	rib	2											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8626	0	sheep/goat	mandible	1	left		adult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8626	0	ox-sized	vertebra, lumbar	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8626	0	sheep/goat	innominate	1	left		adult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8626	0	ox	radius	1	right		subadult		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8626	0	sheep/goat	calcaneum	1	left		adult	fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8626	0	sheep/goat	radius	1	left		subadult		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8626	0	ox-sized	vertebra, caudal	1			subadult	unfused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8626	0	ox	skull	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8626	0	ox-sized	vertebra, thoracic	1			subadult	unfused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8119	0	sheep/goat	tibia	1							rodent			chopped and snapped	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8119	0	sheep-sized	rib	3											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8119	0	ox	calcaneum	1			subadult	unfused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8600	0	ox	humerus	1	left				fused					split distal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8600	0	ox	metatarsal	1	left		subadult	fused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8600	0	ox	tibia	1	right				fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8600	0	ox	metatarsal	1	left		adult		fused					split distal and midshaft	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8600	0	pig	scapula	1	left				fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8600	0	ox	femur	1	right		subadult		unfused					split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8600	0	ox	calcaneum	1	left		adult	fused							0	0	0	0	0	0	0	0	0	0	0	0	129	38.	0	0	0	0	0	0	0			

																											8								
8600	0	ox-sized	rib	3											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8600	0	ox-sized	rib	1										chopped transverse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8600	0	ox-sized	vertebra, thoracic	2											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8600	0	pig	skull	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8600	0	pig	innominate	1	right		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8600	0	ox	vertebra, cervical	1			subadult	unfused	unfused					chopped anterior	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8600	0	ox	horncore	1	left		adult			shortho rn					0	0	0	0	0	0	0	0	0	0	0	0	130	0	0	0	0	0	0	0	0	0
8600	0	deer, unidentified	antler	1		male	adult						sawn distal and proximal		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8600	0	deer, unidentified	antler	1		male	adult			beam			sawn distal and proximal		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8600	0	ox-sized	vertebra, thoracic	1			adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep-sized	rib	17											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox-sized	rib	9											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	metacarpal	1	left		subadult	fused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	scapula	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	humerus	1	left		subadult		unfused					split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	femur	1	left									split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	scapula	1	right		adult		fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	scapula	1	right		adult		fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	scapula	1	left		adult		fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	innominate	1							canine				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	goose	innominate	1			adult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	scapula	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	metacarpal	1	left		adult	fused	fused					split proximal & distal	0	0	0	0	0	0	0	0	0	0	0	0	190	0	0	0	0	27.5	0	0	0	0
8573	0	pig	femur	1	right		subadult	unfused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	femur	1	left		subadult	unfused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

8573	0	ox	tibia	1	right		subadult		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	humerus	1	left				fused					split/chopped medial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	ulna	1	right		juvenile	unfused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	goose	ulna	1			adult		fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	horncore	1	left		adult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	radius	1	right		adult		fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	scapula	1	left				fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	sacrum	1			adult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	metacarpal	1	right		adult		fused					split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	radius	1	left		juvenile	unfused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	innominate	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	hare, brown	tibia	1	left		subadult	fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	ulna	1	left										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep	humerus	1	left				fused					knifecut and sawn midshaft	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	astragalus	1	right		juvenile								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	calcaneum	1	left		subadult	unfused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep-sized	rib	19											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	femur	1	right		subadult		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep	radius	1	right		adult		fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox-sized	rib	1										sawn and snapped proximal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	scapula	1	left				fused		rodent			chopped lateral	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	metacarpal	1	left			fused						split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	humerus	1	right		adult	fused		blade <1.0mm thick				sawn posterior transverse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	tibia	1	left		subadult	unfused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	scapula	1	rig									chopped	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

					ht									across spine																		
8573	0	sheep/goat	tibia	1	left		subadult	unfused						chopped midshaft	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	femur	1	left		juvenile	unfused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	tibia	1	left									sawn proximal and distal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	humerus	1	left		infant	unfused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep	metatarsal	1	right			fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	ulna	1	right										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	mandible	1	left										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	chicken	metatarsal	1	right	female	subadult	juvenilefused	fused						0	0	0	0	0	0	0	0	0	0	0	87.9	15.7	7	15.3	0	0	0	0
8573	0	chicken	femur	1	left		adult	fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	innominate	1	right		adult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox-sized	sacrum	1										split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	fibula	1			subadult	unfused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	tibia	1	left									sawn transverse midshaft	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	skull	1	right									split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	radius	1	left			fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	atlas	1			adult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	humerus	1	left		infant	unfused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox-sized	vertebra, lumbar	4			subadult	unfused	unfused					split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	hare, brown	humerus	1	right		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	106.4	0	0	0	0	5.3	0	12.5	0
8573	0	sheep-sized	rib	21											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	goose	radius	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	rabbit	femur	1	left		juvenile	fused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep	metacarpal	1	right		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	125	0	0	24.7	0	15	0	10.2	25.5
8573	0	deer, fallow	femur	1	right										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	deer, fallow	radius	1	right						rodent				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

8573	0	rabbit	innominate	1	left		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox-sized	vertebra, thoracic	2											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	humerus	1	left				fused		rodent				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	tibia	1								calcined			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	plaice/flounder	vertebra, caudal	5											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	humerus	1	right						rodent				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	tibia	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	radius	1	right		subadult		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	phalange 1	1			adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	metacarpal	1	right			fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	goose	radius	1			adult	fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	innominate	1	right									sawn anterior lateral	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	cod	cleithrum	1	left										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep	metatarsal	1	left		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	122	0	0	18	0	11.2	0	9.7	23.3
8573	0	sheep	metatarsal	1	right		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	ulna	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	chicken	humerus	1	left		adult	fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	hare, brown	radius	1	left		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	106.8	0	0	9.4	0	0	0	0	0
8573	0	pig	tibia	1	left		infant	unfused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	tibia	1	right		infant								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	maxilla	1	right		young adult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	chicken	femur	1	left		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	93.7	0	0	0	8.4	0	0	0	0
8573	0	turkey	tibia	1	left		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	193.5	0	0	11.6	20.4	0	0	0	0
8573	0	plaice	maxilla	1			adult								0	0	0	0	0	0	0	0	0	0	0	57.3	0	0	0	0	0	0	0	0
8573	0	chicken	tibia	1	left		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	137	0	0	7.2	12.9	0	0	0	0
8573	0	sheep/goat	radius	1	left										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	chicken	femur	1	rig		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

					ht																																	
8573	0	ox	metacarpal	1			subadult		unfused					split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	plaice	cleithrum	1			adult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	rabbit	femur	1							rodent				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	rabbit	mandible	1	left		adult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	humerus	1	left										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	metatarsal	1			adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep-sized	rib	2											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	rabbit	innominate	1	right		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	cod family	vertebra	1										chopped transverse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	cod family	vertebra	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	vertebra, thoracic	1			subadult	just fused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox-sized	longbone	1										sawn transverse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	mallard	sternum	1			adult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	goose	sternum	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	mallard	coracoid	1	right		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	55.6	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	vertebra, lumbar	1			adult	fused	fused					split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	hare, brown	humerus	1	left				fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	mallard	dentary	1			adult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox-sized	rib	1			juvenile							sawn transverse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	chicken	ulna	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8637	0	ox	radius	1	left		adult		fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8637	0	ox-sized	rib	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8637	0	pig	humerus	1	left				fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8637	0	pig	innominate	1	right										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8637	0	ox	calcaneum	1	left		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8637	0	ox	humerus	1	right										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8637	0	horse	tooth, mandibular	1			adult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8631	0	ox-sized	rib	5											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8631	0	ox	metacarpal	1	left		adult	fused	fused					split proximal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21.7	63.2
8631	0	ox	metatarsal	1	left		subadult	fused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

8631	0	ox	innominate	1	left										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8631	0	ox	radius	1	left		adult	fused						split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8631	0	ox	scapula	1	left		adult		fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8631	0	ox	horncore	1	right		adult			shorthorn					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8631	0	ox	scapula	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8631	0	pig	mandible	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8631	0	pig	ulna	1	left		juvenile	unfused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8631	0	pig	radius	1	left			fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8631	0	pig	femur	1	right		juvenile		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8631	0	pig	metatarsal	1			subadult	fused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8631	0	pig	metacarpal	1			adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8631	0	goose	metatarsal	1	left		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	89.5	0	0	0	0	0	0	0	0	0	0
8025	0	ox	metatarsal	1	right		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	208	0	0	0	0	22.3	0	22.7	47.5		
8025	0	sheep	horncore	1	right	male	adult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8025	0	sheep/goat	tibia	1	right		adult	fused	fused					chopped proximal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8025	0	pig	femur	1	left		subadult	unfused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8637	0	pig	tibia	1	left		subadult		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8637	0	sheep/goat	radius	1	left				fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8637	0	ox	tooth, maxillary	1	left		subadult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8626	0	sheep/goat	tibia	1	right										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8626	0	ox	ulna	1	right		juvenile	unfused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8762	0	ox	metacarpal	1	left		adult	fused	fused					knife cut distal	0	0	0	0	0	0	0	0	0	0	0	0	189	0	0	0	0	30.2	0	22	57		
8762	0	ox	femur	1	left		subadult		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8762	0	ox	innominate	1	right										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8762	0	ox	astragalus	1	left		adult								0	0	0	0	0	0	0	0	0	0	0	0	0	57	51.6	0	0	0	0	0	0	0	0	0
8762	0	ox-sized	rib	4											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8762	0	ox	scapula	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8762	0	sheep-sized	rib	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8762	0	pig	radius	1	left			fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8762	0	sheep	tibia	1	rig		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	179	0	0	12.	0	0	0	0	0			

					ht																								4					
8762	0	sheep/goat	innominate	1	left		juvenile								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8762	0	sheep	metacarpal	1	left		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	118.5	0	0	25.5	0	15.5	0	0	26.9
8762	0	sheep/goat	antler	1	right		adult								0	0	0	15	12	11	0	0	16	13	14	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox-sized	rib	3										sawn proximal and distal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	humerus	1	right				fused					sawn midshaft	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	scapula	1	left		subadult		unfused					sawn midshaft/knife cut distal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	vertebra, thoracic	1			adult	fused	fused					sawn midline/saw n dorsal lateral medial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep-sized	rib	1										knife cut medial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox-sized	longbone	1							rodent				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	femur	1	left									sawn proximal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	femur	1	right									sawn proximal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	femur	1	left		adult		fused		rodent			sawn midshaft	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8090	0	deer, unidentified	antler	1		male	adult						sawn proximal /distal and midline		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8090	0	ox	femur	1	left		subadult	unfused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8090	0	ox-sized	rib	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7003	0	ox-sized	rib	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7003	0	pig	humerus	1	right		subadult	unfused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8116	0	sheep	metatarsal	1	left			fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8116	0	ox	maxilla	1	right		subadult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8116	0	ox-sized	innominate	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8116	0	pig	innominate	1	right		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6003	0	ox-sized	rib	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6003	0	ox	mandible	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

6003	0	ox	phalange 1	1			adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6003	0	pig	metatarsal	1			subadult	fused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox-sized	rib	7											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox-sized	rib	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep-sized	rib	13											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	scapula	1	left									chopped transverse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	vertebra, thoracic	2			adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	radius	1	right		adult		fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	femur	1	right		subadult		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	innominate	1	B									split ventral	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	humerus	1	right		subadult	unfused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	humerus	1	right		subadult		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	innominate	1	right									chopped medial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	ulna	1	right										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	metatarsal	1			subadult		unfused					split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	radius	1	right			fused						split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	scapula	1	left		adult		fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	metatarsal	1	left			fused						split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	skull	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	skull	1	right									chopped anterior and posterior	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	phalange 3	1			adult	fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	femur	1	right		juvenile	unfused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep	skull + horncore	1	left								horncore chopped anterior proximal	split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	metatarsal	1	left		adult	fused	fused					split proximal and distal	0	0	0	0	0	0	0	0	0	0	0	208	0	0	0	0	23.4	0	0	0
8573	0	ox	femur	1			subadult	unfused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	radius	1	right			fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

8573	0	ox	scapula	1	right				fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	vertebra, cervical	1			subadult	unfused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	scapula	2											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	humerus	1	left				fused					split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	vertebra, thoracic	1			adult	fused	fused					split lateral	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep-sized	rib	7											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	tibia	1	right		subadult	unfused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	axis vertebra	1										split/chopped midshaft	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	radius	1	right			fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	vertebra, thoracic	1			subadult	fused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	vertebra, thoracic	1			subadult	unfused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep-sized	vertebra, thoracic	1			subadult	fused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep	metatarsal	1	right			fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	humerus	1	right		subadult		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	scapula	1	left		adult		fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	radius	1	right			fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	tibia	1	right		subadult		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	humerus	1	left		subadult	unfused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	maxilla	1	right		juvenile								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	mandible	1	left										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox-sized	rib	2											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	metacarpal	1			young adult	fused	Jfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	metacarpal	1			juvenile	unfused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	metacarpal	1			subadult	fused	unfused					chopped midshaft	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	humerus	1	left				fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	innominate	1	right										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

8573	0	ox	tibia	1			adult	fused						split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	vertebra, lumbar	1			subadult	fused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	vertebra, cervical	1			subadult		unfused					chopped midshaft	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	innominate	1	left										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	ulna	1	left										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	axis, vertebra	1			subadult		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	axis, vertebra	1			subadult		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep-sized	vertebra, thoracic	1			subadult	unfused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	pig	metapodial	1			adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	sheep/goat	vertebra, lumbar	1			adult	fused	fused					split lateral	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8573	0	ox	metatarsal	1	right		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	216.5	0	0	42.3	0	24.5	0	23.1	49
8573	0	goat	metatarsal	1	left		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	124.5	0	0	22.3	0	14.5	0	11	28.8
8573	0	sheep/goat	metacarpal	1	right		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	127	0	0	24.3	0	14	0	10	26.1
8880	0	ox-sized	rib	6											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox	radius	1	left										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox	humerus	1	right				fused					split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox	humerus	1	left		adult	fused						split latero-medial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox	mandible	1	right										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox	humerus	1	right				fused					split distal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox	radius	1	right		subadult	unfused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	sheep-sized	rib	6											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	pig	femur	1	left		adult		fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox	horncore	1	right		adult			shorthorn					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox	horncore	1	right		young adult			shorthorn					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox	innominate	1	left		adult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox	radius	1	left		adult		fused					chopped distal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox	radius	1	left									split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	sheep/go	horncore	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

		at																																			
8880	0	ox	maxilla	1	right		adult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox	phalange 3	1			adult	fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox	metatarsal	1			subadult		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox	mandible	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox	scapula	2											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox-sized	rib	8											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	pig	mandible	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox	femur	1	right		subadult		unfused					split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox	innominate	1	left										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox	mandible	1	left		adult								0	0	0	17	15	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox	axis vertebra	1			adult		fused					split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox	vertebra, thoracic	1			subadult	unfused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox	vertebra, thoracic	2											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox	metatarsal	1	left		adult		fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	sheep-sized	rib	2											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	sheep/goat	radius	1	right		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	0	141	0	0	29.9	0	15.8	0	26.8	0	
8880	0	ox	skull	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox-sized	costal cartilage	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox-sized	rib	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	pig	radius	1	right		infant	unfused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	pig	tibia	1	right				Jfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	sheep	metatarsal	1	left		subadult	fused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox	astragalus	1	left		adult								0	0	0	0	0	0	0	0	0	0	0	0	58.3	53.8	0	0	0	0	0	0	0	0
8880	0	ox	radius	1	left		adult		fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox	scapula	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	sheep/goat	tibia	1	right		juvenile	unfused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	ox-sized	vertebra	2			adult	fused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8880	0	horse	mandible	1			adult								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8166	0	ox-sized	rib	6											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8166	0	ox	tibia	1	right				fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

8166	0	ox	femur	1	right		subadult		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8166	0	ox	femur	1	right		subadult	unfused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8166	0	ox	femur	1	right		subadult	unfused							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8166	0	sheep-sized	rib	5											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8166	0	ox	innominate	1	right										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8166	0	sheep/goat	scapula	1	left		adult		fused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8166	0	ox	skull	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8166	0	ox	metacarpal	1	left		subadult	fused	unfused					split	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8166	0	ox	metacarpal	1	right		infant		unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8166	0	ox	mandible	1	right										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8166	0	sheep/goat	metatarsal	1			adult		fused					split distal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8166	0	sheep	metatarsal	1	left		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	124.5	0	0	19	0	11.8	0	9.7	21.9
8166	0	sheep/goat	radius	1	left		adult	fused	fused						0	0	0	0	0	0	0	0	0	0	0	149	0	0	0	0	18.3	0	31	0
8166	0	sheep/goat	vertebra, lumbar	1			subadult	unfused	unfused						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8166	0	cod	hyomandibular	1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8166	0	pig	tooth, maxillary	1											0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 04: Hand-collected Saxon and post-medieval animal bone from LTM03/summary

PHASE	III	IV	V	VI	SAXON (all hc)	PMED (all)	TOTAL
TAXON	**NOS**	**NOS**	**NOS**	**NOS**			
cod				1	1	2	3
cod family						2	2
plaice						1	1
plaice/flounder						5	5
chicken	1	3	1	29	34	7	41
goose	1	3	6	32	42	7	49
mallard				2	2	3	5
turkey						2	2
raven				4	4		4
ox	673	966	296	1136	3071	189	3260
ox-sized						111	111
sheep/goat	113	212	68	449	842	65	907
sheep						16	16
sheep-sized						118	118
goat						3	3
pig	173	283	64	388	908	101	1009
horse	2	1		4	7	2	9
deer, red		4	1	2	7		7
deer, fallow						2	2
deer, roe	1			1	2		2
deer, unidentified						4	4
hare, brown						4	4
rabbit						5	5
dog	1	1			2		2
cat		1	1	1	3		3
human	1	2			3		3
TOTAL	**966**	**1476**	**437**	**2049**	**4928**	**649**	**5577**

Table 05: Hand-collected cattle, sheep/goat and pig bones from LTM03/fragment counts and relative abundance

PHASE	III	III	IV	IV	V	V	VI	VI	PMED	PMED
TAXON	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	N	%
ox	673	70.2	966	66.1	296	69.2	1136	57.6	300	49.8
sheep/goat	113	11.8	212	14.5	68	15.8	449	22.7	202	33.5
pig	173	18.0	283	19.4	64	15.0	388	19.7	101	16.7
TOTAL	**959**	**100**	**1461**	**100**	**428**	**100**	**1973**	**100**	**603**	**100**

Table 06: Wet-sieved animal bone from LTM03 Saxon contexts/summary

PHASE	I	II	III	IV	V	VI	TOTAL
TAXON							
fish, unidentified			3	9	1	331	344
plaice/flounder				1			1
frog/toad			1	1	6	5	13
chicken			2	7	1	14	24
chicken-sized				1			1
goose				2	1	19	22
dove			1				1
woodcock						1	1
ox	1	5	64	80	25	59	234
sheep/goat		1	16	39	14	43	113
pig		3	26	38	9	29	105
deer, red				12		54	66
cat				1		1	2
rodent, small			1		1		2
TOTAL	**1**	**9**	**114**	**191**	**58**	**556**	**929**

Table 07: Animal bone from LTM03 Saxon contexts (all)/sex, age and epiphysial fusion

FN foetal/neonate; MP metapodial; F fused; UF unfused; E early; I intermediate; L late

CONTEXT	TAXON	FN	INFANT	MP P F	MP P UF	MP P	E F	E U	TOTAL E	I F	I U	TOTAL I	L F	L U	TOTAL L	MALE	FEMALE	FUSED	UNFUSED
8143	ox	1						1	1										
8143	pig			1		1					1	1							
8145	ox						1		1										
8145	pig													1	1				
8146	ox						2		2		1	1		1	1				
8146	pig																	1	
8146	pig			1		1	1		1		1	1		2	2				
8149	ox			1		1	1		1	1		1							
8149	sheep/goat			2		2					1	1							
8151	ox						1		1										
8151	sheep/goat			1		1					2	2							
8154	ox		1	10		10	27	2	29	7	6	13	7	14	21	4	3		
8154	pig																	6	
8154	goose																	8	
8154	mallard																	1	
8154	sheep/goat		3	9		9	21	3	24	10	4	14	7	10	17	2			
8154	raven																	4	
8154	pig			11		11	16	3	19	3	13	16		8	8				
8155	ox		1	7		7	23	1	24	5	5	10	12	5	17	2	2		
8155	pig																	1	
8155	sheep/goat			9		9	10	3	13	10	4	14	4	4	8	4			
8155	pig			1		1	3	3	6	1	3	4	1	7	8				
8166	ox	1	2	8		8	9		9	4	4	8	4	11	15		1		
8166	pig																		1
8166	goose																	4	
8166	mallard																	1	
8166	sheep/goat		2	5		5	5	2	7	4	1	5	2		2	1			
8166	pig			4		4	3	1	4	1	3	4	1	3	4				
8169	ox	3		12		12	19	3	22	5	7	12	16	14	30	1	2		
8169	pig																	5	
8169	deer, roe						1		1				1		1				
8169	goose																	5	
8169	sheep/goat		2	9	1	10	18		18	6	5	11	5	6	11	3	1		
8169	pig			14		14	11	3	14	7	11	18	3	8	11				
8172	ox	1	3	13		13	18	4	22	7	7	14	13	13	26	2	3		
8172	sheep/goat			1		1	6		6	4		4	1	2	3	1	2		
8172	pig			3		3	4	1	5	2	5	7		10	10				
8186	ox	2	9	35		35	36	7	43	11	27	33	19	32	51	2	1		
8186	pig																	9	1
8186	goose																	5	
8186	sheep/goat			14		14	29	1	30	10	7	17	12	10	22	6	1		

8186	pig			26		26	24	6	30	10	24	30	2	27	29				
8217	ox	1		3		3	6	1	7	2	4	6	4	7	11	1	1		
8217	pig																		1
8217	sheep/goat		1	5		5	7	1	8	5	2	7	2	2	4	1			
8217	pig						2	1	3	1		1		3	3				
8217	pig			1		1	2	1	3		2	2		3	3				
8255	ox													1	1				
8266	ox						1		1	2		2							
8266	sheep/goat			1		1													
8266	pig			2		2					2	2		1	1				
8279	ox												2		2				
8279	sheep/goat						2		2										
8279	pig			1		1		1	1		1	1							
8282	ox			1		1	1		1		1	1		1	1				
8282	sheep/goat						1		1				1		1				
8295	ox			1		1	2		2					1	1				
8319	sheep/goat						1		1										
8327	ox			1		1		1	1		1	1		1	1				
8327	sheep/goat						1		1										
8327	pig			1		1	1		1		1	1							
8329	ox												1		1				
8329	pig						1		1										
8336	ox			1		1					1	1							
8357	ox										1	1	2		2				
8357	sheep/goat						1		1										
8358	ox			2		2	1		1	2	1	3							
8358	sheep/goat						1		1					1	1				
8362	ox		2	18	1	19	23	4	27	11	16	22	16	3	19	2	3		
8362	goose																	3	
8362	sheep/goat			4		4	7		7	3	1	4	1	3	4	2			
8362	pig			4		4	9	1	10	4	5	9		5	5				
8367	ox		1	4		4	7	1	8	3	3	6	5	3	8	2			
8367	sheep/goat			3		3	6	1	7	1	1	2		1	1	1	1		
8367	pig			1		1	2	3	5	2		2		2	2				
8385	ox			1		1	1		1	1		1	2	3	5				
8385	ox			3		3	3	1	4	2		2				1			
8385	horse			1		1				1		1							
8385	pig													1	1				
8388	ox						2		2		2	2	1	4	5	1			
8388	pig						2		2	1	1	2		2	2				
8405	ox						1		1		1	1		1	1				
8406	pig						1		1										
8464	ox										1	1							
8503	ox			2		2				2		2							
8503	sheep/goat			1		1	6		6	3		3	3		3	1			
8505	ox			7		7	4		4	3		3	1		1		1		
8505	pig			2		2				2	1	3		1	1				

8525	ox			7		7	7		7	6	2	8	8	4	12				
8525	sheep/goat			1		1	2		2	2		2	1	2	3				
8525	pig						7	2	9		1	1		4	4				
8571	ox			5		5	7		7	2	1	3		1	1		3		
8571	sheep/goat			3		3	7		7	2	2	4				2	2		
8571	pig			3		3	3		3		2	2		2	2				
8613	ox			7		7	3		3		3	3	1	1	2				
8613	sheep/goat						1		1	1		1	1		1				
8613	pig						1		1					2	2				
8616	ox			15		15	14		14	12	6	18	14	7	21	2	1		
8616	sheep/goat			6		6	2		2	3	3	8	1	2	3				
8616	pig			5		5	12	3	15	3	2	5	3	6	9				
8618	ox			6		6	17		17	6	1	7	9	3	12	1	1		
8618	sheep/goat			2		2	1		1	3		3	1	2	3	1			
8618	pig			7		7	6		6	4	4	8	1	7	8				
8639	ox		1	4		4	3	4	7	3	4	7	3	2	5		1		
8639	sheep/goat						6		6	1		1	2	1	3				
8639	pig						4		4		1	1	1	1	2				
8646	ox									1		1		1	1				
8646	ox			3		3	8	2	10	2		2	2	6	8	2			
8646	goose																	1	
8646	sheep/goat			1		1	2		2	1		1					1		
8646	pig			4		4		1	1	2	2	4		1	1				
8647	ox		1	3		3	8	1	9	1	5	6	2	4	6	1	2		
8647	dog						1		1										
8647	sheep/goat			3		3	3		3	2	1	3		1	1	2			
8647	pig			1		1	1	2	3	1	1	2		3	3				
8654	ox	2	1	7	1	8	5	3	8	7	1	8	5	8	13	1	1		
8654	sheep/goat						1		1	2		2		7	7				
8654	pig						1		1					1	1				
8655	ox			4		4	8		8	2	3	5	2	2	4	1			
8655	sheep/goat						2		2					1	1				
8655	pig						1		1										
8656	ox			5		5	9		9				1	1	2				
8656	sheep/goat						9		9	4	3	7	3	7	10	1	1		
8656	pig						5	1	6		2	2		4	4				
8657	ox			11		11	15	1	16	6	4	10	7	3	10	2	1		
8657	sheep/goat			1		1	3		3	1		1	2	1	3				
8657	pig			5		5	5		5	4	7	11		1	1				
8659	ox			8		8	10		10	6	4	10	2	6	8	2			
8659	pig																	1	
8659	sheep/goat			4		4	2		2	2		2	1		1	1			
8659	pig						3	1	4	1	3	4	1	6	7				
8662	ox			4		4	3		3	4	1	2		1	1				
8670	ox			2		2	6	1	7	2	1	3	2	1	3	1			
8670	sheep/goat						1		1										
8670	pig									1		1		3	4				

8737	ox		1	1		1	2		2	1	1	2	3		3				
8737	sheep/goat						5		5							1			
8737	pig						4		4					1	1				
8738	ox			2		2	2	1	3	1		1		1	1	1			
8738	sheep/goat			1		1	2		2	1		1	2		2	1			
8738	pig						1		1	2		2	2	2	4				
8747	ox			1		1	1	1	2	1	1	2		1	1				
8747	ox			2		2	2		2	1	2	3	1		1				
8747	sheep/goat						1		1				1		1				
8747	sheep/goat						3		3	1		1		2	2	1			
8747	pig						1		1					3	3				
8747	pig			1		1					2	2	1	4	5				
8757	ox			10		10	21	3	24	8	9	17	12	9	21	2	1		
8757	sheep/goat			2		2	11	2	13	4	1	5	2	3	5	4			
8757	pig			1		1	8	2	10	2	2	4	2	4	6				
8760	ox	1		9		9	6	1	7	8	5	13	3	2	5	1			
8760	sheep/goat						2		2					1	1				
8760	pig						3		3	1		1		5	5				
8765	ox			1		1	4		4	1		1				1			
8765	sheep/goat						1		1										
8765	pig			2		2					3	3		2	2				
8766	ox		1	11		11	8	1	9	8	1	9	3	3	6				
8766	horse						1		1										
8766	goose																	1	
8766	sheep/goat	1		6		6	10	2	12	5	3	8	4	6	10				
8766	pig			2		2	7	1	8	2	1	3	2	2	4				
8771	ox		2	5		5	6	2	7	6	2	8	3	3	6	1	1		
8771	sheep/goat			5		5	4		4	3	1	4		2	2	1			
8771	pig			1		1	7		7		3	3	2	4	6				
8778	ox			1		1	3	1	4	2	1	3					1		
8778	goose																	1	
8778	sheep/goat			3		3	2		2	1	2	3	1	1	2	1			
8778	pig			4		4	2	1	3	3	3	6		2	2				
8783	ox		1	3		3	1		1	2	1	3	1	1	2				
8783	sheep/goat						1		1					1	1				
8783	pig			1		1	1	1	2	2	1	3	2	1	3				
8789	ox		1	18		18	18		18	10	8	18	8	5	13	1	1		
8789	horse						1		1										
8789	sheep/goat		1	2		2	4	2	5	2		2	2	2	4				
8789	pig			4		4	7	4	11	2	3	5		3	3				
8791	ox		1	2		2		1	1	1		1	1		1				
8791	sheep/goat						2		2				1		1				
8799	ox		1	11		11	9	1	10	7	8	15	4	2	6		2		
8799	sheep/goat						2		2					1	1				
8799	pig						1	1	2	1		1	1	3	4				
8800	ox	1		16		16	32	6	38	8	4	12	15	9	24	3	1		
8800	pig																	1	

8800	deer, roe						1		1										
8800	goose																	1	
8800	sheep/goat		1	2		2	5	2	7	3		3	3	5	8				
8800	pig						8		8	3	1	4	1	5	6				
8801	ox			6		6	7		7	2	3	5	6	2	7	2			
8801	goose																	1	
8801	sheep/goat			1		1	1		1	1		1							
8801	pig						3		3					1	1				
8804	ox			3		3	4		4		2	2	2	3	5				
8804	sheep/goat			1		1	1		1					1	1				
8804	pig													3	3				
8832	ox						1		1	1		1							
8832	pig										1	1							
8834	pig						1		1										
8836	ox			1		1	1		1	4		4							
8836	sheep/goat						1		1										
8836	pig						3		3					2	2				
8366	pig																	1	
8366	sheep/goat			1		1	3		3	1		1	1	1	2	1			
8366	pig										1	1							
8366	ox			3		3	4		4	1	4	5	3	3	6				

Table 08: Hand-collected animal bone from LTM03Saxon contexts/sex and dental eruption and wear (after Grant 1982)

PHASE	CONTEXT	TAXON	P1	dpm4	P4	M1	M2	M3	SEX	COMMENTS
	8145	ox						present		
VI	8151	ox					18	16		
VI	8154	ox			present	present	present			
VI	8154	ox			present	14	present			
VI	8154	ox		present		present	present			
VI	8154	ox				present	7	present		
VI	8154	ox						12		
VI	8154	ox						present		
VI	8154	ox		15		15	12			
VI	8154	ox				8	3			
VI	8154	pig		present		7	3			
VI	8154	pig						9		
VI	8154	pig	no		12	17	present		female	
VI	8154	sheep/goat		13		12	10	2		
VI	8154	sheep/goat		13		9	2			
VI	8154	sheep/goat		18		12	10	1		
VI	8154	sheep/goat			present	15	12	present		
VI	8154	sheep/goat			11	12	11	9		
VI	8154	sheep/goat		13		10	present			
VI	8154	sheep/goat						8		
VI	8154	sheep/goat			10	12	12	9		
VI	8155	ox		15						
VI	8155	ox			11					
VI	8155	ox					present	14		
VI	8155	ox						7		
VI	8155	pig	no		7	present	present		male	
VI	8155	pig			present	present	14	8		
VI	8155	pig							male	
VI	8155	pig		15		6	1			
VI	8155	pig			present	14	8	3		
VI	8155	sheep/goat			10	present				
VI	8155	sheep/goat						12		
VI	8155	sheep/goat		13		12	9	2		
VI	8155	sheep/goat		present		12	9	2		
VI	8155	sheep/goat			12	14	12	present		
VI	8155	sheep/goat			present	16	12	12		
VI	8155	sheep/goat			13	12	12	present		
VI	8155	sheep/goat		present		9	2			
VI	8166	ox			11	15	12	12		
VI	8166	ox		14		9	2			
VI	8166	ox			11	15	12			
VI	8166	pig		10						
VI	8166	pig		present		7	2			
VI	8166	pig	yes		9	15	13	8	male	
VI	8166	sheep/goat			13	12	12	11		
VI	8169	ox			present					
VI	8169	ox		14						
VI	8169	ox		16		12	11	4		
VI	8169	ox					16	15		
VI	8169	ox				15	14	14		
VI	8169	ox			11					
VI	8169	ox						present		
III	8169	ox						present		
VI	8169	pig					present	7		
VI	8169	pig							male	WORN C
VI	8169	sheep/goat		10						
VI	8169	sheep/goat			10	12	10	7		
VI	8169	sheep/goat		13		11	3			
VI	8172	ox		8		3				
VI	8172	ox		present		present	present			
VI	8172	ox			13	15	present			
VI	8172	ox		present		present	present			
VI	8172	ox				present	4	1		
VI	8172	ox		16		present	present			
VI	8172	ox			4	15				
VI	8172	ox			3	15	12	8		
VI	8172	sheep/goat			present	present	12	11		
VI	8172	sheep/goat					12	9		

VI	8186	ox		8	3					PAIR
VI	8186	ox			12					
VI	8186	ox			13	15	15	present		
VI	8186	ox			13	present	present			
VI	8186	ox		present		14	12	present		
VI	8186	ox		present						
VI	8186	ox			11	16	15	15		
VI	8186	ox		14		14	present			
VI	8186	ox			11	present				
VI	8186	ox				16	15			
VI	8186	ox					14	present		
VI	8186	ox						3		
VI	8186	ox						present		?M3 IN WEAR
VI	8186	ox						present		M3 IN WEAR
VI	8186	ox						12		
VI	8186	ox		14	present					
VI	8186	ox					present	10		
VI	8186	pig			8	12	8	3		
VI	8186	pig		9		6	2			
VI	8186	pig		present		8	present			
VI	8186	pig	no	present		present	3			
VI	8186	pig		12		present	2			
VI	8186	pig			10	present	12	7		
VI	8186	pig			10					
VI	8186	pig			11	17	14			
VI	8186	pig			7	12	7	2		
VI	8186	pig				17	12	9		
VI	8186	sheep/goat			10	12	10	7		
VI	8186	sheep/goat		present		12	8	2		
VI	8186	sheep/goat						8		
VI	8217	ox					present	15		
VI	8217	ox						7		
VI	8217	ox						7		
VI	8217	ox				12	11	7		
VI	8217	ox		present	13	present				
VI	8217	ox		15						
VI	8217	pig					present	6		
VI	8217	pig	yes		10	17	12	8	female	
VI	8217	sheep/goat					12			
VI	8217	sheep/goat			12	present				
VI	8217	sheep/goat			10	12	12	7		
VI	8217	sheep/goat			12	13	12	12		
VI	8217	sheep/goat			11	12	12	10		
V	8266	sheep/goat			12	12	12	10		
V	8329	ox		12		7	1			
	8336	ox			present	present	present			
V	8355	sheep/goat		present		12	10	3		
	8357	ox		present	present					
	8357	ox					12	9		M3 NO 3RD CUSP
V	8358	ox			11	17	16	16		M3 NO 3RD CUSP
V	8358	ox		15		11	6			
V	8362	ox			13	16				
V	8362	ox		15						
V	8362	ox			11	16	15			
V	8362	ox			13					
V	8362	ox		15		12	12			
V	8362	ox			present	present	present	present		
V	8362	ox						4		
V	8362	ox		present		12	7	2		
V	8362	ox		14		9	4			
V	8362	ox			12	present	16			
V	8362	pig					4	1		
V	8362	pig						UNW		
V	8362	pig					5	2		
V	8362	pig	yes		6	14	7	1	female	
V	8362	sheep/goat		12		8	2			
V	8362	sheep/goat		18		12	10	3		
V	8362	sheep/goat		13		12	9			
V	8362	sheep/goat		18		13	10			
V	8362	sheep/goat					present	10		
V	8362	sheep/goat		present		12	9	2		
	8366	ox		14		12				
	8366	sheep/goat			10	12	present			

	8367	ox					15	12		
	8367	ox			11	present				
	8367	ox			present	17	16			
	8367	pig			15	8	5	1		
	8367	pig	no						female	I'S WELL WORN
	8367	sheep/goat			14	17	13	12		
	8385	pig					present	11		
	8388	ox						present		
	8388	ox			present	present	present	present		
	8388	ox		present						
III	8505	ox			13	present				
III	8505	ox			present					
III	8505	ox				present	16	present		
IV	8525	ox			10	16	16	15		
IV	8525	ox			12	15				
IV	8525	ox						present		
IV	8525	ox			7	14	12	10		
IV	8525	ox			7	14	12	10		
IV	8525	pig			8	12	8	6		
IV	8525	pig			10	15	9	7		
IV	8525	pig							male	
IV	8525	pig				6	2			
IV	8525	pig	yes	8		7	2			
IV	8525	sheep/goat			13	present	12	12		
IV	8571	ox			present	present				
IV	8571	ox			11	present	present			
IV	8571	ox				15	present			
IV	8571	ox				present	present	12		
IV	8571	ox		present						DPM3(14)
IV	8571	sheep/goat			10	12	11			
IV	8571	sheep/goat		13		7				
IV	8571	sheep/goat					present	10		
IV	8571	sheep/goat			12	12	12	10		
	8613	ox		14		present				
IV	8616	ox			present	present	present	present		
IV	8616	ox		14		12	4	2		
IV	8616	ox		14		12	4	2		
IV	8616	ox			12					
IV	8616	ox			UNW					
IV	8616	ox						10		
IV	8616	ox						14		
IV	8616	ox			present	14	12	9		PAIR
IV	8616	pig				9	7			
IV	8616	pig			9	16	11	6		
IV	8616	pig		present		12	7	2		
IV	8616	pig	no		9	14			female	
IV	8616	pig				9	7			
IV	8616	pig			10	15	12	7		
IV	8616	pig	yes		9	12	11	7	female	
IV	8616	pig			10	12	9	6		
IV	8616	pig				present	6	4		
IV	8616	sheep/goat			10	12	11	9		
IV	8616	sheep/goat			13	12	12	present		
IV	8616	sheep/goat						9		
IV	8616	sheep/goat				present	8	2		
IV	8618	ox			10	15	12	8		
IV	8618	ox			10	15	12	9		
IV	8618	ox			present					
IV	8618	ox			present	16				
IV	8618	ox						present		
IV	8618	ox				present	present	12		
IV	8618	ox			10	15	present			
IV	8618	ox					present	12		
IV	8618	ox			12	16	15	14		
IV	8618	pig	yes		present				female	ADULT 1'S JW
IV	8618	pig	yes		9	present			male	
IV	8618	pig	no		8	12	7	3	male	
IV	8618	pig				12	8	6		
IV	8618	pig				10	6	3		
IV	8618	pig			12	present	13	8		
IV	8618	sheep/goat		13		12	10	3		
IV	8639	ox			present	16	present			
IV	8639	pig				13	8	4		

IV	8639	pig			8	15	9	4		
IV	8639	pig					present	8		
IV	8639	pig							male	C WORN
IV	8639	sheep/goat			present	17	13	12		
	8646	ox						present		
	8646	sheep/goat					10	7		
IV	8654	ox			present					
IV	8654	ox			present	present	16	12		
IV	8654	ox			present					
IV	8654	ox					present	10		
IV	8654	ox						7		
IV	8654	ox						8		PAIR
IV	8654	ox			present	14	12	8		
IV	8654	pig	yes		7	12	present		male	
IV	8654	sheep/goat			14	12	12	10		
	8655	sheep/goat		present		12	10	present		
III	8656	ox		14		12	7			
III	8656	sheep/goat			7	12	9	3		
III	8657	ox					15	14		M3 NO 3RD CUSP
III	8657	ox					12	12		
III	8657	ox			10	14	present			
III	8657	ox		14		13	11	7		
III	8657	sheep/goat			12	12	11	8		
III	8657	sheep/goat			10	12	12	7		
III	8657	sheep/goat					10	7		
III	8657	sheep/goat			15	present	12	12		
IV	8659	ox		17		13	11	3		
IV	8659	ox					14	12		
IV	8659	ox		16	present					
IV	8659	ox			10					
IV	8659	ox					present	8		
IV	8659	ox		17		12	12	present		
IV	8659	ox		14		12	11	4		
IV	8659	ox						8		
IV	8659	sheep/goat			4	12	10	2		
	8662	ox		14		11	4			
III	8670	ox		15		14	12			
III	8670	ox		13		12				
III	8670	ox			12	16	present			
III	8670	ox						9		
III	8670	pig					present	1		
III	8670	pig					9	6		
III	8670	pig					15	7		
III	8670	pig					6	1		
IV	8737	pig	yes						male	I1-P2 ADULT
IV	8737	pig							female	CANINE
	8738	sheep/goat		present		present				
	8747	ox					present	12		
VI	8757	ox					present	12		
VI	8757	ox			10	15				
VI	8757	ox		14		12	present			
VI	8757	pig			8	present			female	
VI	8757	sheep/goat						7		
VI	8757	sheep/goat			13	12	12	10		
IV	8760	ox					present	12		
IV	8760	ox				present	12	3		
IV	8760	ox						present		
IV	8760	ox			present					
IV	8760	ox			present	present	present			
IV	8760	ox		present						
IV	8760	ox		14		13	present			
IV	8760	ox					present	11		
IV	8760	ox						present		
IV	8760	pig					16	11		
IV	8760	pig			12	present	16	10		
IV	8760	sheep/goat			present	present	12	9		
	8765	ox		10		3				
	8765	ox			11	15	present	present		
	8765	ox		present		13	8	7		
	8765	sheep/goat					present	12		
VI	8766	ox		15		14	present			
VI	8766	ox				present	15	15		
VI	8766	ox						7		

VI	8766	ox						7		
VI	8766	pig							male	WORN C
VI	8766	sheep/goat			14	17	13	present		
VI	8766	sheep/goat			12	13	12	9		
VI	8766	sheep/goat			11	12	12	8		
VI	8771	pig	yes		8	12	8	3	female	
VI	8771	pig				present	8	3		
VI	8771	sheep/goat			10	12	10	7		
	8778	sheep/goat			4	12	10	4		
	8783	ox			13	19	present			
	8783	pig	no		present				female	
	8783	sheep/goat			12	12	12	12		
III	8789	ox			12	present	14			
III	8789	ox			present	present				
III	8789	ox						11		M3 NO 3RD CUSP
III	8789	ox			present					
III	8789	ox				present	11	3		
III	8789	ox			present	present				
III	8789	ox			12	19	17	present		
III	8789	ox		15		13				
III	8789	pig					9	6		
III	8789	pig				11	6	1		
III	8789	pig			5	7	5	1		
III	8789	pig					present	1		
III	8789	pig	no		10	15	present		female	
III	8789	sheep/goat		13		8				
III	8799	ox			present	present	present	present		
III	8799	ox				16	16	15		
III	8799	ox		14						
III	8799	ox					present	3		
III	8799	ox		15		present				PLUS 3 MANDS DPM2-3
III	8799	ox		14		9	2			
III	8799	ox		15		13	8			
III	8799	ox		14	present					
III	8799	ox						12		
III	8799	ox			present	16	present			
III	8799	pig	yes		7	15	8	2		
III	8799	pig			7	12	7	2		
III	8799	pig					present	8		
III	8799	pig	no		8	12	7	3		
III	8799	pig			6	12	7	1		
III	8799	sheep/goat		15						
III	8800	ox				present	15	12		
III	8800	ox					present	16		
III	8800	ox		present		13	9	2		
III	8800	ox		18		present	present	present		
III	8800	ox			8	present				
III	8800	ox		present		11	7	1		
III	8800	ox		14		12	4	1		
III	8800	ox			7	15	present	present		
III	8800	ox			present	present				
III	8800	ox			14	present				
III	8800	ox		13		present				
III	8800	ox		15		13	10	4		
III	8800	ox				present	15	14		
III	8800	ox		present						
III	8800	ox						14		
III	8800	pig	yes		present				female	
III	8800	pig			10	16	12	present		
III	8800	pig				14	11	7		
III	8800	pig							male	JUST WORN C
III	8800	sheep/goat			13	15	12	12		
IV	8801	ox					present	7		
IV	8801	ox			11	15				
IV	8801	sheep/goat			13	15	12	12		
III	8804	ox						9		
III	8804	ox		14						
III	8804	ox			8	14				
III	8804	ox			12	16	15	present		
III	8804	ox			8	15	15	12		

Table 09: Hand-collected animal bone from LTM03 Saxon contexts/metrical data (after Driesch, von den & Boessneck 1974; Driesch, von den 1976)

PHASE	CONTEXT	TAXON	BONE	GL	Lm	Bp	SD	Bd	Dd	Bdd	Bm	Bl	Sex	Hcmax	Hcmin	HC L	HC C	STATURE (m)
	8149	ox	astragalus	58.8				36.3										
	8149	ox	tibia					58.2	43.7									
VI	8154	chicken	femur	78.7			6.3											
VI	8154	chicken	femur	72.8			6.3											
VI	8154	goat	horncore											67.5	37		175	
VI	8154	goose	coracoid	78.6														
VI	8154	goose	humerus	164.8			12.3											
VI	8154	goose	metatarsal	84.2			8.8											
VI	8154	goose	metatarsal	92.2			8.9											
VI	8154	horse	calcaneum	97.9														
VI	8154	ox	astragalus	59.3				38.2										
VI	8154	ox	metacarpal					48.3		44.7	24.2	22.7						
VI	8154	ox	metatarsal	215			22.3	48.2	28.7	44.2								
VI	8154	ox	metatarsal	214.2														
VI	8154	ox	tibia					52.2	40.8									
VI	8154	sheep	femur			43.2												
VI	8154	sheep	horncore											45.2	27.7	125	120	
VI	8154	sheep	metacarpal	128.8			13.7	26.2	16.2	26.8								
VI	8154	sheep	metacarpal	120.2			12.8	24.3	15.7	25.3								
VI	8154	sheep	metacarpal	116.8			12.2											
VI	8154	sheep	metatarsal	129.2			12.2	24.2	15.2	23.7								
VI	8154	sheep	radius	168			17.2	30.2										
VI	8154	sheep	radius	156.2			17.2	29.1										
VI	8154	sheep	radius					30.8										
VI	8154	sheep/goat	femur					39.3										
VI	8154	sheep/goat	metatarsal					22.8	15.2									
VI	8154	sheep/goat	tibia					23.3	18.6									
VI	8154	sheep/goat	tibia	198.2			13.2	25.7	20.2									
VI	8154	sheep/goat	tibia					25.2	19.3									
VI	8155	chicken	femur	68.3			6.2	12.7										
VI	8155	ox	astragalus	65				44.2										
VI	8155	ox	astragalus	64.2				40.7										
VI	8155	ox	astragalus	57.7				37.2										
VI	8155	ox	astragalus	65.7				44.6										
VI	8155	ox	astragalus	58.2				38										
VI	8155	ox	astragalus	61				39.2										
VI	8155	ox	astragalus	65				42.8										
VI	8155	ox	femur					98.8										
VI	8155	ox	horncore											69.8	56		196	
VI	8155	ox	metacarpal	192.2			33.8	62.8	32.2	56.3	30.3	30.3						
VI	8155	ox	tibia					50.6	40.3									
VI	8155	ox	tibia					51.9	40.2									
VI	8155	ox	tibia					68	48.2									
VI	8155	ox	tibia					66.4	51.3									

VI	8155	pig	tibia					27.2	24.5									
VI	8155	sheep	femur			48.3												
VI	8155	sheep	metacarpal	129.8			15.2	26	16.3	26.2								
VI	8155	sheep	metacarpal	126.3			13.4	25.2	16.2	26								
VI	8155	sheep	metacarpal					27	17.2	26.9								
VI	8155	sheep	metacarpal	117.3			12.7	23.8	15.7	22.9								
VI	8155	sheep	metatarsal	139.2			12.2	23.7	26.8									
VI	8155	sheep	metatarsal	150.6			12.4	24.8	16.8	24.8								
VI	8155	sheep	metatarsal	138.2			12.3	24.7	16.2	24.2								
VI	8155	sheep/goat	tibia					26.8	21.2									
VI	8155	sheep/goat	tibia					27.9	22.2									
VI	8155	sheep/goat	tibia					23.2	18.2									
VI	8166	goose	femur	80.3		21	8.2											
VI	8166	goose	humerus	166.2		38	11.2											
VI	8166	goose	metacarpal	91.7														
VI	8166	mallard/domestic duck	humerus	90.2		20.8	6.8											
VI	8166	ox	horncore											42	34.5	127	128	
VI	8166	ox	horncore											32.8	29.7	125	98	
VI	8166	ox	metacarpal	182.3			25.8	49.8	28.4	48.2	24.2	23.8						
VI	8166	ox	metacarpal	195			207.8	52.8	29.5	49.7	25.2	24.7						
VI	8166	ox	metacarpal	200			34.8			57								
VI	8166	ox	tibia				40.8	64.2	48.7									
VI	8166	sheep	metacarpal	125.8			14.3	25.2	16.2	25.2								
VI	8166	sheep	metatarsal	125			11.8	22.2	14.3	22.2								
VI	8166	sheep	radius	149.4			18.2											**0.601**
VI	8169	chicken	femur	71.2			5.8											
VI	8169	chicken	humerus	65		18	6											
VI	8169	deer, roe	radius	173.2			14.4	24.8										
VI	8169	goose	coracoid	72.3														
VI	8169	goose	humerus	167.2		39.2												
VI	8169	goose	metatarsal	83.7			7.6	18.2										
VI	8169	ox	astragalus	57.2				36.8										
VI	8169	ox	calcaneum	138.2														
VI	8169	ox	femur					79.8										
VI	8169	ox	horncore											52.2	38.2	160	145	
VI	8169	ox	horncore											46.7	36.2	156	133	
VI	8169	ox	metacarpal	178.3			25.2	52.2	28.8	47.2	25.5	24.2						**1.097**
VI	8169	ox	metatarsal	227.3			27.2	55.2	31.2	51.8								**1.239**
VI	8169	ox	tibia					52.2	41.2									
VI	8169	pig	tibia	183.2			19.3	29.3	25.2									**0.718**
VI	8169	pig	tibia					29.2	25.2									
VI	8169	sheep	metacarpal	128.4			13.8	26.7										**0.628**
VI	8169	sheep	metatarsal	140.7			12.2	24.8	16.5	24.2								**0.639**
VI	8169	sheep	radius	164.2			16.2	29.2										**0.66**
VI	8169	sheep	radius					26.8										
VI	8169	sheep/goat	tibia	199.2			14.8	24.8	19.3									**0.6**
VI	8169	sheep/goat	tibia					25.3	20.2									

VI	8169	sheep/goat	tibia					27.2	21.8									
VI	8169	sheep/goat	tibia			41.4												
VI	8169	sheep/goat	tibia			41.2												
VI	8172	goat	horncore										male	60.7	38.7		159	
VI	8172	ox	astragalus	69.2				46										
VI	8172	ox	calcaneum	139.7														
VI	8172	ox	femur			106.7												
VI	8172	ox	metacarpal					64.8		58.7	32.2	31.3						
VI	8172	ox	metatarsal	198.5			23.7	46.7		44.2								**1.082**
VI	8172	ox	tibia			82												
VI	8172	ox	tibia					67.2	52.2									
VI	8172	ox	tibia					56.2	41.2									
VI	8172	sheep	horncore											35.2	23.6			
VI	8172	sheep	metacarpal	113.2			12.2	22.6	15.2	23.2								**0.554**
VI	8172	sheep/goat	tibia	206.2		41.3	14.3	27.3	19.8									**0.621**
VI	8172	sheep/goat	tibia					26.2	20.3									
VI	8172	sheep/goat	tibia					26	20.8									
VI	8186	goose	humerus	161.2			11.8											
VI	8186	goose	metatarsal	81.2			8.3											
VI	8186	ox	astragalus	63.2				41.2										
VI	8186	ox	astragalus	63.2				38.7										
VI	8186	ox	astragalus	58.3				38.2										
VI	8186	ox	calcaneum	138.3														
VI	8186	ox	calcaneum	125.2														
VI	8186	ox	calcaneum	118.2														
VI	8186	ox	calcaneum	131.2														
VI	8186	ox	femur					83.2										
VI	8186	ox	horncore											44.2	34.8		133	
VI	8186	ox	horncore											60.6	50.2	215	186	
VI	8186	ox	metacarpal	192.3				57.3	42.6									**1.183**
VI	8186	ox	metatarsal	210.1														**1.145**
VI	8186	ox	metatarsal	217.2			23.7	48.7	29.2	46.2								**1.184**
VI	8186	ox	radius	246.8		70.2	36.8											**1.061**
VI	8186	ox	tibia					60.2	43									
VI	8186	ox	tibia			83.2												
VI	8186	pig	femur					41.3										
VI	8186	pig	tibia					29.2	25.2									
VI	8186	pig	tibia					29.3	24.8									
VI	8186	pig	tibia					30.2	25.2									
VI	8186	sheep	femur	173.8		47.2	17	39.3										**0.614**
VI	8186	sheep	femur			38.2												
VI	8186	sheep	horncore											39.7	24.6		102	
VI	8186	sheep	horncore											45.8	30.3	168	126	
VI	8186	sheep	horncore											41.2				
VI	8186	sheep	horncore											64.5	45.3			
VI	8186	sheep	humerus			39.2												
VI	8186	sheep	humerus	143.2		39.8	15.2	30.2										**0.613**

VI	8186	sheep	humerus	144.2		39.5	16	32.8										**0.617**
VI	8186	sheep	metacarpal	140.3			15.2	26.2	16.8	25.3								**0.686**
VI	8186	sheep	metacarpal	123.8			14.7			26.8								**0.605**
VI	8186	sheep	metacarpal	115.2			11.8	23.2	15.3	22.2								**0.563**
VI	8186	sheep	metatarsal	143			13.2	26.3	17.2	25.2								**0.649**
VI	8186	sheep	metatarsal					25.7	16.2	25.8								
VI	8186	sheep	radius	164.8			17.8	29.3										**0.662**
VI	8186	sheep	radius					27.8										
VI	8186	sheep/goat	femur					38.3										
VI	8186	sheep/goat	tibia					28.4	20.4									
VI	8186	sheep/goat	tibia					25.7	20.3									
VI	8186	sheep/goat	tibia					26.8	19.8									
VI	8186	sheep/goat	tibia					26.3	22									
VI	8186	sheep/goat	tibia			43.5												
VI	8217	ox	femur			107.1												
VI	8217	ox	tibia					66.6	50.6									
VI	8217	sheep	metacarpal	125.8			14.2	26.2	17	26.2								**0.615**
VI	8217	sheep	metatarsal	123.5			11.7											**0.561**
VI	8217	sheep	metatarsal	150			12.3											**0.681**
VI	8217	sheep	radius	159.2			7.6	29.2										**0.64**
VI	8217	sheep/goat	radius	140.4			14.8	27.2										**0.564**
VI	8217	sheep/goat	tibia					23.7	18.8									
VI	8217	sheep/goat	tibia					25.2	20.1									
V	8266	ox	tibia					52.2	41.2									
	8279	ox	tibia			85.2												
V	8329	ox	calcaneum	113.8														
V	8358	ox	metatarsal	194.7			19.8	44.2	25.7	41.2								**1.061**
V	8362	ox	astragalus	66.2				43.7										
V	8362	ox	calcaneum	117.8														
V	8362	ox	calcaneum	121.9														
V	8362	ox	horncore											46.7	34.2	133	131	
V	8362	ox	metacarpal	188.4														**1.159**
V	8362	ox	tibia					55.2	43.8									
V	8362	pig	tibia					29.3	26.2									
V	8362	pig	tibia					32.2	28.7									
V	8362	pig	tibia					32.3	29.2									
V	8362	sheep	horncore											30.2	18	103		
V	8362	sheep	metacarpal	139.5			14.8	27	17	25.8								**0.682**
V	8362	sheep	metacarpal	123.8			12.6		15	22.2								**0.605**
V	8362	sheep	metatarsal	120.5			10.7	22.4	15.2	21.8								**0.547**
V	8362	sheep/goat	radius					29.2										
	8366	chicken	humerus	67.3			6.8											
	8366	ox	tibia					60.8	46.2									
	8366	sheep	metacarpal	139.7			14.2	25.2	16.2	25.3								**0.683**
	8367	ox	calcaneum	116.3														
	8367	ox	femur					82.2										
	8367	ox	horncore											71.2	52	205	195	

	8367	ox	metacarpal					53.8	30	48.7	25.2	25.3						
	8367	ox	metatarsal	229.9			27.8	57.2	32.2	52.8								**1.253**
	8367	ox	tibia					61.2	43.2									
	8367	pig	tibia					28.4	25.2									
	8367	sheep	horncore											36.6	26.2	137		
	8367	sheep	metacarpal	123.2			15.2	25.4		25.2								**0.602**
	8385	horse	metacarpal	210	198.8		31.2	46.6	34.2	45.3								**1.274**
	8385	ox	astragalus	65.3				44.8										
	8385	ox	horncore											56.2	46.8		163	
	8385	ox	metacarpal	180.4			28	52.8	29.8	47.2	25.8	24.8						**1.109**
	8385	ox	metatarsal	229.8			23.8	50.8	30.4	49								**1.252**
	8385	ox	tibia					63.4										
	8503	ox	horncore											53.5	40.8		170	
	8503	sheep/goat	radius	155			15.5	28.2										**0.623**
V	8503	sheep/goat	tibia					28.2										
V	8503	sheep/goat	tibia					23.8	19.2									
III	8505	ox	metacarpal	188.2			27.2	54		50.2	25.3	25.3						**1.157**
III	8505	ox	metatarsal					56.3										
III	8505	ox	metatarsal					22										
IV	8525	goat	tibia					27.4	21.2									
IV	8525	ox	astragalus	62.6				38.8										
IV	8525	ox	femur					58.3										
IV	8525	ox	metacarpal	177.8			25.8	50.7	27.7	46	24.8	23.8						**1.093**
IV	8525	ox	metacarpal	195.1			34.2	61.2	30.6	56.5	30	28.7						**1.2**
IV	8525	ox	metacarpal	199.8			30.8	56.8	31.8	53.8	27.2	27.2						**1.229**
IV	8525	ox	metatarsal	224			27.8	56.8	30.4	58.5								**1.221**
IV	8525	ox	metatarsal	212.8			25.3	48.3	27.8	50.7								**1.16**
IV	8525	ox	tibia			87												
IV	8525	ox	tibia					62.8	48.2									
IV	8525	sheep/goat	tibia					24.3	18.2									
IV	8571	ox	metacarpal					52.2	29.2	50	24.8	25						
IV	8571	sheep/goat	tibia					26.6										
IV	8571	sheep/goat	tibia					26.2	20.3									
	8613	sheep	radius	157.2			17.3	29.8										**0.632**
	8613	sheep	tibia					25.3	20.6									
IV	8616	goat	metacarpal	116.3			18.2	31.8	18.2	32.6								**0.669**
IV	8616	goat	tibia					28.2										
IV	8616	ox	astragalus	59.7				38.3										
IV	8616	ox	femur			106.2												
IV	8616	ox	femur			102.2												
IV	8616	ox	horncore													171		
IV	8616	ox	horncore											47.2	34.2	157	130	
IV	8616	ox	horncore													162		
IV	8616	ox	metacarpal	187			27											**1.15**
IV	8616	ox	metacarpal					59.8	34.2	55.3	29	28.8						
IV	8616	ox	metacarpal	187.2			27.2	50.8	28.2	152.4								**1.151**
IV	8616	ox	metatarsal	209.8			24.2	48.2	28.2	45.3								**1.143**

IV	8616	ox	metatarsal	230.9			26.5	55.8	31.3	60.2								**1.258**
IV	8616	ox	metatarsal	209.7			24	47.8	27.2	45.2								**1.142**
IV	8616	ox	metatarsal	222			29.6											**1.21**
IV	8616	ox	metatarsal	215.3			22.8	47.8	28.8	44.7								**1.173**
IV	8616	ox	metatarsal	213.7			23.2	47.8	27.5	45.5								**1.164**
IV	8616	ox	metatarsal	215			24.2	47.2	28.2	45.8								**1.171**
IV	8616	ox	radius	303			47											**1.303**
IV	8616	ox	tibia			83.8												
IV	8616	ox	tibia					64.4	48.7									
IV	8616	ox	tibia			89												
IV	8616	pig	femur			55.4												
IV	8616	sheep	metacarpal	125.2			14.8											**0.612**
IV	8618	ox	calcaneum	142.8														
IV	8618	ox	femur					82.2										
IV	8618	ox	horncore											48	36.8	160	139	
IV	8618	ox	metacarpal	174.5														**1.073**
IV	8618	ox	metacarpal	201			37											**1.236**
IV	8618	ox	tibia					62.4	46.7									
IV	8618	pig	femur			54.2												
IV	8618	sheep	metatarsal	140			13	24.7	16.2	24.7								**0.636**
IV	8618	sheep/goat	metatarsal	125.4			15.2	26.2	17.3	26.3								**0.569**
IV	8618	sheep/goat	tibia					25.4	19.7									
IV	8639	ox	astragalus	67.8				41.2										
IV	8639	ox	astragalus	57.6				36.2										
IV	8639	ox	metacarpal	187.4			28.2											
IV	8639	ox	tibia					59.4	46.2									
IV	8639	sheep	femur			44.3												
IV	8639	sheep	radius	142.9			14.2	25.3										**0.574**
IV	8639	sheep/goat	tibia					27	20.2									
	8646	goat	horncore											64	43.2	310	167	
	8646	ox	astragalus	65.2				40.2										
	8646	ox	calcaneum	122.2														
	8646	ox	metacarpal	182.8			25.7	50.7			23.8	24.5						**1.124**
	8646	ox	tibia					53.2	43.2									
	8646	ox	tibia					61.3	48.2									
	8646	sheep	metatarsal					53.7	15	23								
IV	8647	dog	scapula			32.3												
IV	8647	ox	astragalus	67.8				44.4										
IV	8647	ox	femur			106.7												
IV	8647	ox	tibia					49.7	35.5									
IV	8647	sheep	metatarsal	129.2			11.2	2.7	16.2	22.2								**0.587**
IV	8647	sheep/goat	tibia					26.2	20									
IV	8654	goat	horncore											65.6	39.3	290	170	
IV	8654	ox	calcaneum	142.2														
IV	8654	ox	femur					107.5										
IV	8654	ox	metacarpal	178.3														**1.097**
IV	8654	ox	metatarsal	214.8			24.9	48.6	28.2	48.2								**1.171**

IV	8654	ox	metatarsal	233.2			28.2	60.6	32.2	58.4								**1.271**
IV	8654	ox	tibia					69.8	52.3									
IV	8654	ox	tibia					63.4	47.7									
IV	8654	sheep/goat	tibia					25.2	19.8									
IV	8654	sheep/goat	tibia					26	18.8									
	8655	ox	astragalus	55.2	34.3													
	8655	ox	metacarpal					52.2	29.3	47.6	25.5	24.3						
	8655	ox	metatarsal	206.1			23.2	46.3	28.2	44.8								**1.123**
	8656	ox	horncore											51.3	36.7		145	
	8656	ox	metatarsal	211			22.2	49	28.7	46.4								**1.15**
	8656	ox	tibia					56.3	44.7									
III	8657	ox	astragalus	59.4				36.8										
III	8657	ox	horncore											50.3	35.8		143	
III	8657	ox	metacarpal					54.7	28.8	49.3	26	26.7						
III	8657	ox	metacarpal	188														**1.156**
III	8657	ox	metacarpal	193.8														**1.192**
III	8657	ox	radius	247.2			35.2											**1.063**
III	8657	ox	tibia					60.2	48.5									
III	8657	pig	tibia					27.3	25.6									
III	8657	pig	tibia					28.4	24.7									
III	8657	pig	tibia					29.2	25.2									
III	8657	sheep	radius	138			15.7	27.7										**0.555**
III	8657	sheep/goat	radius					31.2										
III	8657	sheep/goat	tibia					25.7	18.8									
IV	8659	ox	metacarpal	195.2			27	50.2		48.9	25.2	23.8						**1.2**
IV	8659	ox	metacarpal	181.2			26.2	50.2	27.8	46.7	24.5	23.6						**1.114**
IV	8659	ox	metacarpal	186			33.2	58.1	31.5	53.3	28.7	27.4						**1.143**
IV	8659	ox	tibia					61.8	48.9									
IV	8659	ox	tibia					54.2	40.8									
IV	8659	ox	tibia					57.8	45.3									
IV	8659	pig	tibia					30.2	27.4									
IV	8659	sheep	metacarpal	129.2			14.2	25.2	16.3	26.8								**0.632**
IV	8659	sheep	metatarsal	141.2			12.4	24.3	17.3	24.3								**0.641**
	8662	ox	metacarpal	178.8														**1.097**
	8662	ox	metatarsal	216.2			28.3	58.2	31.2	54.3								**1.178**
	8662	ox	metatarsal	216.2			26.7	56.2	30.3	51.2								**1.178**
	8662	ox	tibia					60.8	44.7									
	8670	ox	metatarsal					55.2	32.5	53.2								
III	8670	pig	tibia					32.4	29.7									
IV	8737	ox	femur					99										
IV	8737	ox	horncore											59.5	46.8		173	
IV	8737	ox	horncore											46.3	63.2	240	173	
IV	8737	ox	horncore											63.2	48.4		185	
IV	8737	ox	tibia					64.8	49.8									
	8738	ox	horncore											59.2	48		185	
	8738	ox	metatarsal	221			26.3	56.3	30.7	51.3								**1.204**
	8738	pig	humerus	184.2			17.2	38.2										**0.746**

	8738	pig	tibia					30.4	27.3								
	8738	pig	tibia					29.2	26.3								
	8738	sheep	horncore											43.3	31.2	120	126	
	8738	sheep	radius					28.2										
	8738	sheep/goat	tibia					25.3	18.8									
	8738	sheep/goat	tibia			31.2												
	8747	ox	tibia					54.7	42.2									
	8747	pig	calcaneum	81.7														**0.763**
	8747	sheep	radius					30.7										
	8747	sheep/goat	tibia					25.2	19.2									
VI	8757	goose	humerus	165		35.8												
VI	8757	goose	tibia	140.5			8.2	19.2										
VI	8757	ox	calcaneum	135.3														
VI	8757	ox	calcaneum	124.2														
VI	8757	ox	femur			111.3												
VI	8757	ox	metacarpal	199.2			36.4											**1.225**
VI	8757	ox	metacarpal	195.7			29.6	53.4		49.8	25.3	25.3						**1.204**
VI	8757	ox	metacarpal	176			28	50.2	26.8	46.2	24.2	23.7						**1.082**
VI	8757	ox	metatarsal					55.2	32.2	53.5								
VI	8757	ox	metatarsal	224			22.2	49.8	30.3	46.8								**1.221**
VI	8757	ox	tibia					52.4	43.2									
VI	8757	pig	femur					46.3										
VI	8757	pig	tibia					31.2	25.7									
VI	8757	pig	tibia					29.8	25.8									
VI	8757	sheep	radius	144.3			18.2	30.4										**0.58**
VI	8757	sheep/goat	tibia					25.2	19.3									
VI	8757	sheep/goat	tibia					25.2	19.5									
VI	8757	sheep/goat	tibia					23	18.3									
IV	8760	ox	astragalus	60.2				39										
IV	8760	ox	horncore											43.2	35.2		133	
IV	8760	ox	horncore											46.2	35.3	155	133	
IV	8760	ox	metatarsal	208.8			23.2	46.8	27.3	44.2								**1.138**
IV	8760	ox	metatarsal					56.2	32.6	50.6								
IV	8760	ox	tibia			85.4												
IV	8760	ox	tibia					53	42.3									
IV	8760	ox	tibia					55.2	40.7									
IV	8760	pig	tibia					28.7	27.2									
VI	8766	horse	phalange 1	83.2			37.8	48.5										
VI	8766	ox	astragalus	61.7				40.3										
VI	8766	ox	horncore											43.4	33.4	115	126	
VI	8766	ox	metacarpal	193.2			33.2	59.8		54.8								**1.188**
VI	8766	ox	metacarpal	182.2			29.8	54.2	28.3	51.2	25.2	25.6						**1.12**
VI	8766	ox	metatarsal	200.4			22.2	44.2	25.3	41.4								**1.092**
VI	8766	ox	metatarsal	220.2														**1.2**
VI	8766	ox	metatarsal	235.8			28.7	60.2	32.3	55.8								**1.285**
VI	8766	ox	tibia					64.2	46.3									
VI	8766	ox	tibia					64.2	50.3									

VI	8766	pig	femur					41.8										
VI	8766	pig	femur					43.7										
VI	8766	pig	tibia					29.3	25.7									
VI	8766	sheep	metatarsal	127			11.8	22.2		22								**0.577**
VI	8766	sheep	radius				17.3	29.2										
VI	8766	sheep	radius	143.2			16.3	28.2										**0.576**
VI	8766	sheep	radius	164.2			16.7	30.8										**0.66**
VI	8766	sheep	radius	134.3			16.8	28.2										**0.54**
VI	8766	sheep/goat	tibia					25.1	20.2									
VI	8766	sheep/goat	tibia					27.8	21.2									
VI	8766	sheep/goat	tibia					25.3	20									
VI	8766	sheep/goat	tibia					26.2	19.8									
VI	8771	ox	astragalus	64.3				40.2										
VI	8771	ox	femur			122.2												
VI	8771	ox	metacarpal	207.3			37.8	66		61.2	31.2	31.6						**1.275**
VI	8771	ox	metacarpal	187.8			28.2	52.3	29.8	50.2	25.2	24.3						**1.155**
VI	8771	ox	tibia					70.2	52.8									
VI	8771	ox	tibia					65.4										
VI	8771	pig	radius					34.2										
VI	8771	sheep	metatarsal	132.2			12.8	24.3	16.2	23.2								**0.6**
VI	8771	sheep/goat	tibia					24.2	20									
VI	8771	sheep/goat	tibia					26.2	20.2									
	8778	ox	horncore											48.8	36.2	148	130	
	8778	ox	tibia					64.2	51.8									
	8778	ox	tibia					50.2	39.3									
	8778	sheep	metatarsal	135			11.2	23.2	15.2	23.2								**0.613**
	8783	ox	calcaneum	134.8														
	8783	ox	horncore										C	72	55.4	180	200	
	8783	ox	metacarpal	199.7			35.2	62.8	32	58.2	30.3	29.3						**1.228**
	8783	ox	tibia					62	46									
	8783	pig	femur					43.6										
	8783	pig	tibia					30.2	25.7									
	8783	pig	tibia	189.2			18.2	28.7	25.1									**0.742**
III	8789	horse	phalange 1	88.6		55.8	57.6											
III	8789	ox	astragalus	55.2				25.3										
III	8789	ox	calcaneum	117.2														
III	8789	ox	calcaneum	138.3														
III	8789	ox	horncore											48.4	38.3	156	138	
III	8789	ox	horncore											47.3	38.8	147	136	
III	8789	ox	horncore											49.8	38.2		145	
III	8789	ox	horncore											51.5		167		
III	8789	ox	metacarpal	182.2			25.3	47.4	27.3	43.8	23.2	22.7						**1.12**
III	8789	ox	metacarpal	177.8			26.2	50.2	26.8	46.2	24.2	24						**1.093**
III	8789	ox	metacarpal	183.5			33.2											**1.129**
III	8789	ox	metatarsal	205.4			24	47	28.3	44.6								**1.119**
III	8789	ox	metatarsal					47.3	28.2	46.2								
III	8789	ox	tibia			82												

III	8789	ox	tibia					54.7	40.8									
III	8789	sheep	radius					27.2										
III	8789	sheep/goat	metacarpal	115.3			12.6	23.3	14.8	23.7								**0.564**
	8791	ox	tibia					55.3										
	8791	sheep	radius	138.2			13.8	25.8										**0.556**
III	8799	ox	metacarpal	189.3			28.2	53.7	29.3	50.7	25.3	25.3						**1.164**
III	8799	ox	metacarpal	184.2														**1.133**
III	8799	ox	metacarpal					51.3	27.6	46.8	25.2	24						
III	8799	ox	metatarsal					49.7	29.2	47.3								
III	8799	ox	metatarsal					58.7	33.4	53.6								
III	8799	pig	femur					45.3										
III	8799	pig	tibia					29.4	26.9									
III	8800	goat	metacarpal	109.2			15.7	28.4		28.2								**0.628**
III	8800	ox	astragalus	63				38.7										
III	8800	ox	horncore										45.4	39.5	145	136		
III	8800	ox	horncore										45.2	35.2	140	130		
III	8800	ox	metacarpal	178.2														**1.096**
III	8800	ox	metatarsal	213.2			22.2	48.2	28.6	44.7								**1.162**
III	8800	ox	metatarsal					45.2	25.8	42.3								
III	8800	ox	tibia					53.2	40.6									
III	8800	pig	radius	145.2			17.6	32.3										**0.764**
III	8800	pig	tibia					28.7	26.2									
III	8800	pig	tibia					29.2	27.8									
III	8800	sheep	radius	145.2			14.2											**0.584**
III	8800	sheep/goat	tibia					26.1	20.8									
IV	8801	ox	horncore										36.8	27.8		105		
IV	8801	ox	horncore										38.8	29.4	125	116		
IV	8801	ox	metacarpal	168.8			23.8	47.6	27	45.3	22.8	22.3						**1.038**
IV	8801	sheep	metacarpal	115.3			14.3	27.2	16.3	25.7								**0.564**
	8832	ox	tibia					50.2	40.2									
	8836	ox	metatarsal					44.8	26.3	42.6								
	8836	ox	metatarsal					50.2	30.2	47								
	8836	ox	tibia					60.8	44.9									
	8836	ox	tibia					55.3	40.7									

Table 10: Animal bone from LTM03 post-medieval deposits/dental eruption and wear (after Grant 1982; and Payne 1973)

CONTEXT	TAXON	BONE	SIDE	AGE	C	dpm4 (G)	P4 (G)	M1 (G)	M2 (G)	M3 (G)	dpm4 (P)	P4 (P)	M1 (P)	M2 (P)	M3 (P)	AGE (years)
8166	pig	tooth, maxillary		juvenile	0	11	0	0	0	0	0	0	0	0	0	<1.25
8188	ox	mandible	right	adult	0	0	0	0	15	12	0	0	0	0	0	>3.0
8594	pig	maxilla	left	young adult	0	0	0	0	0	6	0	0	0	0	0	1.5-2.0
8606	pig	mandible	right	adult	0	0	11	17	12	10	0	0	0	0	0	>3.0
8606	pig	maxilla	right	subadult	0	0	0	6	0	0	0	0	0	0	0	0.5-1.0
8621	pig	mandible	left	young adult	0	0	0	0	8	0	0	0	0	0	0	>1.0
8762	sheep/goat	mandible	right	adult	0	0	0	15	12	11	0	0	16	13	14	3.0-4.0
8880	ox	mandible	left	adult	0	0	0	17	15	15	0	0	0	0	0	>3.0

Table 11: Animal bone from LTM03 post-medieval deposits/modification

CONTEXT	SAMPLE	TAXON	BONE	SIDE	AGE	GNAWED	BURNT	WORKED	BUTCHERED
8025	0	sheep/goat	tibia	right	adult				chopped proximal
8090	0	deer, unidentified	antler		adult			sawn proximal /distal /midline	
8094	0	ox-sized	vertebra, thoracic		subadult				chopped midshaft
8119	0	sheep/goat	tibia			rodent			chopped and snapped
8166	0	ox	metacarpal	left	subadult				split
8166	0	sheep/goat	metatarsal		adult				split distal
8188	0	goat	horncore	left	adult			chopped proximal	
8188	0	goat	horncore	right	adult			chopped proximal	
8188	0	ox	skull						chopped transverse/split
8188	0	ox-sized	vertebra, thoracic						split
8188	0	sheep/goat	calcaneum	right	adult				chopped lateral
8573	0	cod family	vertebra						chopped transverse
8573	0	deer, fallow	radius	right		rodent			
8573	0	ox	axis vertebra						split/chopped midshaft
8573	0	ox	femur	left					split
8573	0	ox	humerus	left	subadult				split
8573	0	ox	humerus	left					split/chopped medial
8573	0	ox	humerus	left					split
8573	0	ox	innominate			canine			
8573	0	ox	innominate	both					split ventral
8573	0	ox	innominate	right					chopped medial
8573	0	ox	metacarpal	left	adult				split proximal & distal
8573	0	ox	metacarpal	right	adult				split
8573	0	ox	metacarpal		subadult				split
8573	0	ox	metatarsal		subadult				split
8573	0	ox	metatarsal	left					split
8573	0	ox	metatarsal	left	adult				split proximal and distal
8573	0	ox	radius	right					split
8573	0	ox	scapula	right					chopped across spine
8573	0	ox	scapula	left					chopped transverse
8573	0	ox	skull	right					chopped anterior and posterior
8573	0	ox	tibia		adult				split
8573	0	ox	vertebra, cervical		subadult				chopped midshaft
8573	0	ox	vertebra, thoracic		adult				sawn midline/sawn dorsal lateral medial
8573	0	ox	vertebra, thoracic		adult				split lateral
8573	0	ox-sized	longbone						sawn transverse
8573	0	ox-sized	longbone			rodent			
8573	0	ox-sized	rib						sawn and snapped proximal
8573	0	ox-sized	rib		juvenile				sawn transverse
8573	0	ox-sized	rib						sawn proximal and distal
8573	0	ox-sized	sacrum						split
8573	0	ox-sized	vertebra, lumbar		subadult				split

8573	0	pig	innominate	right					sawn anterior lateral
8573	0	pig	metacarpal		subadult				chopped midshaft
8573	0	pig	scapula	left	subadult				sawn midshaft/knife cut distal
8573	0	pig	skull	right					split
8573	0	rabbit	femur			rodent			
8573	0	sheep	humerus	left					knifecut and sawn midshaft
8573	0	sheep	skull + horncore	left				horncore chopped anterior/proximal	split
8573	0	sheep/goat	femur	left					sawn proximal
8573	0	sheep/goat	femur	right					sawn proximal
8573	0	sheep/goat	femur	left	adult	rodent			sawn midshaft
8573	0	sheep/goat	humerus	right	adult				sawn posterior transverse blade <1.0mm
8573	0	sheep/goat	humerus	left		rodent			
8573	0	sheep/goat	humerus	right		rodent			
8573	0	sheep/goat	humerus	right					sawn midshaft
8573	0	sheep/goat	metacarpal	left					split
8573	0	sheep/goat	scapula	left		rodent			chopped lateral
8573	0	sheep/goat	tibia	left	subadult				chopped midshaft
8573	0	sheep/goat	tibia	left					sawn proximal and distal
8573	0	sheep/goat	tibia	left					sawn transverse midshaft
8573	0	sheep/goat	tibia				calcined		
8573	0	sheep/goat	vertebra, lumbar		adult				split
8573	0	sheep/goat	vertebra, lumbar		adult				split lateral
8573	0	sheep-sized	rib						knife cut medial
8594	0	ox	calcaneum	left	adult				chopped lateral
8594	0	pig	femur	left	adult				midshaft knife cut
8594	0	pig	innominate	right	adult				chopped acetabulum
8594	0	pig	innominate	right					chopped acetabulum
8594	0	pig	innominate	right					chopped posterior
8594	0	pig	innominate	left					chopped midshaft
8594	0	pig	scapula	left	adult				chopped distal
8594	0	pig	vertebra, lumbar		subadult				lateral knife cut
8600	0	deer, unidentified	antler	beam	adult			sawn distal and proximal	
8600	0	deer, unidentified	antler	beam	adult			sawn distal and proximal	
8600	0	ox	femur	right	subadult				split
8600	0	ox	humerus	left					split distal
8600	0	ox	metatarsal	left	adult				split distal and midshaft
8600	0	ox	vertebra, cervical		subadult				chopped anterior
8600	0	ox-sized	rib						chopped transverse
8606	0	ox	horncore	right	adult			chopped dorsal/proximal	
8606	0	ox	humerus	right					chopped medial transverse
8606	0	ox	metacarpal	left					split
8606	0	ox	metacarpal	left					split
8606	0	pig	innominate	right	adult				chopped medial
8606	0	pig	vertebra, thoracic		juvenile				chopped anterior
8610	0	pig	innominate						chopped transverse
8621	0	ox	scapula	right	adult				split lateral medial
8621	0	pig	scapula	left					chopped distal

8621	53	ox	innominate						chopped anterior
8621	53	ox-sized	vertebra		subadult				split
8621	53	sheep-sized	vertebra, cervical		subadult				chopped midshaft
8626	0	ox	metapodial		adult				split
8626	0	ox	scapula						chopped lateral
8631	0	ox	metacarpal	left	adult				split proximal
8631	0	ox	radius	left	adult				split
8762	0	ox	metacarpal	left	adult				knife cut distal
8880	0	ox	axis vertebra		adult				split
8880	0	ox	femur	right	subadult				split
8880	0	ox	humerus	right					split
8880	0	ox	humerus	left	adult				split latero-medial
8880	0	ox	humerus	right					split distal
8880	0	ox	radius	left	adult				chopped distal
8880	0	ox	radius	left					split
9381	0	ox-sized	rib						chopped transverse
9381	0	sheep	horncore		adult			chopped proximal	

Table 12: Animal bone from LTM03 post-medieval deposits/metrical data (after Driesch, von den and Boessneck 1974; and Driesch, von den 1976)

CONTEXT	TAXON	BONE	SIDE	SEX	MEAS 1	MEAS 2	MEAS 3	MEAS 4	MEAS 5	MEAS 6	MEAS 7	MEAS 8	MEAS 9	STATURE (mm)
8573	chicken	metatarsal	right	female	87.9	15.7	7	15.3	0	0	0	0	0	
8573	chicken	femur	left		93.7	0	0	0	8.4	0	0	0	0	
8573	chicken	tibia	left		137	0	0	7.2	12.9	0	0	0	0	
8573	goat	metatarsal	left		124.5	0	0	22.3	0	14.5	0	11	28.8	**565.2**
8631	goose	metatarsal	left		89.5	0	0	0	0	0	0	0	0	
8573	hare, brown	humerus	right		106.4	0	0	0	0	5.3	0	12.5	0	
8573	hare, brown	radius	left		106.8	0	0	9.4	0	0	0	0	0	
8573	mallard	coracoid	right		55.6	0	0	0	0	0	0	0	0	
8025	ox	metatarsal	right		208	0	0	0	0	22.3	0	22.7	47.5	**1133.6**
8573	ox	metacarpal	left		190	0	0	0	0	27.5	0	0	0	**1168.5**
8573	ox	metatarsal	left		208	0	0	0	0	23.4	0	0	0	**1133.6**
8573	ox	metatarsal	right		216.5	0	0	42.3	0	24.5	0	23.1	49	**1179.9**
8594	ox	calcaneum	left		135	36.5	0	0	0	0	0	0	0	
8600	ox	calcaneum	left		129	38.8	0	0	0	0	0	0	0	
8600	ox	horncore	left		130	0	0	0	0	0	0	0	0	
8606	ox	calcaneum	right		122.5	31.3	0	0	0	0	0	0	0	
8606	ox	metacarpal	left		0	0	0	59.5	0	34	0	24.8	62.5	
8606	ox	horncore	right		115	120	45	31	0	0	0	0	0	
8606	ox	astragalus	left		61.6	55.4	0	0	0	0	0	0	0	
8626	ox	astragalus	right		57	51	0	0	0	0	0	0	0	
8631	ox	metacarpal	left		0	0	0	0	0	0	0	21.7	63.2	
8762	ox	metacarpal	left		189	0	0	0	0	30.2	0	22	57	**1162.4**
8762	ox	astragalus	left		57	51.6	0	0	0	0	0	0	0	
8880	ox	astragalus	left		58.3	53.8	0	0	0	0	0	0	0	
8573	plaice	maxilla			57.3	0	0	0	0	0	0	0	0	

8166	sheep	metatarsal	left		124.5	0	0	19	0	11.8	0	9.7	21.9	**565.2**
8573	sheep	metacarpal	right		125	0	0	24.7	0	15	0	10.2	25.5	**611.3**
8573	sheep	metatarsal	left		122	0	0	18	0	11.2	0	9.7	23.3	**553.9**
8606	sheep	metatarsal	left		0	0	0	0	0	11.6	0	9.4	22.3	
8762	sheep	tibia	right		179	0	0	12.4	0	0	0	0	0	**538.8**
8762	sheep	metacarpal	left		118.5	0	0	25.5	0	15.5	0	0	26.9	**579.5**
8166	sheep/goat	radius	left		149	0	0	0	0	18.3	0	31	0	**599**
8573	sheep/goat	metacarpal	right		127	0	0	24.3	0	14	0	10	26.1	**621**
8880	sheep/goat	radius	right		141	0	0	29.9	0	15.8	0	26.8	0	**566.8**
8573	turkey	tibia	left		193.5	0	0	11.6	20.4	0	0	0	0	

Appendix R – The Wood Charcoal

Phil Austin

Introduction

Recent excavations on the site of the London Transport Museum revealed features identified as elements of the Saxon settlement of 'Lundenwic'. Knowledge of the contemporary environment is poor for this area of present day London. Analysis of wood charcoal recovered from the site therefore provides an opportunity to gain an insight into which woods were available and how they may have been exploited on the site throughout it's occupation.

The charcoal remains investigated were recovered from a variety of contexts: pits, wells, cremation deposits and miscellaneous layers. All the material examined is currently dated, on the basis of pottery remains, to the period between 550AD and 850AD. Analysis of the charcoal was undertaken to identify the taxa present as a means of gaining direct information about the probable nature and extent of the contemporary woody vegetation and how various woods and other woodland resources may have been used by those occupying the site over this 300 year period.

Methodology

All of the material studied was recovered using standard flotation and wet sieving procedures. Following assessment, in which 5-10 fragments randomly selected from each sample were examined, comprehensive analysis was undertaken of samples from 10 of the 36 contexts provided. (see Table 2.). In keeping with Keepax's (1988) recommendation, 100 fragments per sample (excluding unidentified fragments) were examined to determine as much as possible the full range of taxa present in each context. Where less than 100 fragments were present in a selected sample 100% of the sample was analysed. Fragments were prepared and examined following standard procedures as described in Hather (2000).

Quantification of charcoal remains is a contentious issue that is yet to be satisfactorily resolved. Whilst both taxon fragment counts and weight are relatively straightforward means of ranking taxa neither can be said to offer an entirely reliable index of taxon abundance. In this study taxa are ranked according to the number of contexts in which each are present; that is their 'ubiquity' as defined by Popper (1989). To aid assessment of actual abundance in each sample/context fragment counts were also taken into consideration. Reference was made as and when necessary to descriptions and images in Hather (2000) as an aid to identification. Nomenclature follows Stace (1997).

Results

In total 956 fragments were examined during the full analysis resulting in identification of 12 taxa, listed in Table 1. A further 49 fragments were examined but could not be identified. Full results of this investigation are presented in Table 2. In addition to the findings of the detailed analysis this table includes also the taxa identified in the 26 samples not fully investigated (from which a total of 189 fragments were identified). All the woods identified are hardwoods native to southern England. No softwoods or alien/exotic taxa were identified.

Prunus spp. included both Blackthorn type (*cf P. spinosa*) and Cherry type (*cf. P. avium*) wood. The Maloideae, a sub-family of the Rosaceae, included Hawthorn type (*Crataegus* sp.) and *Sorbus* spp. type wood. It is not clear which species of *Sorbus* are represented. It is believed that many of the fragments identified as *Salix/Populus* derived from *Salix* on the basis of ray characteristics. However, as with the *Prunus* and Maloideae fragments, this level of identification is not certain.

Evidence of fungal degradation in the form of mycelium in vessels, in some instances extending throughout the wood structure, was not uncommon. It is estimated that *ca.*50% of the fragments retained, to a greater or lesser extent, some evidence of fungal degradation. Of the woods affected mycelium was more frequent in fragments derived from smaller and/or younger wood, and most consistently in fragments of *Salix/Populus*.

Thermal degradation was frequently acute and in some instances fragments were on the point of vitrification. This was most apparent and frequent in fragments of *Quercus* from cremation samples. Fragments derived from small branch or twig-wood also tended to be much distorted by thermal degradation, more so than fragments from mature wood.

The great majority of charcoals examined derived from mature stem or branch wood. Oak fragments included those with tyloses in vessels, a feature indicative of non-living heartwood formed in maturity. Bark fragments were positively identified in sample 42, context 8840. It is thought some of the indeterminate fragments may also have been bark wood. The presence of bark suggests that some, though not necessarily all the wood used was unmodified round-wood, rather than worked wood.

Average fragment dimensions was variable within and between samples. However, it was noted that fragments from cremation deposits tended to include greater proportions of significantly large fragments than samples from other contexts, especially mixed layers. This is most probably a reflection of the vulnerability to post-depositional disturbance experienced and whether or not the samples were primary deposits or subject to re-deposition at some stage.

Table 1. LTM03 All taxa - ranking according to fragment count and ubiquity

Taxon	Common name	Frag No. (total)	Ranking	Ubiquity (context/present)	Ranking
Quercus spp.	Pendunculate Oak, Sessile Oak	677	1	10 (34)	1 (1)
Corylus avellana	Hazel	80	2	8 (18)	=2 (=2)
Maloideae inc. *Sorbus* type	Hawthorn, Apple, Pear, Rowan, Whitebeams, Wild Service Tree	42	4	8 (18)	=2 (=2)
Acer campestre	Field Maple	26	5	6 (11)	=3 (3)
Prunus spp.	Blackthorn; Cherries	63	3	6 (10)	=3 (4)
Salix/Populus spp.	Willows/Poplars	17	6	6 (8)	=3 (5)
Fraxinus excelsior	Ash	16	=7	3 (7)	=4 (6)
Fagus sylvatica	Beech	14	8	3 (5)	=4 (7)
Ilex aquifolium	Holly	16	=7	3 (4)	=4 (8)
Alnus glutinosa	Alder	2	=9	1 (1)	=5 (=9)
Carpinus betulus	Hornbeam	2	=9	1 (1)	=5 (=9)
Ulmus *sp.*	Elm	1	10	1 (1)	=5 (=9)
Total = 12 taxa		956	-	10 (36)	-
NOTE: Ubiquity values in parenthesis are totals/ranking inclusive of all assessment sample IDs					

Discussion

The range of taxa identified in this assemblage is unremarkable for an occupation site in southern England. No significant change is apparent in the presence and frequency of taxa identified from individual contexts over the period under investigation. This could represent a consistency in the woods available and selected for use over the centuries, given the longevity of many tree taxa. However, it may also reflect to some degree

the relatively low number of samples available for study from each period and the nature of the contexts themselves. If local wood availability and use altered over the period of the site's occupancy such a change was too subtle to be detected by this investigation. It is thought that much of the wood represented at the site, especially that of the large timber trees, did not derive from the immediate environs of the site but was brought from a source further away. That some of the wood may represent timbers imported from even greater distance beyond the region is possible given the evidence for overseas trade. There is no direct evidence of this in this study, but it is worth noting that waterlogged timbers from Greyfriars Street, Ipswich, have been traced through dendrochronolgy back to Germany having been transported via the Netherlands (Tyers et.al. 1994).

Whilst there seems to be no discernable temporal change in the woods represented, there is an notable variation in the range and relative abundance of taxa represented in the different context types.

Cremation deposits

Cremation deposits are almost exclusively composed of Oak, over 85%, with low quantities of other taxa. Non-cremation deposits are noticeably more diverse, though in most instances Oak is the most abundant taxon. Oak frags mostly derived from large branches or stem wood whereas the non Oak taxa derive mostly from small branches or twigs. This is thought to indicate the consistent and purposeful selection of Oak wood for the pyre structure, whilst other woods were employed, incidentally perhaps, according to what was locally available; the presence of Willow/Poplar in contexts 8868 and 8829, for example.

Given that it is among the very best fuel woods the choice of Oak for cremation is not unexpected from a functional perspective. However, the choice of wood for a ritual as significant as cremation may have been determined not only by the need to generate sufficiently high temperatures to consume a body but also by cultural beliefs associated with the transition from the living world to some place other. We are unlikely to know if any of the woods identified in these deposits were used for their symbolic attributions, or even what symbolic meanings may have been attributed to particular woods or wooden objects at any particular time, but it is plausible and remains a distinct possibility.

Pits & Wells

The contents of pits and (possible) wells most likely reflect the dumping of fire debris, probably from small domestic fires and, as such, indicate the woods used on an everyday basis for mundane activities. Fuel wood would have been required daily to for fires to provide warmth, light and for cooking and other activities. Arguably, for these modest requirements and activities it was not as critical which woods were employed and whatever woods were locally available may have been used when and where possible. The more varied contents of pit and well deposits suggests that wood selection was indeed less discriminate. The proportion of Oak in these deposits is noticeably less compared with cremation deposits, on average accounting for around 50% of the total number of fragments examined from each context. A corresponding increase is seen in the quantities of other taxa other than Oak, in particular Hazel and the Maloideae. The timber trees Ash and Beech along with Field Maple are also better represented.

Miscellaneous layers

Samples from layers unassociated with a distinct type of feature are among the most diverse. It is unclear if the wood from these contexts represent fire waste from small industrial or domestic fires or some other fire related event. At least 3 catastrophic fires are believed to have destroyed the site during it's lifetime (Cowie & Whitehead 1989) and several minor fires are also evident (Blackmore (2002). Some of the charcoal studied from these contexts may have originated from structures and objects destroyed by these events.

Clear evidence of wood used for structural purposes is scanty. Only charcoal from contexts 8407, 8546, and 8548, described as post holes, potentially provide evidence of structural elements. However, the samples studied (during assessment) contain few fragments of charcoal and it is unclear which taxon, if any, actually derive from the post wood. Oak, alongside Hazel, is present in contexts 8407 and 8548. In context 8546 Hazel is the only taxon identified. Both these taxa are common structural woods and either may represent post material.

The Landscape: woodland and scrub

Though abundant in all contexts and all periods the presence of Oak tells us little about the nature of the local environment. Of all the woods present it is the one that is almost certainly present because of human selection rather than incidentally. Though Oak is uncommon on calcareous and wet soils, one or other of the two native species of Oak (*Q. robur* & *Q. petraea*) occur in most habitat types, often as the dominant taxon in woodland. The Oak identified in large quantities here suggest that it was consistently readily available as timber and for fuel. It is unlikely that any of the woodland from which the charcoal derived was undisturbed prior to exploitation by the Saxons. There are many combinations of mixed deciduous woodland in which Oak is dominant and many of the taxa here could have featured as elements within such woods. Beech, however, tends to form purer stands, often on chalk soils, in which the deep shade created by the canopy greatly hampers the successful establishment of other trees and shrubs. The presence of Beech and other taxa associated with alkaline soils suggests that some woods must have derived from a source at some distance from the site itself.

Few taxa thrive In damp clayey soil but a number of the taxa identified are associated with wet or even periodically waterlogged soils, notably Alder, Willow, Poplars and Ash. These may have been present close by the site in association with nearby waterways, including the shoreline of the River Thames. The presence of these taxa suggests that some of the wood could have been collected locally. However, the relatively low quantities of these woods may indicate that woodland or scrub composed of these taxa was limited, or it's use restricted in some way. Alder, Willows and Poplars also indicate, as does the presence of Blackthorn (P.spinosa) and Field Maple, that open areas were certainly present, most likely close by the site. None of these taxa thrive in dense woodland, though they may form open woodland stands (such as Alder Carr) or be confined to the woodland edge.

After Oak, the small trees and shrubs Hazel, the Maloideae (believed here to include Hawthorn) and *Prunus* spp. (*i.e.* Blackthorn) are the most ubiquitous in the samples. This may indicate that areas of scrub or, in the case of Hazel, possible coppice woodland were a feature of the landscape. It is possible also that hedgerows, for which the thorny woods like Blackthorn and Hawthorn are eminently suited, marked out boundaries and bordered fields. However, though it remains a strong possibility, it can only be infered not demonstrated from the findings of this investigation.

Landscape: management

Almost certainly the contemporary landscape was one shaped by centuries of Roman occupation and the concomitant clearances and management of woodland resources that occurred as part of the acculturalisation of the land. What little evidence there is suggests that clearance in the period covered by this investigation was negligible and that the amount of woodland increased, at least locally if not universally (Rackham 2006). In this respect the landscape inherited by the Saxons can be considered moribund. Areas that had been heavily wooded during the Roman period largely remained so. This includes large tracts around London and the Weald. The findings of this investigation could be used to support this (somewhat general) model.

Though individual trees and scrub were almost certainly present locally (possibly even hedgerows) it is highly likely that fields and pasture, including wood pasture made up the landscape immediately around the site. Woodland proper was probably more distant and functioned as part of the wider regional economy as much as the local one. Taking into consideration the longevity of the large timber trees represented on this site, notably Oak, Ash, Hornbeam, and Beech, it is feasible that trees originally cultivated by the Romans remained viable over the following centuries and were inherited as a source of fuel-wood and timber. Unmodified large tree taxa can live for many centuries. If subject to coppicing, or alternative forms of management, indefinitely. The fragmentation of charcoal almost always destroys the original form of the wood and with it any clues as to whether or not the wood had been managed. It is not surprising then that the charcoal examined in this study revealed no direct evidence of actual management through silviculture. However, most of the timber trees represented: Oak, Ash, Hornbeam, Beech and Field Maple, are those that respond well to coppicing and other forms of silviculture. The Willows and Hazel are also excellent coppice plants and are well represented in this assemblage. Saxon woodcraft was sophisticated and is known to have included coppicing and charcoal burning (Rackham 2006). All considered it is a reasonable inference that the most economically valuable woods identified in this assemblage, like Oak, were managed.

Documentary evidence indicates that the economic importance of woodland and it's resources, ownership of woods and rights over timber and fuel-wood, were increasingly moderated as part of the wider economy (*ibid*). The majority of trees and perhaps some of the shrub taxa most probably came to be on site through some form of organised wood trade/exchange system rather than opportunistic acquisition. Likewise, woods not represented in the assemblage may reflect restrictions imposed upon their availibilty, accessibility or use, as much as an actual physical absence.

Summary

The charcoal identified included only native hardwood trees and shrubs, of which Oak was by far the most common as charcoal (though not necessarily as a living tree). Over the period covered by the samples no major variation is evident in the range of taxa recorded. This suggests a certain amount of stability both in the presence and provision of wood. The evidence for structural wood use was inconclusive. Most of the woods represented are believed to derive from mixed deciduous woodland and scrub, on both dry and wet soils. It is thought that woodland resources would have been managed though no direct evidence was found for this. As a fuel Oak was selected preferentially for cremation. Though Oak was often the dominant taxon in all contexts, a much broader range of woods were present in non-crematory contexts. It is believed that in most instances charcoal from these contexts represent fire debris from domestic hearths and possibly small scale industrial fires.

Table 2. LTM 03 Charcoal identification: all samples (inc. assessment samps)

Context	Context description	Spot dates (pottery)	Feat/samp no.	Taxa ID (Frag count)
8167	Burnt layer	-	1	*Quercus* sp. (72) *Prunus* sp. (34) Maloideae (2) *Alnus glutinosa* (2) *Salix/Populus* sp. (1) Indet. (6) Total = 5 taxa. 111 (117) frags

8292	Fill of 8293 (pit cut)	730-850	9	*Quercus* sp (56) *Corylus avellana* (11) *Acer campestre* (10) *Fagus sylvatica* (9) *Fraxinus excelsior* (8) Maloideae (4) *Prunus* sp. (2) Total = 7 taxa. 100 frags
8385	Charcoal + clay layer	600-750	17*	*Quercus* sp. (66) *Corylus avellana* (8) Maloideae (8) *Prunus* spp. (6) *Ilex aquifolium* (4) *Carpinus betulus* (2) *Ulmus* sp. (1) Indet. (7) Total = 7 taxa. 95 (102) frags
8535	Fill of 8536 (well cut)	730-850	36*	*Quercus* sp. (30) *Corylus avellana* (11) Maloideae (3) *Salix/Populus* sp. (3) *Prunus* spp. (3) c.f. *Acer campestre* (1) *Fagus sylvatica* (1) Total = 7 taxa. 52 frags
8613	Fill of pit 8604 (deep pit/well cut)	550-750	50 50	*Quercus* sp. (56) *Corylus avellana* (31) *Fagus sylvatica* (4) *Fraxinus excelsior* (4) *Salix/Populus* sp. (3) *Acer campestre* (2) Total = 6 taxa 100 frags100
8760	Mixed layer	550-750	90 90 90	*Quercus* sp. (56) *Prunus* spp. (17) Maloideae (16) *Ilex aquifolium* (8) *Acer campestre* (2) *Corylus avellana* (1) Indet. (16) Total = 6 taxa 100 (116) frags
8771	Mixed layer	770-850	95 95	*Quercus* sp. (66) *Corylus avellana* (15) *Acer campestre* (5) Maloideae (5)

			95	*Fraxinus excelsior* (4) *Ilex aquifolium* (4) *Salix/Populus* sp. (1) Indet. (4) Total = 7 taxa. 100 (104) frags
8829	Fill of 8828 (pit cut containing cremations 38+39)	550-650	114 124 114 114 114 114	*Quercus* sp. (90) *Salix/Populus* spp. (7) *Corylus avellana* (1) Maloideae (1) *Prunus* sp. (1) Indet. (1) Total = 5 taxa. 100 (101) frags
8840	Fill of 8841 (pit cut containing cremation 42)	550-650	42 [spit 1] - 42 [spit2] [spit 3] [spit 4]	*Quercus* sp. (87) *Acer campestre* (6) Maloideae (3) *Corylus avellana* (2) [Bark (2)] Indet. (10) Total = 4 taxa. 98 (110) frags
8868	Fill of cremation vessel 39	550-750	39 [spit 1] 39 [spit 2] 39 [spit 3] 39 [spit 4]	*Quercus* sp. (98) *Salix/Populus* sp. (2) Indet. (5) Total = 2 taxa. 100 (105) frags
Assessment only samples				
8169	Fill of 8187 (rubbish pit)	730-850	-*	*Quercus* sp. (1)
8295	Fill of 8296 (pit cut)	600-750	7*	*Quercus* sp. (4) Maloideae (1)
8362	Layer	600-750	16 16 - 16	*Quercus* sp. (4) *Corylus avellana* (3) Maloideae (2) *Prunus* sp. (1)
8398	Layer	-	23	*Quercus* sp. (5)
8405	Layer	550-750	24	Maloideae (3) *Quercus* sp. (3) *Salix/Populus* sp. (1) Indet. (3)
8407	Fill of 8408 (posthole)	550-750	26	*Quercus* sp. (7) *Corylus avellana* (1) Maloideae (1) *Prunus* sp. (1)
8525	Fill of 8526 (pit cut)	730-850	34	*Quercus* sp. (4) Maloideae (3) *Fagus sylvatica* (1) *Fraxinus excelsior* (1) *c.f. Prunus* sp. (1)
8537	Fill of 8538 (well cut)	-	37	*Corylus/Alnus* sp. (4)

			37 37	*Quercus* sp. (2) *c.f. Acer campestre* (1) Indet. (3)
8543	Firmly compacted light yellow sandy clay layer	550-650	-	*Quercus* sp. (6) Maloideae (4)
8546	Fill of 8547 (posthole cut)	-	41*	*Corylus avellana* (1) Indet. (1)
8548	Fill of 8549 (posthole cut)	-	42*	*Quercus* sp. (3) *Corylus/Alnus* sp. (1) Maloideae (1) Indet. (3)
8615	Secondary fill of 8617 (pit cut)	600-750/1745-1880	50	*Quercus* sp. (8) *Corylus avellana* (1) *Fraxinus excelsior* (1)
8621	Fill of 8622 (p-med pit cut)	600-750/1840-1900	53	*Quercus* sp. (3) *Corylus avellana* (2) *Fagus sylvatica* (2) *c.f. Salix/Populus* sp. (1) Indet. (2)
8637	Fill of 8638 (sub-circ pit cut)	550-750	-	*Quercus* sp. (3) *c.f. Corylus avellana* (1) Indet. (1)
8639	Mixed gravel layer	550-750	57*	*Quercus* sp. (4) *Corylus avellana* (1) *Ilex aquifolium* (1)
8654	Fill of 8658 (well cut)	600-750	62 62 63	*Quercus* sp. (8) *Fraxinus excelsior* (1) Indet. (1)
8656	Grey sandy silt layer	550-750	-	*Quercus* sp. (4) *Corylus avellana* (1)
8757	Fill of 8758 (well cut)	770-850	89	*Quercus* sp. (7) *Corylus/Alnus* sp. (1) Maloideae (1) *c.f. Prunus* sp. (1)
8763	Fill of 8764 (large pit)	730-850	93	*Fraxinus excelsior* (4) *Quercus* sp. (1)
8770	Fill of 8764 (large pit)	550-750	94	Maloideae (2) *Quercus* sp. (2) *Acer campestre* (1)
8791	Green silt layer	600-750	101	*Quercus* sp. (3) *Corylus avellana* (2)
8811	Yellow/brown silty sand layer	550-750	-*	*Acer campestre* (2)
8836	Fill of 8837 (pit cut)	600-750	118	*Quercus* sp. (1)
8855	Fill of vessel 46	50-400/550-650	46 [spit 1] 46 [spit 2] 46 [spit 3] 46 [spit 4]	*Quercus* sp. (8) *c.f. Acer campestre* (1) Indet. (1)
8858	Fill of 8859 (pit cut for cremation 47)	40-400/550-650	47 [spit 1] 47 [spit 5] 47 [spit 6]	*Quercus* sp. (2) Indet. (8)

			47 [spit 6]	
			47 [spit 7]	
			47 [spit 8]	
			47 [spit 9]	
			39 [spit 2]	
			39 [spit 3]	
			39 [spit 4]	
8991	No context information	-	-	*Quercus* sp. (7) *Acer campestre* (1) *Corylus avellana* (1) Maloideae (1)
* = 100% of sample examined				

Appendix S – The Charred Plant Remains

John Giorgi

INTRODUCTION

During excavations at the London Transport Museum, a large number of bulk soil samples (ranging in size from two to 22 litres) were collected for the potential recovery of macro-fossil plant remains from a range of features dating to the Saxon and post-medieval period. Thirty-nine samples were processed for assessment and on the basis of the results, 13 samples were recommended for further analysis. The revised research aims were to examine cereal production and consumption at the site in early and middle Saxon London and potential fuels used in early Saxon cremations (Roberts 2006).

METHODS

The 13 charred plant assemblages were from the following feature types, areas and periods with most of the analysed samples and the bulk of the material coming from the middle Saxon period (Periods 4 and 6). Charred botanical remains were analysed from a cremation pit fill [8829] in OA2, Period 2 (mid 6th-mid 7th century) and from a pit fill [8693], OA3, Period 3 (mid 7th – early 8th century). Six samples were examined from Period 4 (early-mid 8th century) from a layer [8791] and well fill [8654] in OA6; a pit fill [8525] in OA7; two layers [8362], [8760] in OA8; and from well fill [8535] (??AREA). Four assemblages were analysed from Period 6 (late 8th. - mid 9thcentury) from two pit fills [8292], [8770] and dump deposit [8771] in OA18 and from a burnt layer [8167] in OA20.

*The plant remains were identified in the Environmental Department, MoLAS using a binocular microscope together with modern botanical reference material and reference manuals. All the identifiable charred plant remains were quantified with the exception of the charcoal, small cereal fragments (less than 2mm), stem/culm node fragments and hazelnut (*Corlyus avellana*) shell fragments and indeterminate items, estimates of which were made on the basis of the following rating system: + = 1-10 items; ++ = 11-50 items; +++ = 50+ items. Habitat information was taken from Stace (1991) and Clapham* et al *(1987). Taxonomic order follows Clapham* et al *(1987).*

RESULTS AND DISCUSSION

A table of the charred plant remains is shown in Figure 1. Just over 500 charred plant items were identified and counted with the bulk (92% of the quantified remains) coming from Periods 4 and 6. The size of most of the individual charred plant assemblages, however, was small with ten of the 13 analysed samples containing less than 50 items with an item density of between 0.2 and 2.5 items per litre of processed soil. Only three samples produced 100 or more quantified items and even in these assemblages the densities of quantified remains only ranged from between 4.7 and 10 per litre of processed soil. Variable quantities of very fragmented charcoal were also found in virtually all the analysed flots.

Cereals

Charred cereal grains made up the majority (just over 81%) of the quantified material with this figure not including uncounted small cereal grain fragments present in eight of the analysed samples. A fairly large proportion (37%) of the grains was too poorly preserved for identification.

The best represented cereal was barley (*Hordeum* spp.), accounting for 60% of the identifiable grains, with the recovery of straight, twisted and hulled grains showing the presence of six-row hulled barley (*Hordeum vulgare*). Wheat (*Triticum* spp.) was the second best represented cereal with the better preserved grains

including free-threshing wheat (*Triticum aestivum/turgidum/durum*); it was not possible, however, to establish the type of free-threshing grain because of the absence of diagnostic rachis fragments. Both barley and wheat were present in ten of the 13 analysed samples.

Smaller amounts of rye (*Secale cereale*) and oats (*Avena* spp.) were also recovered from six and two samples respectively. A single charred glume base of the hulled wheat spelt (*Triticum spelta*) was also identified in a middle Saxon context, layer [8690] (Period 4) although this probably represents residual material; the cultivation of this cereal was mainly carried out in the prehistoric and Roman periods and appears to have mainly ceased by Saxon times. The only other potential cereal debris was represented by a culm node fragment from burnt layer [8167] although this may be from a wild grass rather than a cereal.

These four cereals, hulled barley, free-threshing wheat, rye and oats, appear to be the main grains cultivated during the Saxon period on the basis of previous archaeobotanical evidence from southern England (Grieg 1991, 315). Charred plant remains from a number of Saxon *Lundenwic* sites also shows that these are the main grains present during this period with hulled barley and free-threshing wheat being the best represented cereals followed by rye and then fewer oats (Davis, forthcoming); this includes two sites in close proximity to the London Transport Museum site, at 21-22 Maiden lane (Davis and de Moulins 1993) and the Royal Opera House (Davis 2003).

Wheat was the most expensive and preferred bread-making grain (Hagen 1995, 18) while barley and rye may have also been used to make heavier breads. All the cereals may have also been used whole in pottage, a thick porridge-like mixture, was made by cooking cereal meal or groats with water or milk. Barley may have also been used as winter feed for cattle and sheep while fodder was the main use of oats.

Other food plants

Other potential plant foods are only represented by traces of evidence. A small number of legumes were recovered although the condition of the material meant that most of the seeds could only be broadly identified as vetch/tare/vetchling (*Vicia/Lathyrus* spp.) or vetch/tare/ vetchling/ pea (*Vicia/Lathyrus/Pisum* spp.) and thus could be from wild plants/weeds rather than from cultivated pulses. One legume, however, was identified as celtic bean/horse bean (*Vicia faba*) from layer [8362] (Period 4). Beans have also been identified in other *Lundenwic* sites, for example at the Royal Opera House (Davis 2003); being rich in protein, beans were an important food crop in the Anglo-Saxon period (Hagen 1995, 37).

One flax seed (*Linum usitatissimum*) was recovered from dump deposit [8771] (Period 6) and has been recorded from other mid-Saxon deposits in *Lundenwic*, for example at 21-22 Maiden lane (Davis and de Moulins 1993) and the Royal Opera House (Davis 2003). The stem fibres of this plant were used for linen while oil was extracted from the seeds for lighting and cooking. The seeds are also edible being rich in protein and used as food for both animals and humans. Little interpretation, however, can be made on the basis of just one seed. Several hazelnut shell fragments were recovered from pit fill [8292] (Period 6); these fragments may represent the residues from the gathering and consumption of the nuts as food and/or were bought onto the site incidentally with hazel wood, charcoal of which was found in a number of the features including from Period 6.

Wild plant/weed seeds

The remaining botanical remains were from weeds and wild plants although they made up only 17% of the quantified material. Just over a half of these remains consisted of the tubers of onion couch/false oat-grass (*Arrhenatherum elatius*), possibly burnt as tinder for cremations (see below) and indeterminate grass seeds.

The other remains were mainly from plants of disturbed (including cultivated) ground and waste places including goosefoots etc/oraches (*Chenopodium/Atriplex* spp.), medick/clover (*Medicago/Trifolium* spp.), knotgrass (*Polygonum aviculare*), docks (*Rumex* spp.), stinking mayweed (*Anthemis cotula*) and bromes (*Bromus* spp.). These plants may have been growing wild on the site although their presence together with the cereal grains as charred material suggests that they are more likely to have been imported incidentally as cereal weeds.

There were also a few wetland plants represented by charred seeds, including branched bur-reed (*Sparganium erectum*), found on mud or shallow water in ponds, ditches and slow-flowing rivers and on ungrazed marshland (Clapham *et al* 1987), spike-rushes (*Eleocharis palustris/uniglumis*) and sedges (*Carex* spp.). These remains may suggest wet areas on the site or the collection of rushes and sedges from the river nearby for building (thatching)/flooring materials and/or for animal bedding. Branched bur-reed may have been collected incidentally at the same time. It is possible however that the spike-rushes and sedges could represent cereal weeds from a cultivated area of damp ground.

Other botanical material included a moderate amount of thin ribbed stem fragments from a cremation pit fill [8829] and layer [8771].

CHRONOLOGICAL NARRATIVE

There follows a discussion of the results by period, area and feature type.

Period 2 (mid 6th-mid 7th Century)

OA2: Cremation Pit fill [8829] (samples <114>, <124>)

Virtually all the charred plant remains in this pit fill were from sample 114, consisting mainly of charred tubers of onion couch/false oat-grass and indeterminate grass seeds. There was also a moderate range of other wild plants/weeds from plants of disturbed ground and waste places, eg. goosefoots/oraches, knotgrass, docks. There was also a moderate amount of thin ribbed stem fragments which may be from grasses given the relatively good representation of grass seeds in the pit fill although an origin from other plants cannot be ruled out.

There is archaeobotanical evidence to suggest that false oat grass/onion couch was used as tinder for cremations during the Bronze Age (Robinson 1988) and a similar use of this plant during the early Saxon period may be postulated here. Some of the other weed seeds may be from plants collected at the same time for tinder and/or from the use of crop-processing debris although no evidence of cereals was found in these samples.

Period 3 (mid 7th-early 8th Century)

OA3: Pit fill [8693] (samples <71>)

This sample produced just a small number of grains including wheat and barley which probably represents background cereal debris blowing around the site.

Period 4 (early to mid 8th century)

OA6:

Layer [8791] (sample <101>)

Almost 20 charred cereal grains, including free-threshing wheat and hulled barley, plus uncounted fragments were recovered from this layer. This material also probably represents background cereal debris blowing around the site.

Well fill [8654] (sample <62>)

This sample produced less than 10 charred cereal grains and fragments including rye and barley; again this material probably represents background cereal debris blowing around the site.

Well fill [8535] (sample <36>)

Exactly one hundred grains were counted from this well fill with a fairly clean deposit of hulled barley which accounted for almost 90% of the identified cereal grains. There were also occasional grains of free-threshing and rye in this well fill. This may represent part of an accidentally burnt and virtually fully cleaned barley deposit.

OA7:

Pit fill [8525] (sample <34>)

The only analysed sample from this area also only produced a relatively small number of grains and fragments including free-threshing wheat, rye and hulled barley plus three grass seeds including one of brome. As in the samples from OA6, this material is more likely to represent background cereal debris blowing around the settlement.

OA8:

The two/three analysed samples from OA8 produced significantly more charred plant material (mainly cereal grains and fragments) than those samples from OA6 and OA7. This suggests that processing activities, resulting in the accidental burning of grain, may have been taking place close-by with the material being re-deposited in the sampled features.

Layer [8362] (sample <16>)

This sample produced a moderate quantity of cereal remains represented by whole grains and a large number of fragments with free-threshing wheat, hulled barley and rye, plus the only evidence for celtic bean/horse bean on the site. There were also several grass seeds.

Layer [8760] (sample <90>)

Almost 100 cereal grains including free-threshing wheat, hulled barley and possibly oat, plus numerous fragments were recovered from this sampled layer. It also contained a single spelt glume base which is probably residual (see above) and a small range of weed seeds including stinking mayweed. This is a common weed of arable land and waste places especially on heavy soils and may indicate the cultivation of such soils for cereals.

Period 6 (late 8th to mid 9th century)

OA18:

Pit fill [8292] (sample <9>)

This sample produced almost 50 cereal grains including free-threshing wheat, hulled barley and rye, plus numerous fragments and two weed seeds. It also contained the only hazel nut shell fragments recovered from the site.

Dump deposit [8771] (sample <95>)

A large number of grains (almost 100) and numerous fragments were recovered from this dump with free-threshing wheat, hulled barley and rye and also the only definite evidence for oats from the site. This sample also produced the only evidence for flax while there was also a moderate species range of wild plant/weed seeds including characteristic arable weeds, stinking mayweed, bromes, plus a few wetland plants, sedges, spike-rushes, and occasional stem fragments, possibly discarded flooring materials or indicative of cultivated damp arable ground.

Pit fill [8770] (sample <94>)

This sample produced just two grains including free-threshing wheat and one grass seed. Little comment may be made on this material probably representing background cereal debris blowing around the site.

OA20:

Burnt deposit [8167] (sample <1>)

This sample contained a small quantity of cereal grains free-including threshing wheat and hulled barley and fragments and occasional potential cereal culm node fragments. There were also seeds from a relatively wide range of wild plants/weeds of disturbed ground and waste places, eg. goosefoots/oraches, medick/clover, docks, stinking mayweed, while a few wetland plants, eg. branched bur-reed, spike-rush, were also represented in the sample.

SUMMARY

The charred plant remains show that hulled barley and free-threshing wheat appear to be the main cereals used at the site during the mid Saxon period with less evidence for the use of rye and oats. There is also occasional evidence for the use of horse beans and flax, while hazelnuts may have been occasionally gathered and used as food. The few sedges and spike-rushes may be from these plants collected from the river margins for use as building/flooring materials.

The charred plant assemblages (with the exception of the material from cremation pit fill [8829], Period 2) were remarkably similar, dominated by cereal grains and fragments and with relatively small amounts of wild plants/weed seeds. The grains would have been accidentally burnt during the final stages of crop-cleaning before storage, milling or cooking. The paucity of weed seeds suggests that most of the earlier stages of processing had been carried out previously (before arrival on the site) or in an unexcavated area of the site. The few remaining weed seeds may have become accidentally burnt or were separated during the final stages of crop-cleaning and used as fuel. The virtual absence of crop-processing by-products means that little comment may be made on crop husbandry practices although the presence of stinking mayweed may suggest the use of heavy clay soils for cereal cultivation. The plant remains from the cremation pit fill suggest that onion couch tubers were used as tinder.

The generally low quantities and item densities of quantified charred plant material in the samples suggest that most of the material simply represents background cereal debris blowing around the site. The larger

assemblages from Period 4 in layer [8760], Open Area 8, and well fill [8535], Open Area ?? and from Period 6 in dump deposit [8771], Open Area 18, could suggest that crop-processing activities were taking place close by to these sampled features.

Figure 1: The Charred Plant Remains

-		date range	mid 6th-mid 7th C		mid 7th/ early 8th	early/ mid 8th C						late 8th-mid 9th C			
-		period	2	2	3	4	4	4	4	4	4	6	6	6	6
-		area	OA2	OA2	OA3	OA6	OA6	OA6	OA7	OA8	OA8	OA18	OA18	OA18	OA20
		Context	8829	8829	8693	8791	8654	8535	8525	8362	8760	8292	8771	8770	8167
		sample	114	124	71	101	62	36	34	16	90	9	95	94	1
		feature	PIT	PIT	PIT	LAYER	WELL	WELL	PIT	LAYER	LAYER	PIT	DUMP	PIT	BURNT
		vol sample (litres)	20	5	8	10	10	10	10	10	22	20	15	10	10
		vol flot(ml)	10	5	5	10	5	5	5	30	30	5	40	5	10
LATIN_NAME	ENGLISH	HAB_USE													
Charred plant remains															
Cereal grains															
Triticum aestivum / turgidum / durum type	Free-threshing wheat	FI				3		1	1	1	6	2	7	1	
T. cf. aestivum / turgidum / durum type	?Free-threshing wheat	FI							1		8		3		
Triticum spp.	Wheat	FI			1			1	2		14	3	3		1
Secale cereale L.	Rye	FI					1	3	2	3		5	1		
cf. *S. cereale*	?Rye	FI								2		3	2		
Triticum/Secale spp.	Wheat/Rye	FI					1	4				1			
Hordeum vulgare L.	Hulled barley	FI				6		65	7	6	17	11	17		3
cf. *H. vulgare*	?Hulled barley	FI			1	1	1	10	1		7	2	3		1
Avena spp.	Oat	AFI											11		
cf. *Avena* spp.	?Oat	AFI									1		6		
Cerealia	Indet. Cereal	FI			5	9	5	16	4	9	41	13	46	1	6
cereal grain frags	cereal fragments <2mm					++	++		++	+++	+++	++	+++		++
Chaff															
Triticum spelta L.	spelt wheat glume base	FI									1				
Other plants															
Stellaria sp.	Chickweed										1				
Chenopodium sp.	Goosefoot Etc.	ABCDFH									3	1	1		
Atriplex spp.	Orache	ABCDFH	1												
Chenopodium /	Goosefoots /	ABFGH	3												3

Atriplex spp.	Oraches														
Linum usitatissimum L.	Flax	HI											1		
Medicago / Trifolium spp.	Medick/Clover	ABDI	1												2
Vicia faba L.	Celtic Bean / Horsebean	FI								1					
Vicia/Lathyrus spp.	Vetch / Tare / Vetchling	ACDEFI			1					1	1				1
Vicia / Lathyrus / Pisum spp.	Vetch / Tare / Vetchling / Pea	ABCDEFI											1		
Polygonum aviculare agg.	Knotgrass	BG	2												1
Rumex spp.	Dock	ABCDEFG	2										1		2
Polygonaceae indet.			1												
Corylus avellana L.	Hazelnut shell fragments	CF										+			
Anthemis cotula L.	Stinking Mayweed	ABGH	1								1		2		2
Compositae indet.	-	-													1
Sparganium erectum L.	Branched bur-reed	E													2
Eleocharis palustris / uniglumis	Spike-Rush	E											1		1
Carex spp.	Sedge	CDEH											1		
Cyperaceae indet.	-	ABCDEFI	1												
Bromus spp.	Bromes	ABD							1		1		3		
Arrhenatherum elatius (L.) Beauv.	False oat-grass tubers		20	1											
Gramineae indet.	grasses	ABCDEFHI	7	1		1	1		2	2	2	1	6		2
Gramineae indet.	grass stems (culm node)	ABCDEFHI													+
indeterminate	stems		++										+		
indeterminate	-	-	+								+		+		+
indeterminate	charcoal	-	+++	+++	+++	+++	+++		+++	+++	+++	+++	+++	+++	+++

Key:
Habitat/use codes: A = segetals, weeds of cultivated ground; B = ruderals, weeds of disturbed ground and waste places; C = plants of woods, scrub, hedgerows; D = plants of grassy places; E = aquatic and damp ground plants; F = edible plants; G = medicinal and poisonous plants; H = other uses, eg fibre, dyeing; I = cultivated plants Item frequency: + = 1-10 items; ++ = 11-50 items; +++ = 51-250 items; ++++ = 250+ items

Appendix T – The Post-medieval Pottery

Jacqui Pearce

Introduction and methodology

The pottery from LTM03 was originally examined by Lyn Blackmore, whose assessment report has been used in the preparation of this outline of the post-medieval ceramics recovered from the site. All pottery was recorded on an Excel spreadsheet, using current MoLAS codes for fabric, form and decoration, with quantification by sherd count, minimum vessel count (ENV) and weight in grammes. All sherds were also examined by the author, with a view to identifying patterns and thereby refining the chronology.

The finds are in good condition, with some complete or near-complete items and numerous large sherds. A total of 222 sherds from a minimum of 182 vessels of post-medieval date were recovered (weight 16192 g). Three contexts are of medium size (between 30 and 100 sherds), one of them ([8581]) dated to the mid 18th century and two ([8002] and [8745]) to the mid to late 19th century. Post-medieval pottery was found in 17 other small contexts, all but one of them yielding fewer than 10 sherds each. This does have repercussions for dating, and most have been assigned only a broad date range, with chronological refinement hindered by the absence of distinctive diagnostic and closely datable types. This can be misleading and imply an earlier date of deposition than was likely to have been the case. It appears that most post-medieval activity on the site took place from the mid 18th century onwards, with major episodes of dumping taking place in the third quarter of the 18th century and middle of the 19th century. It is highly likely that most if not all excavated contexts fall within these ranges, even when an apparently earlier date is suggested by the spot-date records. This report will therefore focus on the major groups, and highlight overall trends apparent in the evidence.

The post-medieval pottery

The earliest find is the base of a large cylindrical jar in tin-glazed ware decorated with blue-painted bands from the Phase VIII drain fill [8762], which probably dates to the mid to late 17th century. Otherwise there is very little pottery that can be dated earlier than c 1700 with any certainty.

Eighteenth-century

Phase VIII soakaway

Although 18th-century fabrics and forms are present in several contexts, the largest and most closely datable group comes from the Phase VIII soakaway (context [8581]), which yielded 41 sherds (26 ENV, 2931g). Deposition is dated to c 1760–1780 and the finds include a high proportion of good quality decorative wares. There are sherds from several vessels in London tin-glazed ware, covering a wide range of functions. A whole but fragmented chamber pot with plain white glaze has an everted rim and slight shoulder cordon, and is typical of forms made c 1675–1725 (Noël Hume 1977, 101, fig XVIII, nos 2–7). Sherds from three flared, plain bowls with hooked rims are of similar date, while a complete small, plain white drug jar or ointment pot represents a long-lived type current from the mid 17th well into the 18th century. These are all common, everyday forms, widely available and used throughout London at this period. Far more unusual is a complete spittoon or ‘spitting pott’ with plain white glaze. Made in the form of a small chamber pot with a single strap handle, the vessel has a flaring tubular spout attached through the walls at the shoulder opposite the handle, to allow the contents to be emptied out. The distinguishing feature is the non-spill rim, which is angled inwards, leaving only a small central hole. Small vessels of this kind were designed for individual use, while larger forms were intended for communal use in taverns, public houses and the like, usually in stronger fabrics such as salt-glazed stoneware. An example of similar size and shape in the Colonial Williamsburg

collection has blue-painted *chinoiserie* decorated and is dated to c 1770 (Austin 1994, no 723), although undecorated pieces are also known (eg Crellin 1969, fig 398). Other forms in tin-glazed ware from the same group include sherds from two flat-based plates with simple decoration in blue on white and in blue and manganese, both typical of the early to mid 18th century. There is also the base of a punch bowl with blue-painted floral decoration of the same period.

Other vessels in various fabrics reinforce these connections with dining and drinking alcoholic or hot beverages. Part of a plate in white salt-glazed stoneware has a simple bead and reel moulded rim, very popular in early Georgian England and derived from contemporaneous silver shapes. There is also a saucer in the same fabric, which was made between c 1720 and 1770 at various centres in the Midlands and north of England. The latest identifiable English wares are represented by a bowl and the base of a large eggcup in creamware, which was developed during the 1740s, gaining huge popularity during the later 18th century. Probably made for duck eggs, the eggcup has a pedestal base perforated in the centre. Another relatively unusual form in excavated material is part of a capuchine or small handled cup in Nottingham stoneware. The form is illustrated on James Morley's Nottingham trade card c 1690–1700, and is generally thought to have been used for drinking coffee (Green 1999, 123–24).

Several fragments of Chinese porcelain are of some interest since they represent high quality imported wares, some of which are extremely rare finds archaeologically in London. The remains of three small teabowls, almost certainly part of a set, have a pale celadon green glaze outside, with *anhua* or hidden decoration lightly incised under the glaze. Inside they are decorated in underglaze blue with simple floral motifs. The rims are outlined in dark brown externally. Underneath the base, two of the teabowls have *lingzhi* fungus marks, and the other a chrysanthemum, all within a double circle in underglaze blue. They were made during the Kangxi period (1662–1722) and date to the first quarter of the 18th century (Jean Martin and Cyril Beecher pers comm.). Part of a bowl from the same group is decorated in underglaze blue with fish and other emblems, and has a brown rim. Underneath the base there is a devolved conch shell mark within a double circle, and the piece also dates to the first quarter of the 18th century (Martin and Beecher pers comm). A sherd from a fine, small beaker dates to the same period and is decorated in underglaze blue with a band of stylised chrysanthemums (cf OCS 2003, no 59). The latest piece of Chinese porcelain is part of the neck of a guglet, or bottle-shaped vessel that would have held water for hand-washing. It is decorated in underglaze blue with a band of trellis and panels and was made during the Qianlong period (1736–95), probably c 1760–80 (Martin and Beecher pers comm.). Sherds from a teabowl and a saucer with fluted, scalloped rim have floral decoration in overglaze enamels in *famille rose* palette and date to the same period. The proportion of Chinese porcelain recovered from the fill of the soakaway is relatively high, accounting for 36% of all pottery by sherd count (27% by ENV). The pieces are of good quality, and were mostly brought into London at a time before the market for oriental wares had reached its peak. They speak of a high standard of living and refined taste, especially when viewed alongside the other finds from the same feature.

By comparison the quantity of coarseware recovered from this group is very small. The main form identified is a large, deep, straight-sided oval pan in London-area post-medieval redware. It would probably have been used for salting meat (pork, ham, beef), designed to allow the joint to soak in brine for a month or more, after which it could be dried and hung ready for use (Brears 1974, 151; Brears 1971, 66). Surprisingly, given the importance of this practice in the days before refrigeration, this is not a common form in excavated contexts from London.

Early to mid nineteenth century

A number of small groups assigned to Phases VIII, IX and XI and XIII date to the late Georgian and Regency periods, in the late 18th/early 19th centuries, although close dating is hindered by their size. Special mention should be made of the remains of a small hexagonal beaker in Chinese *blanc de chine* porcelain, found in context [8615], OA6, Phase IV, dated to the turn of the 18th and 19th centuries by the presence of a sherd

from a pearlware plate with blue shell edge decoration. The pure white Chinese porcelain was highly desirable and of very high quality, and the vessel is beautifully potted with very thin walls. It dates probably to the early 18th century (Jean Martin pers comm) and is one of very few examples of this ware found in excavated contexts from London. On this basis, it would have been old when thrown away, most likely kept carefully for its intrinsic value until finally broken many years after it was made.

Contexts dated after c 1800 are dominated by factory-made finewares, largely made in the flourishing potteries of the Midlands and north of England. A major consequence of the Industrial Revolution, ceramic production in Britain had been transformed over the course of the mid to late 18th century, giving birth to a wide range of refined earthenware and porcelain bodies that were highly durable and readily lent themselves to new forms of mass-produced decoration such as transfer-printing. The chief of these were creamware, pearlware and refined whiteware, together with, by the turn of the 18th and 19th centuries, bone china, which was to become the standard English porcelain body thereafter. All these are found in quantity on the site, datable principally by their shapes and styles of decoration. One notable early 19th-century group comes from Phase VIII, context [8573], which is dated to c 1807-60 and includes a complete toy saucer in creamware alongside a range of other factory-made finewares. There is also part of another cup, possibly a *capuchine*, in Nottingham stoneware, which would have been old when discarded, and sherds from a coffee can and two cups in English porcelain, one of them with overglaze enamelled decoration. The latest finds in this group are part of a chamber pot and a cup in transfer-printed ware with blue underglaze decoration typical of the early 19th century. Although other groups have been dated to the same period, it is difficult to be certain when they were deposited because of their small size; it could be purely accidental that no later sherds were included with the material recovered. Features dated accordingly include the [8621] pit fill from Building 1/2, Phase XIII; the [8575] brick-lined drain from Phase VIII; the lining of the water channel [8610] and drain cut [8119], both from the same period. All are dated on the evidence of ceramics alone to the second quarter of the 19th century. There are also two larger groups that mostly include pottery made during this period, but which may well have been thrown away at the time the area was redeveloped in the 1850s.

Phase VIII fill [8745]

This medium-sized assemblage includes 50 sherds from a minimum of 44 vessels (2550 g), and dates mostly to the end of the 18th and early 19th century, with the latest material made during the 1820s and ‘30s. A small quantity of everyday, plain, household earthenwares is represented by sherds from a chamber pot and a conical stool pan in green-glazed Surrey-Hampshire border whiteware, as well as by part of a bowl and a flowerpot in London-area redware. Production of white border ware was largely discontinued in the early 18th century in favour of redwares, although the pale buff fabric was apparently still used for sanitary wares such as those found here throughout much of the century. A fine example of a similar stool pan was found in a large clearance group from Crosswall in the City of London, alongside high quality Chinese porcelain teawares dated to c 1770 (Vince and Egan 1981, 177). Stool pans were the removable element in a close stool or commode, an essential household item, alongside the chamber pot, at a time before the widespread adoption of the water closet. The Surrey-Hampshire border industry nevertheless focussed mainly on redware production and these whiteware vessels are relatively rare, late survivals by this date. Sherds from two chamber pots were also found in plain, undecorated tin-glazed ware with a very slight bluish tinge to the white glaze. These were very common throughout the 18th century and changed little in shape or detail over time. Together these items represent the sanitary arrangements of the household by whom they were discarded, although there would doubtless have been many more such items in use during the lifetime of any one family in residence. The only other items in tin-glazed ware are two plain ointment pots with pedestal bases, a very common form associated with the later delftware pothouses, with large numbers excavated at Mortlake, which finally ceased production of tin-glazed wares in 1827 (Stephenson 2003, fig 53). Part of a dish in combed slipware may have been made at Mortlake or Hounslow, with considerable quantities excavated on the site of John Abbott’s Hounslow Pottery in Hanworth Road (Massey et al 2003).

Although this style of decoration was developed in the Staffordshire potteries in the later 17th century, production in Hounslow continued well into the 19th century.

A number of late 18th- to early 19th-century factory-made, refined earthenwares are represented, mostly in the form of tea and table-wares. Creamware was developed in the 1740s in the Staffordshire Potteries and continued to be made into the early 19th century, while pearlware was introduced in the last quarter of the century in an attempt to achieve a whiter glaze. Both were eventually overtaken by refined white earthenwares and stone chinas during the first half of the 19th century. All these fabrics occur in the [8745] fill, with decoration spanning the end of the 18th century and the period up to the 1830s. Part of a small ointment pot was found in plain creamware, as well as a plate with moulded feather edge rim decoration, one of the most popular patterns made in this ware during the 18th century. There is also part of a strainer or sifter spoon with a perforated, flat-based bowl, which is an uncommon find in excavated contexts. Pearlware was distinguished the feint bluish tinge of its glaze, which was achieved by the addition of cobalt. It was extremely popular at the turn of the 18th and 19th centuries and is represented here by sherds from two saucers with underglaze blue-painted decoration, the rim of a plate with the popular blue shell edge rim decoration and the bowl of a ladle, its rim outlined in blue. Part of a teabowl has underglaze blue decoration in the form of stylized foliage bands highlighted with sage green leaves painted over the glaze.

Both pearlware and refined whitewares were decorated with blue transfer-printed designs under the glaze, and both are represented in the context [8745] fill, which includes some early examples predating the introduction of stippling on the copperplate originals to indicate shading c 1807. The forms are mainly tea- and tablewares, with a number of different designs identified. Part of a teabowl in pearlware is decorated with the Chinese-inspired 'buffalo' pattern, and was probably made at the Spode factory, one of the earliest patterns of this kind to be transfer-printed on earthenware, but seldom marked so difficult to attribute (Copeland 1999, 100–16). Another very popular *chinoiserie* design, the 'two temples' pattern, is seen on a London-shape cup and saucer from the same set and may again have been made at the Spode factory, although it was one of the most widely copied Chinese landscape designs (ibid, 53–66). Cups of this distinctive, angular shape were very popular in the early 1800s. Sherds from two fluted cups are decorated in the 'mandarin' pattern, another popular design developed at the turn of the 18th and 19th centuries (ibid, 49, figs 11–13), and there is also a sherd from a plate decorated in the ubiquitous 'willow' pattern. Part of a bowl with a pattern showing a Chinese family seated outside a teahouse or pavilion in a river landscape (as yet unattributed) serves to emphasise the importance of oriental inspiration on decorative table- and teawares at the beginning of the 19th century. There are also, however, examples of European themes in the decoration of transfer-printed wares from this context, which probably date to the 1820s to '30s. These include a slop bowl with a rural scene involving sheep-shearing, and a plate decorated with an underglaze black transfer design showing a farmhouse and barn in mountainous countryside. The border decoration of this plate includes the Prince of Wales feathers and motto 'Ich Dien'; black and brown transfer-printed designs under the glaze were introduced around 1810, before which blue had been the only colour that could withstand the high firing temperatures required for glazing. Part of a bowl from the same context is decorated with a brown transfer-printed sheet pattern based on fruit and leaves, which probably dates to the 1820s.

In addition to the transfer-printed wares described above, the group includes a quantity of Chinese export porcelain that would have made a fine complement to the household's decorative china. Some of these pieces would have been quite old by the time they were thrown away and were clearly highly regarded by their owners. All are decorated in underglaze blue. The earliest pieces are part of a dish decorated with lotus, millet and other flowers within a key-fret border, and part of a fine, small teabowl painted with flower sprigs outside and with a trellis pattern around the rim inside. Both date to the Kangxi period (1662–1722) and were made during the first quarter of the 18th century (Jean Martin and Cyril Beecher pers comm.). Part of a large plate has a brown-edged rim with floral patterns and was probably made during the second quarter or mid 18th century, as does a dish decorated with lotus and chrysanthemums within a trellis and panels border (Martin and Beecher pers comm). The same pattern can be seen on porcelain recovered from the wreck of

the *Götheborg*, sunk in 1745 (Wastfelt et al 1991, nos 51, 78). The latest piece of Chinese porcelain is part of a saucer dish decorated in 'willow pattern' style, with a hexagonal cell border and brown-edged rim, dated to the late 18th century.

The only other pottery in the group consists of a complete teapot lid in black basalt ware, its finial missing, and two small sherds of English porcelain, one from a cup with gilded details and part of a saucer with overglaze painted rosebuds. Both are too small to allow attribution to a factory to be made. There is also part of a chamber pot in yellow ware, with banded slip decoration. Introduced in the 1820s, this durable and very practical pottery rapidly gained in popularity and was soon used for a variety of household functions across the country from the 1830s onwards. It represents one of the latest pieces in the assemblage.

Mid to late 19th-century

Three contexts are dated to after 1850. Two are small and the third is one of the largest post-medieval groups recorded on the site. Context [8084], backfill in Building1, Phase XIII, includes part of a saucer with an underglaze transfer-printed pattern enhanced by overglaze painted decoration. It also includes a dwarf ink bottle in London stoneware and the small lid of a mustard pot in Staffordshire mottled brown-glazed ware, which would have been residual by the mid 19th century. Context [8174], in the Phase VIII backfill of a brick-lined well, again yielded only three sherds, but they all date to the early Victorian period. A small sub-rectangular dish, which is almost complete, is decorated in underglaze blue with the standard 'willow' pattern, while a far more unusual find archaeologically is the complete base of a toilet box decorated in green under the glaze in a pattern named as 'Greek' in the mark underneath. The box is rectangular in shape and has two lateral partitions inside, forming three small compartments. Wedgwood introduced a 'Greek' series of designs c 1800, and Spode followed suit in 1806, initiating what was to become an extensive range, while Minton entered the field in 1810 (Neale 2005, 88–89). Green underglaze transfer prints were first developed in 1825, so the toilet box probably dates to the second quarter of the 19th century. One other sherd in this context comes from a moulded plate with overall green glaze in majolica, a flamboyant decorative ware distinguished by its use of highly colourful glazes, which was introduced by Minton in 1850.

Phase VIII backfill [8002]

This group is similar in size to fill [8745] but later in date. A total of 52 sherds from a minimum of 45 vessels (8082 g) were recovered, with little obviously residual or intrusive material and several whole pots and complete profiles. The pottery was probably discarded together at one time, or over a short period, most likely when the area was redeveloped in the 1850s.

A wide range of household functions is represented, with a high proportion of forms in various fabrics intended for storage purposes. There are sherds from seven bottles of different types in brown salt-glazed stoneware, all probably from London factories. A complete straight-sided porter bottle has a sharp or 'hard' shoulder and a concave neck profile, with a double ring lip. The name and address 'MUMFORD COPPICE ROW' is impressed on the side (the road is in London EC4). The bottle was clearly damaged before firing and carries a sizeable below the mark. This shape of bottle was adopted when porter was first marketed in 1827 (Askey 1998, 62). Two sherds from the more rounded shoulder of a second bottle carry the impressed mark 'Kinsey Holborn'. The style of lettering and the shape of the bottle are both earlier, and in Kent's 1794 Directory for the Cities of London and Westminster and the Borough of Southwark E Kinsey is recorded as a wine merchant at 129 Holborn (http://www.londonancestor/kents/kents-k.htm, accessed August 2007). A large straight-sided 'upright' bottle in brown salt-glazed stoneware dates to the middle of the 19th century and is of a type that could be 'cased' in wickerwork for repeated transport, paralleled by examples found on the site of the Fulham Pottery where sizes up to six gallons were made (Green 1999, 165, fig 135, no 391). The form appears to have been introduced no earlier than the 1840s and possibly not until 1850 (ibid). The LTM06 bottle has the impressed mark 'W WALTER Spirit Warehouse 75 DRURY LANE', which cannot now

be traced. A smaller 'bellied' bottle in stoneware continues a late 18th-century style, before the development of the straight-sided collar neck, and is typical of the period c 1800–35, as found again at Fulham (ibid, 161). The form is ultimately derived from the Rhenish Bartmann jug and was also made at the Vauxhall Pottery c 1840 (Hildyard 1985, no 131).

In addition to the various stoneware bottles found in context [8002] there are two dwarf inks. They match closely a group of five whole ink bottles found in the fill of the Phase VIII brick hearth in Building 1 (context [8018]). These are squat, straight-sided forms less than 2 inches tall, which were advertised in Doulton's 1873 catalogue for 2s 9d per gross (Askey 1998, 107). They were also known as 'penny inks' and were very common in excavated material from the site of the Fulham Pottery (Green 1999, fig 138, nos 410–11).

Several other jars in different fabrics were also found, serving a variety of functions. Three whole jars in refined white earthenware were made for holding meat or fish paste, or relish, and there are also two whole cylindrical jars in bone china, one with gilded bands top and bottom. These were more likely intended for the dressing table, as was a small cosmetic pot also in bone china, decorated with rosebuds delicately painted overglaze. All have a lid-seating at the rim, but are now missing their lids. Two complete, identical pot lids in refined white earthenware have black underglaze transfer-printed decoration advertising their contents as 'Cold Cream'. Pharmaceutical or cosmetic preparations were also probably contained in three whole cylindrical jars in tin-glazed ware, of the kind excavated in large quantities on the site of the Mortlake pothouse, which finally closed in 1827. Two have plain white glaze, while the third has a royal blue glaze outside. By the time the pottery was discarded, probably in the 1850s, these would already have been old and out of date. The only other jar identified is French tin-glazed ware, inscribed 'Moutarde de MAILLE; Vinaigrier du Roi de LL.; MM le Roi d'Angleterre; et les Empereurs; d'Autriche et de Russie; a Paris'.

There is relatively little pottery that would have been used in the kitchen for cooking or preparing food. Sherds from a small pipkin and a bowl in Surrey-Hampshire border redware, part of a dish in Sunderland-type coarseware and a bowl in yellow ware with engine-turned bands are all common types of kitchen ware in the mid 19th century, and would have been found in households throughout London and right across the social spectrum. There is also part of a flowerpot in redware, no doubt made in the London area.

The remaining ceramics are almost all tea- and tablewares. As is the norm at this date, transfer-printed wares dominate, mostly decorated in underglaze blue. Part of a saucer is decorated in the 'tendril' pattern, with similar but not identical examples made by Benjamin Adams c 1820 (Neale 2005, 151, 166). Another saucer has the popular 'Eton College' print, produced by various makers between the 1820s and 1840s, while part of a dish is decorated with the 'birds and flowers' pattern, as produced by Lowndes and Beech 1821–34 (ibid, 37). The perennial 'willow pattern' is seen on an almost complete square dessert dish or vegetable tureen (cf ibid, 117), although not on any other forms. A mug or coffee can decorated with a river scene, featuring a bridge, sailing boats and figures on the bank has not yet been attributed, although it has the painted mark 11 underneath the base. The base of a jug or ewer from a wash set has 'blue marble' decoration, a sheet print in flow blue, examples of which were made by Davenport c 1840 (ibid, 135). Transfer prints in other colours are also represented. The base of a bowl decorated in green carries the mark 'FOREST' over a beehive and flowers with the banner 'FLORENTINE CHINA', denting a stylised pattern made by Samuel Alcock c 1830 at the Cobridge Hill Pottery, Burslem, which was operating between 1829 and 1859 (ibid, 122). There is also part of a dish decorated in a 'moss' pattern sheet print in grey.

Transfer-printed wares were not the only decorative and presentable pieces of china thrown away in the [8002] deposit. At the upper end of the scale, there are two almost complete saucers in bone china both decorated with the same simple gilded pattern based on a central floral spray painted within thin gold bands around the rim. The ware's pure, brilliant whiteness derives from its high bone ash content. The body was developed by Josiah Spode I after 1790, and was subsequently adopted by other factories so that by the early 19th century bone china had become the main English porcelain body and has remained so ever since

(Godden 1992, xxii). Without a mark the saucers are difficult to attribute, although they may have been made at New Hall, probably dating to the early 19th century. They would have formed part of a tea service that was very probably reserved for 'best' and only used on special occasions. Part of a plate in bone china is decorated in Imari style with a 'Japan pattern' in underglaze blue and overglaze red and gold. By the early 1800s stylised Japanese patterns became increasingly popular as they were made to satisfy the demand for reasonably priced, colourful wares. Japan patterns were a standard type of decoration made by most manufacturers between c 1800 and 1830, and particularly associated with Denby and Spode. Other teawares in the same assemblage include an almost-complete teapot of small, squat, pear-shaped form in black-glazed ware, with a refined red earthenware body and lustrous, glossy glaze. A small cream or milk jug in refined white earthenware has a crudely painted blue ground and poor quality moulded decoration, clearly imitating, rather unsuccessfully, Wedgwood's jasper ware and presenting quite a contrast with the high quality bone china saucers. Part of a majolica plate with moulded decoration under a green glaze is one of the latest pieces recorded in the group, made after 1850.

Appendix U – The Post-medieval Glass

Lyn Blackmore

Introduction

Glass bottles and vessels were found in six contexts, although most are from fill [8745] of the 19th-century soakaway [8795], which contained five objects. All the vessel glass and other objects (sixteen fragments from 13 objects) were accessioned; these are described below by function and date. The bottles and phials were recorded as bulk glass. Further details are available in the finds archive.

Distribution

The earliest finds are from fill [8581] of the soakaway [8583], the pottery from which dates to *c* 1760–80. The two items of vessel glass comprise part of a large trumpet-shaped glass (<155>; Fig 00, No.1), possibly used for drinking Ratafia, and a complete jelly glass (<154>; Fig 00, No.2). Also present in this group are four complete mallet bottles (Fig 00, nos.3, 4, 5, 6), probably of the 1730s, and fragments of three others.

From the ceramic dating the finds in soakaway [8795] were either discarded over a long period of time, or comprise a mixed assemblage discarded after *c* 1840. Certainly some of the glass is much earlier than this, notably a sherd from an early 18th-century onion bottle and a cordial glass of the 1760s (<156>; Fig 00, No.7). Two goblets or rummers (<157>, <158>; Fig 00, Nos 8, 9) date to the late 19th or early 19th century, a beaker (<159>; Fig 00, No.10) and a possible salt or condiment dish (<160>; Fig 00, No.11). Also present are single sherds from a mid 18th-century early cylindrical wine bottle and a 19th-century octagonal bottle.

Single fragments of glass, probably of late 18th- or 19th-century date, were recovered from two brick-lined drain cuts. These comprise a small stopper, probably from a perfume bottle in lining [8749] of cut [8751] and the neck/rim of an unusual wine bottle in pale green glass from lining [8575] of drain [8577] (Fig 00, No.12).

The largest group of glass was found in layer [8573] over well [8568], which contained pottery dating to 1807–1860, a perfume bottle (<153>; Fig 00, No.13), a small flask (Fig 00, No.14), part of a polygonal bottle in clear glass with notched decoration (<241>) and 13 fragments from various bottles and phials and windows.

The group of finds from fill [8002] of room [8007] in Building 1 is dated by the pottery to 1850–1900. The glass comprises part of a trumpet-shaped wine glass of *c* 1750–60 (<151>), a moulded glass condiment jar (<242>; Fig 00, No.15) and a range of bottles. These include one near complete mallet bottle (Fig 00, No.16) and the rims of two cylindrical bottles, a complete octagonal sauce bottle (Fig 00, No.17), a complete small cylindrical phial in colourless glass (Fig 00, No.18) and the body of a small bottle for hair oil (Fig 00, No.19). The latter fits with the various ceramic items from the same context that must have been used in the bedroom or dressing room.

Most other contexts contained only small amounts of glass. These include part of an onion bottle from fill [8626] of cut [8625] and a complete phial similar to No.16 (Fig 00) from the fill [8162] of pit [8163]. A wine glass (<152>; Fig 00, No.20) and the rim of a cylindrical wine bottle dated to 1830–1840 were found in fill [8174] of wall [8075], while small fragments of window glass were found in fill [8754] of timber support [8746]. In addition, several very small undiagnostic fragments were recovered by sieving fill [8621] of pit [8622].

The tablewares

Drinking glass

Six stemmed glasses and one jelly glass were found. Most are in clear leaded glass, although <156> has a greyish tinge and appears brown due to decomposition of the surface.

Two glasses are simple flutes with plain stems and drawn trumpet-shaped bowls, possibly used for drinking Ratafia. The larger of the two is <155> ([8581], Fig 00, No.1), which probably dates to the 1740s (cf Bickerton 1993, 12); this piece is incomplete, represented by part of the domed foot, stem with elongated tear and lower part of the bowl (extant height 122mm). The smaller find <151> ([8002]) comprises the lower part of the bowl and upper part of the stem; it could date to between *c* 1740–1760 (cf ibid, 14).

A plain cordial glass (<156> [8745], Fig 00, No.7), represented by part of the small cup-shaped bowl, thick tapering stem (solid) and domed base (diameter 80mm, extant height 130mm), probably dates to the 1760s (cf Bickerton 1993, 12, bottom left; 18, bottom right; Brooks 1975, 46, right).

Probably of late 18th- to early 19th-century date are two short-stemmed goblets, or rummers, from [8745], both with pontil scars. Of these, <157> (Fig 00, No.8), has a bucket-shaped bowl, double ring knop at the junction with the stem, ring knop at the mid-point of the stem and complete base (diameter 69mm, length of stem *c* 30mm, extant height 87mm). Goblet <158> (Fig 00, No.9) has a short plain stem with a single ring knop at the junction with the round-based bowl (possibly of ovoid form); the base is complete (diameter 75mm, length of stem *c* 25mm, extant height 64mm).

Of similar or slightly later date is a small ?sherry glass represented by three fragments forming the complete profile (<152> [8174], Fig 00, No.20; height 117mm; rim diameter 40mm, base diameter 60mm). It has ball knop at the junction of the short stem and the conical bowl, the lower part of which is facetted (octagonal section), the upper part a plain band (depth 37mm). Facetting was probably introduced in the 1760s and facetted stems had become very popular by the last quarter of the 18th century (Bickerton 1993, 19; Pearce 2000, 166); from the associated pottery, however, it is likely that <152> is of 19th-century date.

Beaker

The only other drinking glass is a plain narrow cylindrical beaker or tumbler (<159> [8745] Fig 00, No.10) with pontil scar on the underside of the thick base (diameter 50mm, extant height 40mm).

Jelly glass

A complete deep cone-shaped jelly glass with slightly everted rim and recessed base with pontil scar (<154> [8581], Fig 00, No.2; height 82mm, rim diameter 60mm, base diameter 36mm). From the associated pottery this piece should date to *c* 1745-80.

Condiment dish and jars

These three items probably date to the late 18th- or 19th century, of which the first is half of a small moulded dish (<160> [8745], Fig 00, No.11). Octagonal with straight, very slightly flaring sides, this has a flat ground rim and deep V-shaped facets making a star pattern on the underside of the base, each groove aligned with the approximate centre of the vertical face. Width of base and rim 66mm and 71mm respectively, height 37mm.

The second is part of a shouldered octagonal vessel in colourless glass, either a bottle or small jar, the alternate angles of which have small notched facets (<243>, [8573]).

The third is a mould-blown condiment jar in natural green glass that was designed to fit in a tray (<242>, [8002]; Fig 00, No.15). Of at least quadripartite form, the base itself is circular (diameter 59mm), but the body above it is square with oval facetted sides. Above this is a waisted section of roughly octagonal form that tapers towards the top. Only tiny area of the fourth part survives; it suggests that the body splays out again, either to the same shape as the second section or to the rim (extant height 84mm).

Bottles

Wine bottles

Twenty-three fragments from 17 wine bottles were recovered from the site (5221g). Typologically the earliest are the necks and rims of two onion bottles (Dumbrell 1983, 62–3), one from fill [8581] of soakaway [8583] (possibly *c* 1680–1715), the other from fill [8626] of cut feature [8625] (possibly dating to the early 18th century).

The main feature of the collection is the presence of eight mallet bottles (Dumbrell 1983, 79–80), five of which are complete or near complete (Fig 00, photo). Those from [8581] still have elements of the onion form, with a squat profile, slightly inverted wall, rounded shoulder and tapering neck; they probably date to the between *c* 1725–30. Of the larger examples, No.3 contains 0.75 litre ($1^{3/8}$ pints; base diameter 115mm, height 170mm), while No.4 contains 0.7 litre ($1^{¼}$ pint; base diameter 105/110mm, height 175mm). The sides of both are slightly marvered but not completely flattened and both are noticeably lop-sided. The other bottles are smaller versions of the above. No.5, which is slightly lop-sided, contains just over 0.4 litre (just under ¾ pint; base diameter *c* 80mm, height 145mm). No.6 is about the same size, but could not be measured as the wall is damaged (base diameter 98mm, height 140mm). The others comprise a rim, and a rim and base (diameter *c* 105mm) from two bottles of similar size to the first two, and the base that is comparable to the smaller examples (diameter 90mm).

The complete bottle from [8002] (Fig 00, No.16) has a capacity of *c* 1 litre (1.75 pints). It differs from the above in that the body is slightly taller and the shoulder less rounded; the body is marvered, with a profile that is only slightly inverted (base diameter 100mm, height 105+mm). It is very similar to bottles found in America and dated to 1729 and 1735 (Noel Hume 1970, 64–5). In addition to the above, the base of a mallet bottle with high domed kick was found in fill [8745] (diameter 112mm).

Four early cylindrical bottles are represented, one by a base dating to after 1750 (found in fill [8745] of [8795]) and two necks/rims dating to the late 18th-century (both from [8002]). The fourth find is a body fragment from [8573]. A neck/rim from fill [8174] of wall [8075] is from a mould blown bottle in natural green glass sherds with deep collared rim typical of the period 1830–40 (Dumbrell 1983, 115).

Of interest is the rim and neck of a mould-blown bottle in aqua-coloured glass from [8575] (Fig 00, No.12), with has a slightly polygonal neck, would string and slightly everted flat-topped rim. Although appearing resembling the 17th-century shaft-and-globe form, the colour of the glass and faceting are atypical and it is likely that this is a late 178th- or 19th-century piece.

Phials, medicinal bottles and sauce bottles

Six cylindrical phials were found, all in clear glass and of 18th-/19th-century date. Complete medium-sized tall narrow examples were found in [8002] (Fig 00, No.18) and in fill [8162] of pit [8163]. The former has sloping shoulder and a slightly tapering body (height 105mm, base diameter 20mm, shoulder 26mm); the latter has a flat shoulder and uniform body (height 100, diameter 28mm). The others, from [8573], are fragmented examples, three at least with a larger diameter (one base 45mm, two complete and one incomplete rims). A small long-necked and thin-walled bottle or flask from [8573] may also have contained

some form of pharmaceutical concoction, oil or perfumed water; the body is missing but was probably of bulbous form (Fig 00, No.14). The quality of the natural green glass and collared rim suggests that this find dates to the 19th century.

One small bottle moulded square-sectioned bottle in aqua-coloured glass from [8002] (Fig 00, No.19) has lettering stating the contents and source 'The original and genuine [R]owland's [M]acassar Oil,' from 'No 20 Hatton Garden London'. The body is near complete (24 x 28mm, height to shoulder 70mm), the neck and rim missing. Macassar oil was originally derived from seeds of the ylang-ylang tree, used for smoothing the hair, allegedly imported from an island in what is now Indonesia. The term was first used in 1809 (etymologyonline.com).

Two larger moulded bottles probably also contained some form of medical preparation. One is octagonal in section with seam across the concave base ([8745], span of flat faces *c* 50mm, from corners 53mm). Two bottles may have been used for sauces. That from [8002], in pale green glass, is a complete long-necked rectangular bottle with bevelled corners and flat recessed base (Fig 00, No.17; base 40 x 58mm, height 190mm). The other, from [8573], represented by the flat base and part of the body only, is in darker green glass; the base was originally the same size as that from [8002].

Perfume bottles

A near complete small oval-bodied perfume bottle in purple glass (<153> [8573], Fig 00, No.13) probably dates to the 19th century. Made in a two-part mould (slightly misaligned in assembly), it has a flat base (*c* 12mm square), oval body (53 x 40mm) with raised decoration on the flat faces and ribbed sides with slightly flaring cylindrical neck (length 16mm, rim diameter 17mm; total height 68mm). A small colourless glass stopper (<161> [8749]) with hollow spherical head (diameter 15mm) may also be from a perfume bottle; the stem is incomplete (extant length 9mm).

Window glass

Very little window glass was found. Stratigraphically the earliest find is intrusive in the fill of the Saxon burial [8699] ([8701] <18>); although of similar thickness as Roman glass (1.5–3mm), the colour is greener than usual and one edge is machine cut. The other glass is mainly natural green in colour, but one fragment from [8573] is natural blue. The four pieces from [8754] are extremely small. The five fragments from [8573] include a small pane, probably from a lantern (width 52mm, extant length [8573]) and two offcuts, one with thickened rim from the edge of a sheet of glass, the other a small strip (71 x 8mm).

Discussion

Much of the glass is typical of the 18th century, and although some groups are of 19th-century date, at least some of the vessel glass was rather older than most of the associated ceramics, in some cases by up to 60-80 years. Together with the ceramics, the finds, and especially those from soakaway [8583], give a good picture of life in fairly affluent households of the 18th and 19th centuries.

Per	LU	Cxt	Pcxt	Acc	Mat	Object	Tot	ENV	Illus	Comment
XIII	B1/2	8581	8583	155	GLASS	CUP	1	1	1	trumpet-shaped bowl; lead glass?
XIII	B1/2	8581	8583	154	GLASS	CUP	1	1	2	jelly glass, whole
XIII		8581	8583	-	GLASS	BOTTLE	1	1	3	Mallet
XIII		8581	8583	-	GLASS	BOTTLE	1	1	4	Mallet
XIII		8581	8583	-	GLASS	BOTTLE	1	1	5	Mallet
XIII		8581	8583	-	GLASS	BOTTLE	1	1	6	Mallet

VIII		8745	8795	156	GLASS	CUP	1	1	7	1760-1770
VIII		8745	8795	157	GLASS	CUP	1	1	8	rummer
VIII		8745	8795	158	GLASS	CUP	1	1	9	1700+
VIII		8745	8795	159	GLASS	BEAK	2	1	10	1750+
VIII		8745	8795	160	GLASS	SALT?	1	1	11	half base; cut star on underside
		8575		-	GLASS	BOTTLE	1	1	12	Neck only
VIII		8573	8574	153	GLASS	FLAS	1	1	13	Perfume, purple glass
		8002		-	GLASS	FLAS	1	1	14	Neck only
		8002		-	GLASS	CUP	1	1	15	Condiment jar
		8002		-	GLASS	BOTTLE	1	1	16	Mallet
		8002		-	GLASS	BOTTLE	1	1	17	Sauce bottle
		8002		-	GLASS	BOTTLE	1	1	18	Phial
		8002		152	GLASS	CUP	3	1	19	Hair oil, manufacturers name
VIII		8174	8075	-	GLASS	CUP	3	1	20	Wine glass - sherry

Appendix V – The Clay Tobacco Pipes

Tony Grey

Introduction

Thirty-eight clay tobacco pipe fragments from thirteen contexts were recovered from the excavation including twenty-five pipe bowls, ten stems and three mouthpieces. This assemblage was recorded in accordance with current MoLAS practice. Reference was made to the London clay pipe typology (Atkinson and Oswald 1969). The prefix AO for a pipe indicates the Atkinson-Oswald London typology and the prefix OS indicates the Oswald typology (Oswald 1975). Quantification and recording followed guidelines set out by Higgins and Davey (1994; Davey 1997).

The assemblage

Whilst the pipe stems and mouthpieces are undiagnostic and only broadly datable the pipe bowls are datable according to the above typologies and are probably all from local London pipe makers. None of the pipes are early in date, they range from *c* 1680 to the end of the nineteenth century. There are thirteen pipes bearing makers' marks and twenty decorated pipes (most of them also marked). None of the pipes are complete as all have been smoked and discarded.

The decorated pipes include a type AO26 (dated *c* 1740-1800) from Context [8749] bearing images of the Prince of Wales' feathers and the thistle of Scotland surmounted by a crown (Figure 00, No.1). Three type AO27 bowls (dated *c* 1780-1820) have leaves running down the front and back seams of the bowl from Context (8002) with a similarly decorated AO27 from Context (8047) and a further two such pipes from Context (8084). A type AO28 (dated *c* 1820-60) from Context (8575) also bears leaves down the bowl seams. A type AO30 (dated *c* 1850-1910) from Context (8084) and five AO30s from Context [8085] are decorated with wheatsheaves within vertical ribbing whilst another AO30 from the latter context bears leaves along the stem.

Three pipes are decorated with Masonic symbols on the bowl (Figure 00, No.2). These are dated *c* 1780-1820 with one from Context (8573), one from Context (8575) and one from Context (8749). The symbols include the crossed square and compass, the moon and the Sun, the sword, the plumb line and rule, the two pillars, seven stars, three towers and a ladder and trowel and others. Each bears the maker's initials WB.

Of especial interest is a pipe dated *c* 1780-1820 with decoration promoting the cause of the abolition of slavery (Figure 00, No.3). On one side of the bowl is a reproduction of the Slave Medallion produced in 1787 by Josiah Wedgwood copying the emblem of the Society for the Abolition of Slavery modelled by William Hackwood where a kneeling Negro slave in manacles is accompanied by the motto 'Am I not a man and a brother?' though this motto is not present on the pipe. Within a very few years thousands of copies of the Slave Medallion were widely distributed which considerably influenced public opinion. On the opposite side of the pipe bowl is an image of Britannia standing with spear. This pipe is from Context (8573).

All of the makers' initials are moulded in relief on the sides of the heel on pipes dated *c* 1780-1820 with the exception of a pipe dated *c* 1840-1910 from Context (8085) where the name is in relief along the sides of the stem and the Prince of Wales pipe dated *c* 1740-1800 with illegible initials on the sides of the spur. The makers' initials include DH Context (8002), IE on the abolitionist pipe Context (8573), WB on the three Masonic pipes Contexts (8573), (8575) and (8749), WJ Context (8002) (two pipes) and Context (8084), WS (c 1780-1820) Context (8575). Another pipe from Context (8575) has a possible crown G. None of the marks are reliably matched to a known maker.

Discussion

The clay tobacco pipes, in conjunction with the pottery, assist in dating demolition and redevelopment phases in the 18th and 19th centuries. There are three pipe groups of modest size from Contexts (8002), (8084) and (8085). Properties on the site of Covent Garden market were demolished by the Duke of Bedford 1856-61 and demolition material (8002) sealing Buildings 1 and 2 in Open Area 24 contained four pipe bowls dated *c* 1850-1910. The abolitionist pipe and a Masonic pipe help date (8573), a deposit slumped into the top of well [8568] to no earlier than *c* 1787.

There is a history of Masonic activity in the Covent Garden area from the 18th century. The freemasons met at the Apple Tree Tavern, 28 Charles Street. The first Grand Lodge, from the four London lodges, was initially based at this tavern in 1717 but it changed its name and location several times until by 1799 it was based at the Shakespeare Head in the northeast corner of Covent Garden. The third lodge of the original four lodges also met at the Apple Tree but it too soon changed its name and location. So the Masonic pipes recovered from this site are most likely associated with meetings of freemasons in taverns in this area in the late 18th century and later.

Appendix W – Context Register

Context Number	Context Description	Length	Width	Depth	Single Context Plan?	Plan No	Section No.
001	Concrete ground slab	1.40m	1.20m	0.38m	No	1	1
002	Bedding for 001	1.40m	1.20m	0.20m	No	-	1
003	Ground make -up	1.40m	1.20m	0.18-0.45m	No	-	1
004	Brick pier	0.35m	0.35m	not seen	No	1	1
005	Basement wall	1.40m	n/a	3.72m	No	1	-
006	Demolition layer	1.40m	0.84m	0.16-0.78m	No	-	1
007	Brick floor	0.70m	0.65m	700mm	No	1	1
008	Flue run	not seen	0.40m	0.30m	No	1	1
009	Levelling/made ground	0.70m	0.65m	0.40m	No	1	1
010	Bedding for 007	0.70m	0.65m	10mm	No	-	-
011	Made ground	unclear	unclear	0.40m max	No	-	1
012	Brick floor?	unclear	unclear	55mm	No	-	1
013	Uncertain deposits	unclear	unclear	unclear	No	-	1
014	Fill of 015	1.40m	0.40m	3.72m	No	1	1
015	Construction cut	1.40m	0.40m	3.72m	No	1	1
016	Concrete ground slab	1.85m	0.90m	0.35m	No	-	-
017	Made ground	1.85m	0.90m	<0.35m	No	-	-
018	Drain run	1.85m	0.30m	0.25m	No	-	-
019	Support base for 017	1.85m	0.48m	0.10m	No	-	-
1/001	Concrete ground slab	Trench	Trench	0.15m	No	-	-
1/002	C19th backfill	Trench	Trench	3.5m	No	-	-
1/003	Yellow/brown silty clay	Trench	Trench	1.00m	No	-	-
1/004	Light brown/yellow sandy gravel	Trench	Trench	4.0m	No	-	-
1/005	Dark grey/brown clay	Trench	Trench	1.0m	No	-	-
2/001	Concrete ground slab	Trench	Trench	0.15m	No	-	-
2/002	C19th backfill	Trench	Trench	4.0m	No	-	-
2/003	Light brown clayey silt	Trench	Trench	1.0m	No	-	-
2/004	Light brown sandy gravel	Trench	Trench	4.0m	No	-	-
3/001	Concrete ground slab	Trench	Trench	0.15m	No	-	-
3/002	C.19th backfill	Trench	Trench	4.0m	No	-	-
3/003	Light brown clayey silt	Trench	Trench	1.5m	No	-	-
3/004	River terrace gravels	Trench	Trench	3.0m	No	-	-
3/005	Dark grey clay	Trench	Trench	3.0m	No	-	-
4/001	Brick cobbled surface	Trench	Trench	0.20m	No	-	-
4/002	C.19th backfill	Trench	Trench	2.50m	No	-	-
4/003	Dark brown clayey silt	Trench	Trench	2.80m	No	-	-
4/004	River terrace gravels	Trench	Trench	2.50m	No	-	-

Context Number	Context Description	Length	Width	Depth	Single Context Plan?	Plan No	Section No.
4/005	Mid brown compact clay	Trench	Trench	1.00m	No	-	-
4/006	Dark grey compact clay	Trench	Trench	0.5m	No	-	-
5/001	Brick cobbled surface	Trench	Trench	0.20m	No	-	-
5/002	C.19th backfill	Trench	Trench	4.80m	No	-	-
5/003	River terrace gravels	Trench	Trench	2.00m	No	-	-
5/004	Natural brown clay	Trench	Trench	1.5m	No	-	-
5/005	Natural dark grey clay	Trench	Trench	1.5m	No	-	-
6/001	Concrete ground slab	Trench	Trench	0.15m	No	-	-
6/002	C.19th backfill	Trench	Trench	1.35m	No	-	-
6/003	Loose dark grey/brown clayey sandy silt	Trench	Trench	1.50m	No	-	-
6/004	Mid-dark brown sandy clay	Trench	Trench	1.00m	No	-	-
6/005	Dark brown/grey sandy clay	Trench	Trench	1.5m	No	-	-
6/006	River terrace gravels	Trench	Trench	1.50m	No	-	-
6/007	Compact brown clay	Trench	Trench	2.00m	No	-	-
6/008	Compact dark grey clay	Trench	Trench	1.30m	No	-	-
7/001	Concrete ground slab	Trench	Trench	0.15m	No	-	-
7/002	C.19th backfill	Trench	Trench	3.50m	No	-	-
7/003	Dark sandy silty clay	Trench	Trench	1.00m	No	-	-
7/004	Light brown clayey silt.	Trench	Trench	2.50m	No	-	-
8/001	P-med wall	6.90m	0.60m	0.75m	No	1+2	-
8/002	Generic C19th backfill	Site	Site	3.50m	No	-	-
8/003	Brick structure	1.60m	0.85m	0.70m	No	2	-
8/004	Brick butress	0.76m	0.50m	0.84m	No	2(3)	-
8/005	Brick butress	0.70m	0.50m	0.80m	No	2(3)	-
8/006	Brick wall	5.00m	0.50m	0.75m	No	2(3)	-
8/007	Tile floor	2.65m	1.82m	0.03m	No	2(3)	-
8/008	Brick hearth	0.80m	0.68m	0.52m	No	2(3)	-
8/009	Room in Area 1	2.70m	1.86m	0.80m	No	2(3)	-
8/010	Mortar bedding for (8/007)	2.70m	1.86m	0.08m	No	2(3)	-
8/011	Brick wall	2.26m	0.22m	0.80m	No	2(3)	-
8/012	Brick wall	0.58m	0.50m	0.76m	No	2(3)	-
8/013	Wood threshold	0.75m	0.17m	0.02m	No	2(3)	-
8/014	Brick structure	1.00m	0.30m	0.15m	No	2(3)	-
8/015	Vaulted structure	5.00m	0.70m	0.45m	No	2(2+3)	-
8/016	Brick underpinning	0.60m	0.36m	0.25m	No	2(3)	-
8/017	VOID	-	-	-	-	-	-
8/018	Fill of (8/008)	0.40m	0.18m	0.40m	No	2(3)	-
8/019	VOID	-	-	-	-	-	-
8/020	Brick wall	1.60m	0.40m	0.30m	No	2(2)	-
8/021	Room in Area 1	2.68m	1.04m	1.00m	No	2(3+4)	-
8/022	Brick wall	1.60m	0.24m	0.60m	No	2(1)	-

Context Number	Context Description	Length	Width	Depth	Single Context Plan?	Plan No	Section No.
8/023	Brick wall	1.75m	0.38m	0.75m	No	2(1)	-
8/024	Brick wall	2.85m	0.32m	0.50m	No	2	-
8/025	Poss. Med. Layer	1.26m	0.10m	0.45m	No	-	1
8/026	Brick wall	0.94m	0.34m	0.96m	No	2(4)	-
8/027	Bedding layer for (8/028)	2.84m	2.00m	0.15m	No	2(3+4)	-
8/028	Brick floor	2.68m	1.04m	0.07m	No	2(3+4)	-
8/029	Sloping cut between (8/021) and (8/035)	1.20m	0.94m	0.15m	No	2(3+4)	-
8/030	Brick wall	2.16m	0.24m	0.72m	No	2(4)	-
8/031	Brick wall	1.50m	0.38m	1.10m	No	2	-
8/032	Brick structure	1.20m	0.90m	0.28m	No	2(4)	-
8/033	Tile lined drain	0.80m	0.30m	0.30m	No	2(4)	-
8/034	Brick floor. Same as (8/028)	2.68m	1.04m	0.07m	No	2(4)	-
8/035	Room in Area 1	2.74m	2.06m	0.96m	No	2	-
8/036	VOID	-	-	-	-	-	-
8/037	VOID	-	-	-	-	-	-
8/038	Concrete ground slab	Site	Site	0.35m	No	-	1
8/039	Bedding layer for (8/038)	Site	Site	0.18m	No	-	1
8/040	Brick wall	0.85m	-	1.90m	No	-	1
8/041	VOID	-	-	-	-	-	-
8/042	Linear construction cut	7.20m	1.50m	1.50m	No	2(1+2)	-
8/043	Tiled slope	0.96m	0.46m	0.15m	No	2(3+4)	-
8/044	Brick and tile floor surface	2.10m	1.18m	0.07m	No	2(3+4)	-
8/045	Brick wall	1.84m	0.58m	0.56m	No	2(4)	-
8/046	Brick wall	1.44m	0.50m	1.25m	No	2(4)	-
8/047	P-med dump layer	Site	Site	0.15m	No	2	-
8/048	Room in Area 1	-	-	-	No	2	-
8/049	Post-med dump layer	5.80m	5.10m	0.10m	No	-	-
8/050	Brick wall	1.70m	1.30m	0.55m	No	2	-
8/051	Brick structure	1.10m	0.96m	0.55m	No	2	-
8/052	Brick wall	2.16m	0.22m	0.35m	No	2	-
8/053	Brick wall	2.00m	0.56m	0.49m	No	2(5)	-
8/054	Slate and brick drain	2.00m	0.40m	0.30m	No	2	-
8/055	Brick wall	2.30m	0.40m	0.70m	No	2	-
8/056	Brick wall	2.20m	1.30m	0.52m	No	2	-
8/057	Brick structure	1.90m	1.70m	0.50m	No	2	-
8/058	Brick floor	1.00m	0.40m	0.07m	No	2	-
8/059	Brick lined drain	0.87m	0.35m	0.35m	No	2	-
8/060	Fill of [8/061]	0.85m	0.30m	-	No	2	-
8/061	Construction cut for (8/050)	0.85m	0.30m	-	No	2	-
8/062	Brick wall	0.52m	0.36m	-	No	2	-
8/063	Room in Area 1	-	-	-	No	2	-
8/064	Brick wall	1.34m	0.46m	0.40m	No	2(7)	-
8/065	Brick wall	1.70m	0.32m	0.55m	No	2(7)	-
8/066	Brick wall	1.50m	0.60m	0.75m	No	2(8)	-
8/067	Brick structure	0.60m	0.60m	0.55m	No	2(8)	-

Context Number	Context Description	Length	Width	Depth	Single Context Plan?	Plan No	Section No.
8/068	Brick wall	0.74m	0.70m	0.23m	No	2(8)	-
8/069	Brick wall	3.40m	0.24m	1.12m	No	2(8)	-
8/070	Brick wall	3.60m	0.80m	1.50m	No	2(8)	-
8/071	Brick wall	3.50m	0.60m	0.52m	No	2(8)	-
8/072	Brick-lined drain	0.65m	0.54m	0.25m	No	2(8)	-
8/073	Floor surface	1.70m	0.70m	0.06m	No	2(8)	-
8/074	Tile and brick floor	3.53m	2.85m	0.07m	No	2(8)	-
8/075	Brick wall	1.70m	1.43m	0.54m	No	2(9)	-
8/076	Brick flue	0.58m	0.46m	0.65m	No	2	-
8/077	Floor surface	3.60m	2.40m	0.05m	No	2(7)	-
8/078	Brick wall	1.76m	-	1.00m	No	2(4)	-
8/079	Room in Area 1	1.90m	1.86m	1.00m	No	2	-
8/080	Brick wall	2.30m	1.10m	1.00m	No	2(4)	-
8/081	Brick wall	10.15m	0.50m	1.50m	No	2(4)	-
8/082	Sand layer	1.90m	1.86m	0.15m	No	2(4)	-
8/083	Floor surface	3.40m	1.40m	0.07m	No	2(8)	-
8/084	Backfill layer	0.90m	0.70m	0.50m	No	2	-
8/085	Backfill layer	0.90m	0.90m	0.40m	No	2	-
8/086	Room in Area 1	3.50m	1.34m	1.60m	No	2	-
8/087	Room in Area 1	3.65m	2.90m	1.30m	No	2	-
8/088	Room in Area 1	3.50m	2.60m	1.60m	No	2	-
8/089	Room in Area 2	-	-	-	No	3	-
8/090	Dark brown silty layer	-	-	-	No	3	-
8/091	Drain cut	3.00m	0.30m	0.30m	No	3(1+2)	-
8/092	Fill of [8/091]	3.00m	0.30m	0.30m	No	-	-
8/093	Pit cut	0.63m	0.30m	0.18m	No	3(1+2)	-
8/094	Fill of [8/093]	0.63m	0.30m	0.18m	No	-	-
8/095	Bedding layer	2.20m	1.20m	0.05m	No	3(1)	-
8/096	Pit cut	0.27m	0.21m	0.17m	No	3(1)	-
8/097	Fill of [8/096]	0.27m	0.21m	0.17m	No	-	-
8/098	Brick wall	4.00m	0.58m	0.53m	No	3(1)	-
8/099	VOID	-	-	-	-	-	-
8/100	Brick flue	1.60m	0.70m	1.40m	No	3(2)	-
8/101	Brick wall	1.00m	-	1.10m	No	3(2)	-
8/102	Brick flue	0.65m	0.35m	1.40m	No	3(2)	-
8/103	Bedding layer	5.00m	2.40m	0.30m	No	3(1,2,3,4)	-
8/104	Brick pillar	0.60m	0.60m	0.37m	No	3(1)	-
8/105	Brick pillar	0.60m	0.60m	1.00m	No	3(1)	-
8/106	Brick wall	0.65m	0.23m	0.76m	No	3(1)	-
8/107	Brick floor surface	0.90m	0.66m	0.07m	No	3(1)	-
8/108	Brick pillar	0.50m	0.43m	1.00m	No	3(1)	-
8/109	Brick threshold foundation	1.10m	0.23m	0.15m	No	3(1)	-
8/110	Brick wall	2.00m	0.50m	0.90m	No	3(3+4)	-
8/111	Brick wall	1.50m	0.13m	0.40m	No	3(3+4)	-
8/112	Fill of (8/075)	1.70m	1.00m	0.40m	No	2(7+10)	-
8/113	VOID	-	-	-	-	-	-

Context Number	Context Description	Length	Width	Depth	Single Context Plan?	Plan No	Section No.
8/114	green gravel layer - missing						
8/115	Pit cut	1.30m	0.85m	0.30m	No	4	-
8/116	Fill of [8/115]	1.30m	0.85m	0.30m	No	-	-
8/117	Fill of [8/118]	2.70m	0.60m	0.30m	No	-	-
8/118	Drain cut	2.70m	0.60m	0.30m	No	4	-
8/119	Fill of [8/120]	2.60m	0.60m	0.40m	No	-	-
8/120	Drain cut	2.60m	0.60m	0.40m	No	3	-
8/121	Brick wall	1.10m	0.78m	-	No	4	-
8/122	Brick wall	2.65m	0.32m	0.45m	No	4	-
8/123	Brick floor	1.50m	0.45m	0.06m	No	4	-
8/124	Brick floor	2.60m	0.42m	0.06m	No	4	-
8/125	Sandstone slab capping	1.10m	0.26m	0.23m	No	4	-
8/126	Construction cut	0.70m	0.66m	0.57m	No	4	-
8/127	Fill of [8/126]	0.70m	0.66m	0.57m	No	-	-
8/128	Construction cut	1.10m	0.46m	1.00m	No	4	-
8/129	Fill of [8/128]	1.10m	0.46m	1.00m	No	-	-
8/130	Generic number for post med layer	-	-	-	-	-	-
8/131	Rubble backfill of [8/133]	2.00m	0.62m	0.60m	No	4	-
8/132	Mortar dump for wall [8/001]	2.00m	0.62m	0.20m	No	4	-
8/133	Cut for wall [8/001]	2.00m	0.82m	0.62m	No	4	-
8/134	Fill of construction cut [8/135]	3.36m	0.30m	0.47m	No	3	-
8/135	Construction cut	3.36m	0.30m	0.47m	No	3	-
8/136	Drainage channel wall	0.92m	0.18m	0.30m	No	4	-
8/137	Tile floor in room [8/079]	1.90m	1.82m	0.03	No	5	-
8/138	Fill of [8/139]	0.44m	0.30m	0.09m	No	-	-
8/139	Posthole	0.44m	0.30m	0.09m	No	7	-
8/140	Dumped layer	1.60m	1.00m	0.10m	No	-	-
8/141	Layer	0.82m	0.64m	0.19m	8/141	-	2
8/142	Sandy gravel deposit	1.00m	0.62m	-	8/142	-	-
8/143	Mixed daub+sand demolition layer	0.88m	0.64m	-	8/143	-	-
8/144	Mixed charcoal+daub demolition layer	1.20m	0.70m	-	8/'144	-	2
8/145	Demolition layer	1.54m	1.30m	-	8/145	-	2
8/146	Demolition layer	1.54m	1.30m	0.12m	8/146	-	2
8/147	Limestone foundation	0.18m	0.10m	0.13m	8/147	-	2
8/148	Gravel layer	1.40m	0.70m	-	8/148	-	2
8/149	Bonding for limestone cobbles	1.25m	0.80m	0.19m	8/150	-	2
8/150	Possible foundation cut filled with [8/147]	1.25m	0.80m	0.19m	8/150	-	2
8/151	Fill of [8/152]	20m	0.80m	0.13m	8/152	-	-
8/152	Beam slot	20m	0.80m	0.13m	8/152	-	-
8/153	missing						
8/154	Deposit			0.20m	No	8	-
8/155	Silty sand layer	4.84m	2.80m		8/155	-	-

Context Number	Context Description	Length	Width	Depth	Single Context Plan?	Plan No	Section No.
8/156	Pit cut	2.00m	1.00m	0.35m	No	6	-
8/157	Yellow clay deposit	2.00m	2.00m	0.10m	No	8/157	-
8/158	Burnt deposit	0.60m	0.55m	0.10m	No	8/157	-
8/159	Fill of [8/161]	1.40m	1.35m	1.20m	No	-	-
8/160	Brick lining for cess pit [8/161]	1.40m	1.18m	0.90m	8/160	-	-
8/161	Cess pit	1.60m	1.40m	1.20m	8/161	-	-
8/162	Fill of [8/163]	2.20m	1.30m	0.40m	No	-	-
8/163	Post med pit	2.20m	1.30m	0.40m	8/163	-	-
8/164	Fill of [8/165]	0.30m	0.30m	0.10m	8/165	-	-
8/165	Posthole	0.30m	0.30m	0.10m	8/166	-	-
8/166	missing						
8/167	Burnt layer	?	?	0.03m	-	-	-
8/168	Charcoal rich deposit	?	?	?			-
8/169	Fill of [8/187]	?	?	0.25m			-
8/170	Construction cut for [8/122]	4.50m	0.40m	?	No	4	-
8/171	Construction cut for [8/123]	5.50m	0.80m	?	No	4	-
8/172	Fill of [8/173]	2.30m	1.40m	0.36m	No	-	-
8/173	Pit cut	2.30m	1.40m	0.36m	8/173	-	-
8/174	Fill of [8/075]	1.10m	0.70m	0.70m	No	-	-
8/175	Brick structure	1.40m	0.80m	0.70m	8/175	-	-
8/176	Construction cut	1.35m	0.90m	0.83m	8/176	-	-
8/177	Fill of [8/175]	1.40m	0.70m	1.04m	No	-	-
8/178	missing						
8/179	missing						
8/180	Fill of [8/180]	0.55m	0.24m	0.30m	No	-	-
8/181	Pit cut	0.55m	0.24m	0.30m	8/181	-	-
8/182	Fill of [8/183]	0.93m	0.88m	nfe	No	-	-
8/183	Brick well	1.42m	1.35m	nfe	8/183	-	-
8/184	Fill of [8/185]	1.90m	1.80m	nfe	No	-	-
8/185	Construction cut for [8/183]	1.90m	1.80m	nfe	8/185	-	-
8/186	Fill of [8/187]	2.30m	2.30m	0.30m	No	-	3
8/187	Rubbish pit	3.00m	3.00m	0.80m	8/187	-	3
8/188	Fill of [8/189]	0.62m	0.48m	0.25m	No	-	-
8/189	Construction cut for [8/006]	0.62m	0.48m	0.25m	8/189	-	-
8/190	Fill of [8/191]	3.20m	0.80m	0.13m	No	-	-
8/191	Wall cut	3.20m	0.80m	0.13m	8/191	-	-
8/192	Layer	3.24m	2.98m	-	8/192	-	-
8/193	VOID	-	-	-	-	-	-
8/194	Fill of [8/194]	0.90m	0.30m	0.25m	No	-	-
8/195	Pit cut	0.90m	0.30m	0.25m	8/195	-	-
8/196	Fill of [8/196]	0.40m	0.20m	0.32m	No	-	-
8/197	Posthole - duplicated number	0.40m	0.20m	0.32m	8/197	-	-
8/197	Fill of [8/198]	2.20m	1.06m	-	No	4	-
8/198	Construction cut for [8/030]	2.20m	1.06m	-	No	4	-
8/199	Fill of [8/200]	1.30m	0.80m	0.23m	No	-	-
8/200	Pit cut	1.30m	0.80m	0.23m	8/200	-	-

Context Number	Context Description	Length	Width	Depth	Single Context Plan?	Plan No	Section No.
8/201	Fill of [8/203]	1.30m	1.20m	0.35m	No	-	-
8/202	Fill of [8/203]	2.00m	1.83m	1.10m	No	-	-
8/203	Pit cut	2.00m	1.83m	1.10m	8/203	-	-
8/204	Fill of [8/205]	10.15m	0.50m	-	No	4	-
8/205	Construction cut for [8/081]	10.15m	0.50m	1.50m	No	4	-
8/206	Sandy gravel layer	1.40m	0.60m	0.04m	8/206	-	-
8/207	Fill of [8/208]	0.40m	0.32m	0.40m	No	-	-
8/208	Stakehole	0.40m	0.32m	0.40m	8/208	-	-
8/209	Fill of [8/210]	1.25m	0.90m	0.25m	No	-	-
8/210	Pit cut	1.25m	0.90m	0.25m	8/210	-	-
8/211	Fill of [8/187]	3.00m	3.00m	0.80m	No	-	3
8/212	Sand layer	1.40m	0.70m	0.03m	8/212	-	-
8/213	Clay silt layer	2.60m	2.60m	012m	8/213	-	-
8/214	Silty sand layer	1.00m	0.95m	0.15m	8/214	-	-
8/215	Silty sand layer	2.50m	0.90m	0.15m	8/215	-	-
8/216	Fill of [8/187]	1.00m	1.00m	0.30m	No	-	3
8/217	Secondary fill of [8/219]	1.70m	1.30m	0.50m	No	-	-
8/218	Primary fill of [8/219]	1.10m	1.10m	0.13m	No	-	-
8/219	Medieval pit	1.70m	1.30m	0.63m	8/219	-	-
8/220	Fill of [8/221]	0.74m	0.70m	0.12m	No	-	-
8/221	Pit cut	0.74m	0.70m	0.12m	8/221	-	-
8/222	Clay layer	1.70m	1.00m	0.15m	8/222	-	-
8/223	Dumped layer	1.80m	1.00m	0.20m	8/223	-	-
8/224	Clay layer	2.80m	0.98m	0.10m	8/224	-	-
8/225	Layer	2.80m	1.00m	0.20m	8/225	-	-
8/226	Yellow clay layer	2.02m	1.20m	0.06m	8/226	-	-
8/227	Dumped deposit	3.58m	3.20m	0.12m	8/227	-	-
8/228	Fill of [8/229]	1.10m	0.30m	0.28m	No	-	-
8/229	Pit cut	1.10m	0.30m	0.28m	8/229	-	-
8/230	Fill of [8/230]	0.20m	0.18m	0.15m	No	-	-
8/231	Posthole	0.20m	0.18m	0.15m	8/231	-	-
8/232	Fill of [8/233]	1.50m	0.70m	0.41m	No	-	-
8/233	Medieval pit	1.50m	0.70m	0.41m	8/232	-	-
8/234	Layer	2.20m	1.72m	0.25m	8/234	-	-
8/235	Fill of [8/236]	1.50m	0.70m	0.67m	No	-	-
8/236	Construction cut for wall [8/205]	1.50m	0.70m	0.67m	8/236	-	-
8/237	Fill of [8/238]	1.50m	0.52m	0.16m	No	-	-
8/238	Construction cut	1.50m	0.52m	0.16m	8/138	-	-
8/239	Fill of [8/240]	2.32m	1.60m	0.47m	No	-	-
8/240	Cut of heavily truncated pit	2.32m	1.60m	0.47m	8/240	-	-
8/241	Fill of [8/242]	1.46m	1.05m	0.30m	No	-	-
8/242	Pit cut	1.46m	1.05m	0.30m	8/242	-	-
8/243	Layer	5.50m	3.20m	0.10m	8/243	-	-
8/244	Fill of [8/245]	2.04m	1.00m	0.15m	-	-	-
8/245	Pit cut	2.04m	1.00m	0.15m	8/245	-	-
8/246	Pit cut	1.00m	0.95m	0.45m	8/246	-	-

Context Number	Context Description	Length	Width	Depth	Single Context Plan?	Plan No	Section No.
8/247	Fill of [8/246]	1.00m	0.95m	0.45m	No	-	-
8/248	Fill of [8/249]	0.35m	0.35m	0.23m	No	-	-
8/249	Posthole	0.35m	0.35m	0.23m	8/249	-	-
8/250	Gravel layer	3.40m	2.70m	0.20m	8/250	-	-
8/251	Fill of [8/252]	0.40m	0.20m	0.50m	No	-	-
8/252	Pit cut	0.40m	0.20m	0.50m	8/252	-	-
8/253	Fill of [8/245]	0.71m	0.30m	0.25m	No	-	-
8/254	Posthole	0.71m	0.30m	0.25m	8/254	-	-
8/255	Fill of [8/255]	0.33m	0.28m	0.22m	No	-	-
8/256	Posthole	0.33m	0.28m	0.22m	8/256	-	-
8/257	Daub+gravel demolition layer	2.20m	2.00m	?	8/257	-	-
8/258	Layer	1.75m	1.20m	0.30m	8/258	-	-
8/259	Fill of [8/260]	0.72m	0.65m	0.60m	No	-	-
8/260	Small pit cut	0.72m	0.65m	0.60m	8/260	-	-
8/261	Fill of [8/262]	1.50m	1.50m	1.43m	No	-	-
8/262	Robbed well	1.50m	1.50m	1.43m	8/262	-	-
8/263	Layer	1.72m	1.10m	0.08	8/263	-	-
8/264	Layer	1.70m	0.50m	0.02m	8/264	-	-
8/265	Charcoal rich layer	2.20m	1.74m	0.10m	8/265	-	-
8/266	Fill of [8/268]	1.62m	1.12m	0.10m	No	-	-
8/267	Charcoal layer	1.90m	0.80m	0.10m	8/267	-	-
8/268	Shallow pit cut	1.62m	1.12m	0.31m	8/268	-	-
8/269	Medieval layer	2.40m	2.18m	0.05m	8/269	-	-
8/270	Fill of [8/271]	2.56m	0.63m	0.10m	No	-	-
8/271	Shallow ditch cut	2.56m	0.63m	0.10m	8/271	-	-
8/272	Daub layer	1.60m	1.40m	0.10m	8/272	-	4
8/273	Posthole	0.40m	0.20m	0.25m	8/273	-	-
8/274	Fill of [8/273]	0.40m	0.20m	0.25m	No	-	-
8/275	Clay layer	0.82m	0.46m	0.16m	8/275	-	-
8/276	Gravel layer	2.92m	0.50m	0.10m	8/276	-	-
8/277	Fill of [8/278]	1.50m	0.20m	0.15m	No	-	-
8/278	Beam slot	1.50m	0.20m	0.15m	8/278	-	-
8/279	Slumped layer	3.30m	1.16m	0.25m	8/279	-	-
8/280	Fill of [8/281]	0.40m	0.30m	0.45m	No	-	-
8/281	Posthole	0.40m	0.30m	0.45m	8/281	-	-
8/282	Burnt ash layer	3.58m	1.15m	0.10m	8/282	-	-
8/283	Fill of [8/283]	0.40m	0.40m	0.40m	No	-	-
8/284	Posthole	0.40m	0.40m	0.40m	8/284	-	-
8/285	Severely truncated shallow cut	3.28m	1.04m	0.25m	8/285	-	-
8/286	Fill of [8/287]	0.20m	0.20m	0.30m	No	-	-
8/287	Posthole	0.20m	0.20m	0.30m	8/287	-	-
8/288	Fill of [8/288]	0.30m	0.15m	0.22m	No	-	-
8/289	Posthole	0.30m	0.15m	0.22m	8/289	-	-
8/290	Fill of [8/291]	0.38m	0.33m	0.38m	No	-	-
8/291	Posthole	0.38m	0.33m	0.38m	8/291	-	-
8/292	Fill of [8/293]	1.33m	1.28m	0.79m	No	-	-

Context Number	Context Description	Length	Width	Depth	Single Context Plan?	Plan No	Section No.
8/293	Pit cut	1.33m	1.28m	0.79m	8/293	-	-
8/294	Gravel layer	1.40m	0.80m	0.10m	8/294	-	-
8/295	Fill of [8/296]	1.84m	1.12m	0.10m	No	-	-
8/296	Pit cut	1.84m	1.12m	0.10m	8/296	-	-
8/297	Fill of [8/300]	0.35m	0.33m	0.25m	No	-	-
8/298	Silty sand deposit	2.10m	2.00m	0.58m	No	-	4
8/299	Gravel layer	2.50m	2.00m	0.16m	No	-	4
8/300	Posthole	0.35m	0.33m	0.25m	8/300	-	-
8/301	Fill of [8/302]	0.50m	0.36m	0.20m	No	-	-
8/302	Posthole	0.50m	0.36m	0.20m	8/302	-	-
8/303	Burnt clay layer+charcoal	2.30m	1.80m	0.10m	8/303	-	-
8/304	Fill of [8/305]	0.60m	0.40m	0.27m	No	-	-
8/305	Posthole	0.60m	0.40m	0.27m	8/305	-	-
8/306	Daub+charcoal demolition dump	2.60m	1.80m	0.25m	8/306	-	4
8/307	VOID	-	-	-	-	-	-
8/308	Fill of [8/309]	0.50m	0.40m	0.18m	No	-	-
8/309	Posthole	0.50m	0.40m	0.18m	8/309	-	-
8/310	Primary fill of [8/311]	1.50m	1.50m	0.40m	No	-	-
8/311	Pit cut	1.50m	1.50m	0.40m	8/311	-	-
8/312	Fill of [8/313]	0.36m	0.32m	0.20m	No	-	-
8/313	Posthole	0.36m	0.32m	0.20m	8/313	-	-
8/314	Fill of [8/315]	0.40m	0.18m	0.21m	No	-	-
8/315	Posthole	0.40m	0.18m	0.21m	8/315	-	-
8/316	Fill of [8/317]	0.30m	0.30m	0.20m	No	-	-
8/317	Posthole	0.30m	0.30m	0.20m	8/317	-	-
8/318	Gravel layer	2.30m	0.70m	0.15m	8/318	-	-
8/319	Fill of [8/320]	0.43m	0.27m	0.24m	No	-	-
8/320	Posthole	0.43m	0.27m	0.24m	8/320	-	-
8/321	Fill of [8/322]	0.40m	0.23m	0.30m	No	-	-
8/322	Posthole	0.40m	0.23m	0.30m	8/322	-	-
8/323	Silty sand layer	1.40m	1.22m	0.05m	8/323	-	-
8/324	Silty clay layer	5.80m	4.40m	0.10m	8/324	-	-
8/325	Layer	2.60m	2.32m	0.16m	8/325	-	-
8/326	Gravel layer	0.60m	0.50m	0.03m	8/326	-	-
8/327	Burnt layer	1.40m	1.30m	0.05m	8/327	-	-
8/328	Posthole	0.25m	0.20m	0.20m	8/328	-	4
8/329	Fill of [8/328]	0.25m	0.20m	0.20m	No	-	4
8/330	Posthole	0.14m	0.14m	0.18m	8/330	-	-
8/331	Fill of [8/330]	0.14m	0.14m	0.18m	No	-	-
8/332	Gravel layer	1.15m	0.88m	0.04m	8/332	-	-
8/333	Fill of [8/333]	0.48m	0.11m	0.04m	No	-	-
8/334	Small slot	0.48m	0.11m	0.04m	8/334	-	-
8/335	missing						
8/336	Demolition layer	1.45m	1.40m	0.08m	8/336	-	4
8/337	Room Number	-	-	-	-	-	-
8/338	Stakehole	0.08m	0.07m	0.08m	8/338	-	-

Context Number	Context Description	Length	Width	Depth	Single Context Plan?	Plan No	Section No.
8/339	Fill of [8/338]	0.08m	0.07m	0.08m	No	-	-
8/340	Small dump layer	0.50m	0.40m	0.04m	8/340	-	-
8/341	Stakehole	0.10m	0.90m	0.11m	8/341	-	-
8/342	Fill of [8/341]	0.10m	0.90m	0.11m	No	-	-
8/343	Pit cut	1.00m	0.90m	0.20m	8/343		
8/344	Fill of [8/343]	1.00m	0.90m	0.20m	No		
8/345	Gravel deposit	1.25m	1.00m	0.15m	8/345		
8/346	Brick floor	1.70m	0.80m	0.07m	No	9	-
8/347	Brick hearth	2.02m	1.16m	1.40m	No	9	-
8/348	Brick wall	4.10m	1.70m	0.50m	No	9	-
8/349	Apsidal brick structure	1.48m	1.40m	0.30m	No	9	-
8/350	Square brick structure	0.40m	0.33m	0.20m	No	9	-
8/351	Fill of [8/356]	0.42m	0.38m	0.30m	No	-	-
8/532	Posthole	0.42m	0.38m	0.30m	8/356	-	-
8/353	Sandy gravel layer	1.40m	0.90m	0.15m	8/357	-	-
8/354	Sandy gravel layer	6.00m	2.50m	0.15m	8/358	-	-
8/355	Demolition layer	2.40m	0.60m	0.08m	8/359	-	-
8/356	Demolition layer	0.90m	0.40m	0.10m	8/360	-	-
8/357	Demolition layer	1.28m	0.70m	0.08m	8/361	-	-
8/358	Dumped deposit	6.50m	5.00m	0.20m	8/362	-	-
8/359	Gravel layer	0.70m	0.64m	0.06m	8/363	-	-
8/360	Charcoal layer	2.00m	0.68m	0.02m	8/364	-	-
8/361	Linear cut	2.40m	0.60m	0.30m	8/365	-	-
8/362	Layer	2.44m	2.18m	0.17m	8366	-	-
8/363	Dark burnt layer	8.20m	3.42m	0.14m	8367	-	-
8/364	Fill of [8/365]	0.06m	0.06m	0.10m	no	-	-
8/365	Stake hole cut	0.06m	0.06m	0.10m	no	8369	-
8/366	Fill of [8/367]	0.15m	0.11m	0.11m	no	-	-
8/367	Stake hole cut	0.15m	0.11m	0.11m	no	8369	-
8/368	Fill of [8/369]	0.10m	0.08m	0.13m	no	-	-
8/369	Stake hole cut	0.10m	0.08m	0.13m	no	8369	-
8/370	Fill of [8/371]	0.66m	0.21m	0.14m	no	-	-
8/371	Gully cut	0.66m	0.21m	0.14m	no	8369	-
8/372	Fill of [8/373]	0.20m	0.18m	0.08m	no	-	-
8/373	Posthole	0.20m	0.18m	0.08m	no	8369	-
8/374	Fill of [8/375]	0.18m	0.15m	0.06m	no	-	-
8/375	Posthole	0.18m	0.15m	0.06m	no	8369	-
8/376	Fill of [8/377]	0.20m	0.18m	0.08m	no	-	
8/377	Posthole cut	0.20m	0.18m	0.08m	no	8369	
8/378	Fill of [8/379]	0.18m	0.15m	0.06m	no	-	
8/379	Posthole	0.18m	0.15m	0.06m	No	8369	
8/380	Pit cut	1.10m	0.80m	0.15m	8380	-	
8/381	Fill of [8/380]	1.10m	0.80m	0.15m	No	-	-
8/382	Fill of [8/380]	1.10m	0.80m	0.15m	No	-	-
8/383	Pit cut	0.58m	0.36m	0.35m	8/383	-	-
8/384	Fill of [8/383]	0.58m	0.36m	0.35m	No	-	-

Context Number	Context Description	Length	Width	Depth	Single Context Plan?	Plan No	Section No.
8/385	Charcoal+clay layer	2.50m	2.50m	0.10m	8/385	-	-
8/386	Fill of [8/387]	0.08m	0.07m	0.15m	No	-	-
8/387	Stakehole	0.08m	0.07m	0.15m	8/387	-	-
8/388	Occupation layer	9.22m	0.98m	0.16m	8/388	-	-
8/389	Fill of [8/390]	0.07m	0.07m	0.15m	No	-	-
8/390	Stakehole	0.07m	0.07m	0.15m	8/390	-	-
8/391	Dumped layer	1.16m	0.68m	0.06m	8/391	-	-
8/392	Fill of [8/393]	0.40m	0.40m	0.10m	No	-	-
8/393	Posthole	0.40m	0.40m	0.10m	8/393	-	-
8/394	Fill of [8/395]	2.40m	0.36m	0.16m	No	-	-
8/395	Linear cut	2.40m	0.36m	0.16m	8/395	-	-
8/396	Fill of [8/397]	1.20m	1.06m	0.40m	No	-	-
8/397	Pit cut	1.20m	1.06m	0.40m	8/397	-	-
8/398	Layer	3.88m	2.54m	0.07m	8/398	-	-
8/399	Thin sandy layer	6.98m	3.15m	0.01m	No	8/399	-
8/400	missing					-	-
8/401	missing					-	-
8/402	Fill of [8/840]	0.07m	0.07m	0.10m	no	-	-
8/403	Stakehole	0.07m	0.07m	0.10m	8/403	-	-
8/404	Gravel layer	3.04m	2.44m	0.06m	8/404	-	-
8/405	Layer	4.00m	2.46m	0.10m	8/405	-	-
8/406	Layer	3.94m	3.46m	0.03m	8/406	-	-
8/407	Fill of [8/408]	0.40m	0.21m	0.20m	no	-	-
8/408	Posthole	0.40m	0.21m	0.20m	8/408	-	-
8/409	Fill of [8/410]	0.22m	0.18m	0.10m	no	-	-
8/410	Shallow cut, possible posthole	0.22m	0.18m	0.10m	8/410	-	-
8/411	missing					-	-
8/412	missing					-	-
8/413	Posthole	0.30m	0.26m	0.20m	no	8/399	-
8/414	Fill of [8/413]	0.30m	0.26m	0.20m	no	-	-
8/415	Posthole	0.34m	0.25m	0.15m	no	8/399	-
8/416	Fill of [8/415]	0.34m	0.25m	0.15m	no	-	-
8/417	Posthole	0.22m	0.20m	0.14m	no	8/399	-
8/418	Fill of [8/417]	0.22m	0.20m	0.14m	no	-	-
8/419	Posthole	0.30m	0.12m	0.15m	no	8/399	-
8/420	Fill of [8/419]	0.30m	0.12m	0.15m	no	-	-
8/421	Posthole	0.10m	0.08m	0.11m	no	8/399	-
8/422	Fill of [8/421]	0.10m	0.08m	0.11m	no	-	-
8/423	Stakehole	0.09m	0.08m	0.11m	no	8/399	-
8/424	Fill of [8/423]	0.09m	0.08m	0.11m	no	-	-
8/425	missing					-	-
8/426	missing					-	-
8/427	missing					-	-
8/428	missing					-	-
8/429	Fill of [8/430]	0.06m	0.06m	0.09m	No	-	-
8/430	Stakehole	0.06m	0.06m	0.09m	8/430	-	-

Context Number	Context Description	Length	Width	Depth	Single Context Plan?	Plan No	Section No.
8/431	Clay+gravel layer	2.10m	0.40m	0.04m	8/431	-	-
8/432	Burnt layer	5.00m	2.80m	0.05m	8/432	-	-
8/433	Fill of [8/434]	0.24m	0.16m	0.05m	No	-	-
8/434	Posthole	0.24m	0.16m	0.05m	8/434	-	-
8/435	Fill of [8/476]	0.06m	0.04m	0.14m	No	-	-
8/436	Stakehole	0.04m	0.04m	0.07m	No	8/399	-
8/437	Fill of [8/436]	0.04m	0.04m	0.07m	No	-	-
8/438	Stakehole	0.08m	0.06m	0.07m	No	8/399	-
8/439	Fill of [8/438]	0.08m	0.06m	0.07m	No	-	-
8/440	Stakehole	0.05m	0.05m	0.05m	No	8/399	-
8/441	Fill of [8/440]	0.05m	0.05m	0.05m	No	-	-
8/442	Stakehole	0.06m	0.06m	0.06m	No	8/399	-
8/443	Fill of [8/442]	0.06m	0.06m	0.06m	No	-	-
8/444	Stakehole	0.06m	0.05m	0.05m	No	8/399	-
8/445	Fill of [8/444]	0.06m	0.05m	0.05m	No	-	-
8/446	Stakehole	0.05m	0.04m	0.05m	No	8/399	-
8/447	Fill of [8/446]	0.05m	0.04m	0.05m	No	-	-
8/448	Fill of [8/449]	0.06m	0.06m	0.04m	No	-	-
8/449	Stakehole	0.06m	0.06m	0.04m	No	8/399	-
8/450	Fill of [8/451]	0.34m	0.24m	0.13m	No	-	-
8/451	Stakehole	0.34m	0.24m	0.13m	No	8/399	-
8/452	Fill of [8/453]	0.05m	0.05m	0.03m	No	-	-
8/453	Stakehole	0.05m	0.05m	0.03m	No	8/399	-
8/454	Fill of [8/455]	0.05m	0.05m	0.04m	No	-	-
8/455	Stakehole	0.05m	0.05m	0.04m	No	8/399	-
8/456	Fill of [8/457]	0.06m	0.06m	0.08m	No	-	-
8/457	Stakehole	0.06m	0.06m	0.08m	No	8/399	-
8/458	Fill of [8/459]	0.05m	0.05m	0.06m	No	-	-
8/459	Stakehole	0.05m	0.05m	0.06m	No	8/399	-
8/460	Fill of [8/461]	0.05m	0.05m	0.06m	No	-	-
8/461	Stakehole	0.05m	0.05m	0.06m	No	8/399	-
8/462	Fill of [8/463]	0.05m	0.05m	0.03m	No	-	-
8/463	Stakehole	0.05m	0.05m	0.03m	No	8/399	-
8/464	Fill of [8/465]	0.38m	0.36m	0.19m	No	-	-
8/465	Posthole	0.38m	0.36m	0.19m	No	8/399	-
8/466	Fill of [8/467]	0.36m	0.31m	0.27m	No	-	-
8/467	Posthole	0.36m	0.31m	0.27m	No	8/399	-
8/468	Fill of [8/469]	0.36m	0.34m	0.14m	No	-	-
8/469	Posthole	0.36m	0.34m	0.14m	No	8/399	-
8/470	Fill of [8/471]	0.42m	0.40m	0.14m	No	-	-
8/471	Posthole	0.42m	0.40m	0.14m	8/471	-	-
8/472	Ash layer	1.04m	0.80m	0.05m	8/472	-	-
8/473	Debris layer	3.54m	0.40m	0.02m	8/473	-	-
8/474	Stakehole	0.07m	0.05m	0.16m	No	8/399	-
8/475	Fill of [8/847]	0.07m	0.05m	0.16m	No	-	-
8/476	Stakehole	0.06m	0.04m	0.14m	No	8/399	-

Context Number	Context Description	Length	Width	Depth	Single Context Plan?	Plan No	Section No.
8/477	Fill of [8/478]	0.26m	0.11m	0.04m	No	-	-
8/478	Posthole	0.26m	0.11m	0.04m	No	8/399	-
8/479	Fill of [8/480]	0.35m	0.21m	0.16m	No	-	-
8/480	Posthole	0.35m	0.21m	0.16m	No	8/399	-
8/481	Fill of [8/481]	0.25m	0.10m	0.07m	No	-	-
8/482	Posthole	0.25m	0.10m	0.07m	No	8/399	-
8/483	Fill of [8/484]	0.06m	0.06m	0.06m	No	-	-
8/484	Stakehole	0.06m	0.06m	0.06m	No	8/399	-
8/485	Fill of [8/486]	0.05m	0.05m	0.03m	No	-	-
8/486	Stakehole	0.05m	0.05m	0.03m	No	8/399	-
8/487	Fill of [8/488]	0.05m	0.05m	0.06m	No	-	-
8/488	Stakehole	0.05m	0.05m	0.06m	No	8/399	-
8/489	Fill of [8/490]	0.05m	0.05m	0.03m	No	-	-
8/490	Stakehole	0.05m	0.05m	0.03m	No	8/399	-
8/491	Fill of [8/492]	0.08m	0.06m	0.05m	No	-	-
8/492	Stakehole	0.08m	0.06m	0.05m	No	8/399	-
8/493	Fill of [8/494]	0.05m	0.05m	0.02m	No	-	-
8/494	Stakehole	0.05m	0.05m	0.02m	No	8/399	-
8/495	Fill of [8/496]	0.05m	0.05m	0.02m	No	-	-
8/496	Stakehole	0.05m	0.05m	0.02m	No	8/399	-
8/497	Fill of [8/498]	0.06m	0.06m	0.04m	No	-	-
8/498	Stakehole	0.06m	0.06m	0.04m	No	8/399	-
8/499	Fill of [8/500]	0.08m	0.08m	0.08m	No	-	-
8/500	Stakehole	0.08m	0.08m	0.08m	No	8/399	-
8/501	Fill of [8/502]	0.07m	0.06m	0.05m	No	-	-
8/502	Stakehole	0.07m	0.06m	0.05m	No	8/399	-
8/503	Fill of [8/504]	1.10m	1.00m	0.22m	No	-	
8/504	Pit cut	1.10m	1.00m	0.22m	8/504	-	-
8/505	Ash layer	7.00m	5.20m	0.12m	8/505	-	-
8/506	Fill of [8/507]	0.05m	0.05m	0.08m	No	-	-
8/507	Stakehole	0.05m	0.05m	0.08m	No	8/507	-
8/508	Fill of [8/509]	0.06m	0.04m	0.06m	No	-	-
8/509	Stakehole	0.06m	0.04m	0.06m	No	8/507	-
8/510	Fill of [8/511]	0.06m	0.06m	0.05m	No	-	-
8/511	Stakehole	0.06m	0.06m	0.05m	No	8/511	-
8/512	Fill of [8/513]	0.07m	0.07m	0.11m	No	-	-
8/513	Stakehole	0.07m	0.07m	0.11m	No	8/511	-
8/514	Fill of [8/515]	0.10m	0.10m	0.17m	No	-	-
8/515	Stakehole	0.10m	0.10m	0.17m	8/515	-	-
8/516	Fill of [8/517]	0.08m	0.08m	0.17m	No	-	-
8/517	Stakehole	0.08m	0.08m	0.17m	No	8/511	-
8/518	Fill of [8/519]	0.05m	0.05m	0.07m	No	-	-
8/519	Stakehole	0.05m	0.05m	0.07m	No	8/511	-
8/520	Fill of [8/521]	1.86m	1.84m	1.60m	No	-	-
8/521	Pit cut	1.86m	1.84m	1.60m	8/521	-	-
8/522	missing					-	-

Context Number	Context Description	Length	Width	Depth	Single Context Plan?	Plan No	Section No.
8/523	Fill of [8/524]	1.00m	1.00m	0.58m	No	-	-
8/524	Pit cut	1.00m	1.00m	0.58m	8/524	-	-
8/525	Fill of [8/526]	1.94m	1.86m	1.54m	No	-	-
8/526	Pit cut	1.94m	1.86m	1.54m	8/526	-	-
8/527	Fill of [8/528]	0.18m	0.15m	0.15m	No	-	-
8/528	Posthole cut	0.18m	0.15m	0.15m	8/528	-	-
8/529	Fill of [8/530]	0.17m	0.15m	0.28m	No	-	-
8/530	Posthole cut	0.17m	0.15m	0.28m	8/530	-	-
8/531	Firmly compacted light brown sandy clay layer	2.54m	2.10m	0.05m	8/531	-	-
8/532	Firmly compacted grey sandy clay	2.86m	2.20m	0.05m	8/532	-	-
8/533	Fill of [8/534]	0.48m	0.32m	0.17m	No	-	-
8/534	Posthole cut	0.48m	0.32m	0.17m	8/534	-	-
8/535	Fill of [8/536]	2.30m	2.20m	1.30m	No	-	-
8/536	Well cut	2.30m	2.20m	1.30m	8/536	-	-
8/537	Fill of [8/538]	0.82m	0.80m	0.40m	No	-	-
8/538	Well cut	0.82m	0.80m	0.40m	8/538	-	-
8/539	Fill of [8/540]	2.00m	1.20m	0.45m	No	-	-
8/540	Pit cut	2.00m	1.20m	0.45m	8/540	-	-
8/541	Fill of [8/542]	0.40m	0.22m	0.19m	No	-	-
8/542	Posthole cut	0.40m	0.22m	0.19m	8/542	-	-
8/543	Firmly compacted light yellow sandy clay layer	2.76m	1.18m	0.30m	8/543	-	-
8/544	Fill of [8/545]	0.50m	0.44m	0.13m	No	-	-
8/545	Pit cut	0.50m	0.44m	0.13m	8/545	-	-
8/546	Fill of [8/547]	0.24m	0.22m	0.15m	No	-	-
8/547	Posthole cut	0.24m	0.22m	0.15m	8/547	-	-
8/548	Fill of [8/549]	0.21m	0.19m	0.18m	No	-	-
8/549	Posthole cut	0.21m	0.19m	0.18m	8/545	-	-
8/550	Posthole cut	0.43m	0.22m	0.16m	8/550	-	-
8/551	Fill of [8/550]	0.43m	0.22m	0.16m	No	-	-
8/552	Grave cut	1.50m	0.50m	0.20m	8/558	-	-
8/553	Fill of [8/552]	1.50m	0.50m	0.20m	No	-	-
8/554	Fill of [8/555]	1.46m	1.36m	0.96m	No	-	-
8/555	Pit cut	1.46m	1.36m	0.96m	8/555	-	-
8/556	Fill of [8/557]	1.22m	1.10m	0.20m	No	-	-
8/557	Pit cut	1.22m	1.10m	0.20m	8/557	-	-
8/558	Skeleton	1.50m	0.50m	0.20m	8/558	-	-
8/559	Brick wall	5.50m	0.40m	0.25m	No	10 (1+4)	-
8/560	Brick wall	2.46m	0.46m	0.15m	No	10 (1+2)	-
8/561	Brick floor	1.80m	1.75m	0.07m	No	10 (1+2)	-
8/562	Brick wall	5.50m	2.80m	0.80m	No	10 (3)	-
8/563	Brick wall	0.70m	0.50m	1.20m	No	10 (3)	-
8/564	Brick wall	0.90m	0.46m	0.80m	No	10 (2)	-
8/565	Brick wall	2.30m	1.20m	0.20m	No	10 (2)	-

Context Number	Context Description	Length	Width	Depth	Single Context Plan?	Plan No	Section No.
8/566	Brick flue	0.80m	0.45m	0.80m	No	10 (2)	-
8/567	Brick wall	3.40m	0.23m	0.08m	No	10 (2)	-
8/568	Brick wall	1.20m	0.23m	0.60m	No	10 (2)	-
8/569	Cut for cremation 10	0.30m	0.20m	0.15m	8/569	-	-
8/570	Fill of [8/569]	0.30m	0.20m	0.15m	No	-	-
8/571	Fill of [8/572]	1.22m	0.94m	0.28m	No	-	-
8/572	Pit cut	1.22m	0.94m	0.28m	8/572	-	-
8/573	Fill of [8/574]	1.08m	1.06m	0.40m	No	-	-
8/574	Pit cut	1.08m	1.06m	0.40m	8/574	-	-
8/575	Fill of brick-lined drain (8/577)	10.25m	0.84m	0.52m	No	-	-
8/576	Packing fill within cut [8/578]	10.25m	0.84m	0.52m	No	-	-
8/577	Brick-lining for drain cut [8/578]	10.25m	0.84m	0.52m	8/577	-	-
8/578	Post-med drain cut	10.25m	0.84m	0.52m	8/578	-	-
8/579	Firmly compacted mid-grey sandy silt layer	2.20m	0.80m	0.02m	8/579	-	-
8/580	Brick blocking-up of drain (8/577)	0.78m	0.12m	0.52m	8/577	-	-
8/581	Fill within brick-lining (8/583)	1.20m	1.10m	0.76m	No	-	-
8/582	Packing fill within cut [8/584]	1.20m	1.10m	0.76m	No	-	-
8/583	Bricklining for possible soakaway	1.20m	1.10m	0.76m	8/583	-	-
8/584	Cut for possible soakaway	1.20m	1.10m	0.76m	8/584	-	-
8/585	Fill of [8/586]	0.90m	0.30m	0.22m	No	-	-
8/586	Small p-med pit cut	0.90m	0.30m	0.22m	8/586	-	-
8/587	Fill of [8/588]	0.68m	0.27m	0.20m	No	-	-
8/588	Small p-med pit cut	0.68m	0.27m	0.20m	No	11	-
8/589	P-med mid-grey sandy silt layer	1.23m	0.47m	0.02m	8/589	-	-
8/590	Fill of [8/591]	0.70m	0.29m	0.35m	No	-	-
8/591	Small p-med pit cut	0.70m	0.29m	0.35m	No	11	-
8/592	Fill of [8/593]	0.69m	0.40m	0.36m	No	-	-
8/593	Pit cut	0.69m	0.40m	0.36m	No	11	-
8/594	Greyish-green sandy clay layer	0.90m	0.72m	0.05m	8/594	-	-
8/595	Brick-lining for [8/630]	1.20m	0.60m	0.12m	8/595	-	-
8/596	Fill of [8/597]	0.29m	0.27m	0.10m	No	-	-
8/597	Small pit cut	0.29m	0.27m	0.10m	8/597	-	-
8/598	Dump layer	0.80m	0.73m	0.04m	8/598	-	-
8/599	Secondary fill of [8/601]	0.60m	0.40m	0.10m	No	-	-
8/600	Primary fill of [8/601]	0.80m	0.53m	0.06m	No	-	-
8/601	Pit cut	0.80m	0.53m	0.16m	8/601	-	-
8/602	P-med pit cut	1.40m	1.40m	0.35m	8/602	-	-
8/603	Fill of [8/602]	1.40m	1.40m	0.35m	No	-	-
8/604	Deep pit/well cut	1.15m	1.10m	1.40m+	8/604	-	-
8/605	Latest fill of [8/604]	1.15m	1.10m	0.50m	No	-	-
8/606	Dump layer	3.60m	2.60m	0.15m	8/606	-	-
8/607	Fill of brick structure (8/607)	1.60m	0.60m	0.75m	No	-	-
8/608	Deep p-med brick structure	2.00m	0.80m	0.75m+	8/608	-	-

Context Number	Context Description	Length	Width	Depth	Single Context Plan?	Plan No	Section No.
8/609	P-med cut for (8/608)	2.00m	0.80m	0.80m+	8/609	-	-
8/610	Fill of (8/595)	1.20m	0.30m	0.12m	No	-	-
8/611	Fill of pit [8/604]	1.15m	1.10m	0.10m	No	-	-
8/612	Fill of pit [8/604]	1.15m	1.10m	0.10m	No	-	-
8/613	Fill of pit [8/604]	1.15m	1.10m	0.30m	No	-	-
8/614	Fill of pit [8/604]	1.15m	1.10m	0.20m	No	-	-
8/615	Secondary fill of [8/617]	2.18m	2.18m	0.55m	No	-	-
8/616	Primary fill of [8/617]	1.96m	1.96m	0.80m	No	-	-
8/617	Pit cut	2.18m	2.18m	1.35m	8/617	-	-
8/618	Secondary fill of [8620]	1.15m	1.12m	0.45m	No	-	-
8/619	Primary fill of [8/620]	1.15m	1.08m	0.65m	No	-	-
8/620	Cut of possible well	1.15m	1.12m	1.10m+	8/620	-	-
8/621	Fill of [8/622]	0.60m	0.50m	0.35m	No	-	-
8/622	P-med pit cut	0.60m	0.50m	0.35m	8/622	-	-
8/623	Linear cut	3.00m	0.28m	0.15m	No	11	-
8/624	Fill of [8/623]	3.00m	0.28m	0.15m	No	-	-
8/625	Sub-rectangular cut	1.60m	0.68m	0.50m	8/625	-	-
8/626	Fill of [8/625]	1.60m	0.68m	0.50m	No	-	-
8/627	Sandy clay layer	2.28m	2.16m	0.16m	8/627	-	-
8/628	Gravelly clay layer	2.44m	1.40m	0.08m	8/628	-	-
8/629	Packing fill within [8/630]	1.90m	0.90m	0.13m	No	-	-
8/630	Cut for p-med water channel	1.90m	0.90m	0.13m	No	11	-
8/631	Fill of [8/632]	1.48m	0.90m	0.50m	No	-	-
8/632	P-med pit cut	1.48m	0.90m	0.50m	No	11	-
8/633	Fill of [8/634]	1.80m	0.80m	0.11m	No	-	-
8/634	P-med linear cut	1.80m	0.80m	0.11m	No	11	-
8/635	Fill of [8/636]	0.88m	0.86m	0.32m	No	-	-
8/636	P-med pit cut	0.88m	0.86m	0.32m	8/636	-	-
8/637	Fill of [8/638]	1.22m	0.67m	0.56m	No	-	-
8/638	Sub-circular pit cut	1.22m	0.67m	0.56m	8/638	-	-
8/639	Mixed gravel layer			0.10m	8/639	-	-
8/640	Fill of [8/641]	0.80m	0.64m	0.40m	No	-	-
8/641	Pit cut	0.80m	0.64m	0.40m	8/641	-	-
8/642	Layer of burning debris	1.30m	0.94m	0.10m	8/642	-	-
8/643	Fill of [8/645]	1.00m	0.70m	0.15m	No	-	7
8/644	Dumped fill in [8/645]	0.80m	0.70m	0.04m	No	-	7
8/645	Pit cut	2.26m	0.80m	0.60m	8/645	-	7
8/646	Layer of burning debris	3.00m	2.40m	0.06m	8/646	-	-
8/647	Gravel layer	4.32m	2.40m	0.10m	8/647	-	-
8/648	Fill of [8/645]	0.40m	0.30m	0.25m	No	-	-
8/649	Fill of [8/645]	0.86m	0.70m	0.05m	No	-	-
8/650	Fill of [8/651]	0.24m	0.20m	0.09m	No	-	-
8/651	Posthole	0.24m	0.20m	0.09m	8/651	-	-
8/652	Fill of [8/653]	0.35m	0.35m	0.18m	No	-	-
8/653	Posthole	0.35m	0.35m	0.18m	8/651	-	-
8/654	Fill of [8/658]	1.27m	1.30m	0.40m	No	-	-

Context Number	Context Description	Length	Width	Depth	Single Context Plan?	Plan No	Section No.
8/655	Grey clayey silt layer	5.96m	4.00m	0.15m	8/655	-	-
8/656	Grey sandy silt layer	10.58m	2.60m	0.35m	8/656	-	-
8/657	Grey sandy silt layer	8.40m	2.50m	0.30m	8/657	-	-
8/658	Well cut	1.30m	1.27m	1.10m+	8/658	-	-
8/659	Fill of [8/663]	2.40m	2.20m	1.00m	No	-	6+7
8/660	Fill of [8/663]	2.00m	1.75m	0.12m	No	-	6
8/661	Fill of [8/663]	0.65m	0.65m	0.75m	No	-	6
8/662	Fill of [8/663]	1.25m	1.00m	0.20m	No	-	6
8/663	Possible rubbish pit cut	2.48m	2.20m	1.20m	8/663	-	6+7
8/664	Fill of [8/665]	0.36m	0.27m	0.14m	No	-	-
8/665	Posthole	0.36m	0.27m	0.14m	8/651	-	-
8/666	Fill of [8/667]	0.38m	0.22m	0.10m	No	-	-
8/667	Posthole	0.38m	0.22m	0.10m	8/651	-	-
8/668	Fill of [8/669]	1.34m	0.82m	0.30m	No	-	-
8/669	Pit cut	1.34m	0.82m	0.30m	8/669	-	-
8/670	Fill of [8/671]	1.66m	1.56m	0.32m	No	-	-
8/671	Possible rubbish pit cut	1.66m	1.56m	0.32m	8/671	-	-
8/672	Fill of [8663]	0.50m	0.50m	0.12m	No	-	6
8/673	Redeposited natural layer	2.40m	1.30m	0.10m	8/673	-	-
8/674	Fill of [8/675]	0.50m	0.47m	0.41m	No	-	-
8/675	Pit cut	0.50m	0.47m	0.41m	8/675	-	-
8/676	Fill of [8/677]	0.36m	0.27m	0.14m	No	-	-
8/677	Pit cut	0.36m	0.27m	0.14m	8/677	-	-
8/678	Fill of [8/679]	0.20m	0.18m	0.10m	No	-	-
8/679	Posthole	0.20m	0.18m	0.10m	8/679	-	-
8/680	Fill of [8/681]	0.50m	0.45m	0.11m	No	-	-
8/681	Pit cut	0.50m	0.45m	0.11m	8/681	-	-
8/682	Redeposited brickearth layer	1.90m	1.90m	0.08m	8/682	-	-
8/683	Fill of [8/684]	1.02m	0.86m	0.23m	No	-	-
8/684	Pit cut	1.02m	0.86m	0.23m	8/684	-	-
8/685	Fill of [8/686]	0.22m	0.16m	0.44m	No	-	-
8/686	Posthole	0.22m	0.16m	0.44m	8/686	-	-
8/687	Fill of [8/688]	0.26m	0.25m	0.28m	No	-	-
8/688	Posthole	0.26m	0.25m	0.28m	8/688	-	-
8/689	Fill of [8/690]	0.09m	0.09m	0.18m	No	-	-
8/690	Posthole	0.09m	0.09m	0.18m	8/690	-	-
8/691	Redeposited natural layer	3.60m	2.50m	0.10m	8/691	-	-
8/692	Redeposited clay layer	1.94m	0.60m	0.08m	8/692	-	-
8/693	Fill of [8/694]	0.28m	0.26m	0.15m	No	-	-
8/694	Sub-circular pit cut	0.28m	0.26m	0.15m	8/694	-	-
8/695	Fill of [8/696]	0.28m	0.28m	0.29m	No	-	-
8/696	Posthole	0.28m	0.28m	0.29m	8/696	-	-
8/697	Fill of [8/698]	0.08m	0.08m	0.10m	No	-	-
8/698	Stakehole	0.08m	0.08m	0.10m	8/694	-	-
8/699	Grave cut	1.50m	0.90m	0.46m	8/700	-	-
8/700	Skeleton	?	?	?	8/700	-	-

Context Number	Context Description	Length	Width	Depth	Single Context Plan?	Plan No	Section No.
8/701	Primary grave fill			0.12m		-	-
8/702	Fill of [8/699]			0.40m		-	-
8/703	Fill of [8/704]	0.04m	0.04m	0.07m	No	-	-
8/704	Stakehole	0.04m	0.04m	0.07m	No	[8/696]	-
8/705	Fill of [8/706]	0.05m	0.05m	0.07m	No	-	-
8/706	Stakehole	0.05m	0.05m	0.07m	No	[8/696]	-
8/707	Sandy layer	2.85	-	0.34m	8/707	-	8
8/708	Organic layer	0.85m	-	0.15m	No	-	8
8/709	natural layer				No	-	8
8/710	Gravelly, sandy layer	1.02m	1.02m	0.03m	No	8/710	-
8/711	Fill of [8/712]	0.10m	0.08m	0.15m	No	-	-
8/712	Stakehole	0.10m	0.08m	0.15m	No	8/710	-
8/713	Fill of [8/714]	0.08m	0.08m	0.12m	No	-	-
8/714	Stakehole	0.08m	0.08m	0.12m	No	8/710	-
8/715	Fill of [8/716]	0.08m	0.08m	0.07m	No	-	-
8/716	Stakehole	0.08m	0.08m	0.07m	No	8/716	-
8/717	Fill of [8/718]	0.07m	0.07m	0.06m	No	-	-
8/718	Stakehole	0.07m	0.07m	0.06m	No	8/716	-
8/719	Dumped levelling layer	0.60m	0.42m	0.05m	8/719	-	-
8/720	Fill of [8/721]	0.68m	0.66m	0.13m	No	-	-
8/721	Sahllow pit	0.68m	0.66m	0.13m	No	8/721	-
8/722	Fill of [8/723]	0.06m	0.06m	0.06m	No	-	-
8/723	Stakehole	0.06m	0.06m	0.06m	No	8/721	-
8/724	Fill of [8/724]	0.08m	0.08m	0.08m	No	-	-
8/725	Posthole	0.08m	0.08m	0.08m	No	8/721	-
8/726	Fill of [8/727]	0.22m	0.22m	0.15m	No	-	-
8/727	Posthole	0.22m	0.22m	0.15m	8/727	-	-
8/728	Sandy layer	0.80m	0.50m	0.06m	8/728	-	-
8/729	Fill of [8/730]	0.55m	0.39m	0.45m	No	-	-
8/730	Pit	0.55m	0.39m	0.45m	No	8/730	-
8/731	Fill of [8/732]	0.47m	0.40m	0.30m	No	-	-
8/732	Pit	0.47m	0.40m	0.30m	No	8/730	-
8/733	Burnt layer	0.20m	0.15m	0.02m	8/733	-	-
8/734	Ashy layer/lens	0.25m	0.20m	0.04m	8/734	-	-
8/735	Linear masonary structure	4.50m	0.60m	0.15m	8/735	-	-
8/736	Rectangular brick structure	1.80m	1.55m	0.25m	No	8/736	-
8/737	Fill of [8/790]	1.60m	1.60m	0.22m	No	-	-
8/738	Fill of [8/790]	1.90m	1.90m	0.16m	No	-	-
8/739	Fill of [8/740]	4.80m??	0.65m	0.10m	No	-	-
8/740	Pit	4.80m??	0.65m	0.10m	8/740	-	-
8/741	Construction cut for [8/736]	1.80m	1.50m	0.30m	No	8/736	-
8/742	Fill of [8/736]	0.50m	0.50m	0.30m	No	8/736	-
8/743	Fill of [8/736]	0.50m	0.50m	0.30m	No	8/737	-
8/744	Square red brick structure	0.22m	0.10m	0.08m	:?	-	-
8/745	Fill of [8/?]	1.55m	1.55m	2.5m	No	-	-
8/746	Brick soakaway	2.20m	1.80m	2.44m	No	13	-

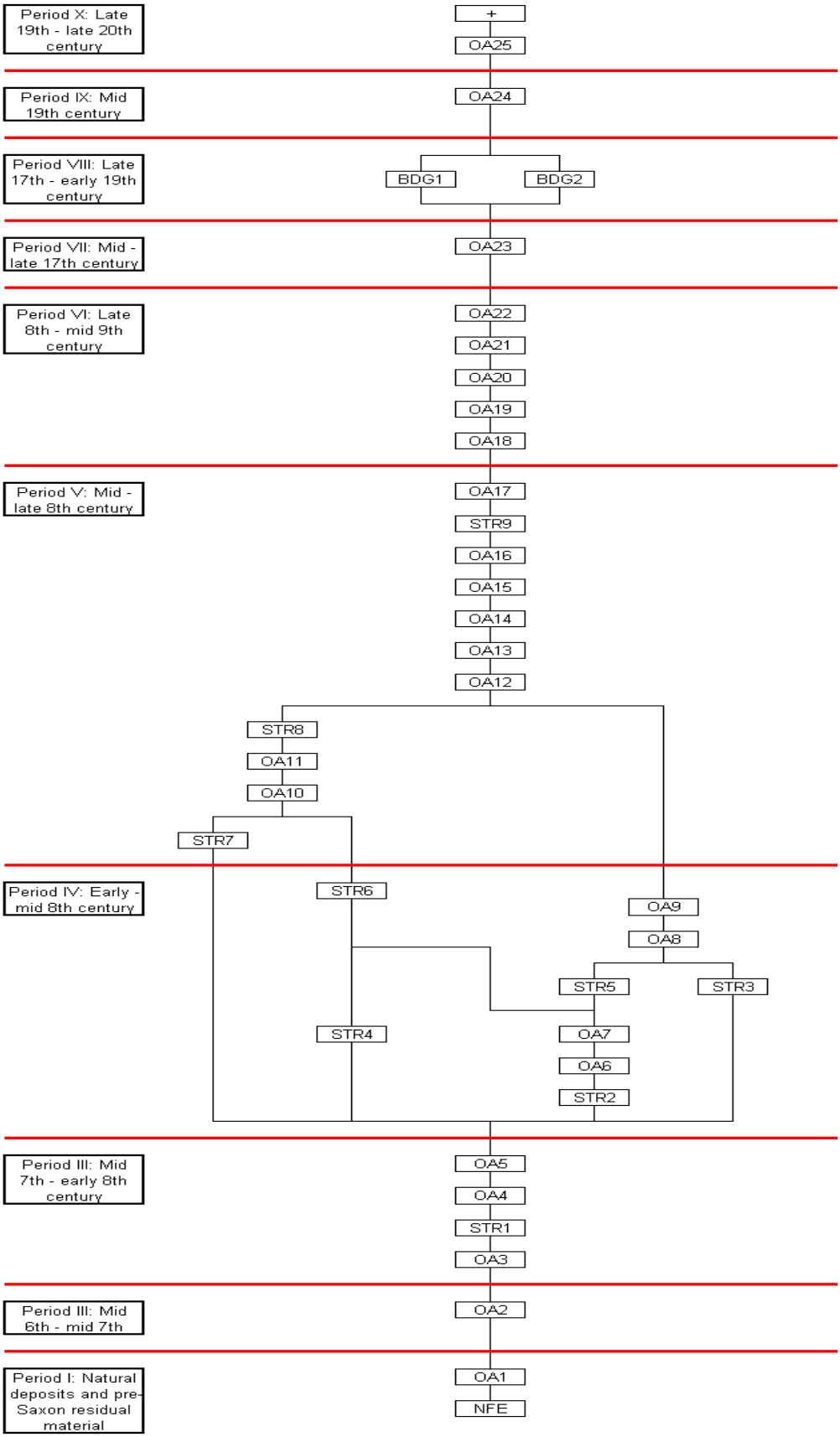
Context Number	Context Description	Length	Width	Depth	Single Context Plan?	Plan No	Section No.
8/747	Fill of [8/790]	2.37m	2.30m	0.80m	No	-	-
8/748	Red brick channel	1.10m	0.70m	0.35m	No	13	-
8/749	Fill of [8/751]	1.15m	0.30m	0.20m	No	-	-
8/750	Fill of [8/751]	1.15m	0.30m	0.20m	No	13	-
8/751	Post med drain	9.80m	0.78m	0.40m	No	13	-
8/752	Amended brick alteration to drain	0.60m	0.10m	0.10m	No	13	-
8/753	Brick drain	2.22m	0.42m	0.40m	No	13	-
8/754	Support timber beam for [8/746]	0.45m	0.15m	-	No	13	-
8/755	Support timber beam for [8/746]	1.00m	0.14m	-	No	13	-
8/756	Fill of [8/758]	0.70m	0.60m	0.45m	No	-	-
8/757	Fill of [8/758]	1.44m	1.22m	1.43m	No	-	-
8/758	Well cut	1.44m	1.22m	1.43m	8/758	-	-
8/759	Brick channel/flue	1.55m	0.46m	0.20m	No	13	-
8/760	Mixed layer	4.30m	3.40m	0.15m	8/760	-	-
8/761	Post med trample layer	2.70m	1.50m	0.10m	8/761	-	-
8/762	Fill of [8/753]	2.22m	0.42m	0.40m	No	-	-
8/763	Fill of [8/764]	1.70m	1.60m	1.60m	No	-	-
8/764	Large pit	1.70m	1.60m	1.60m	8/764	-	-
8/765	Silt clay layer	3.60m	1.70m	0.20m	8/765	-	-
8/766	Fill of [8/767]	1.50m	1.45m	1.10m	8/767	-	-
8/767	Well cut	1.50m	1.45m	1.10m	8/767	-	-
8/768	Post-med drain cut	1.90m	0.66m	0.13m	No	14	-
8/769	Fill of [8/768]	1.90m	0.66m	0.13m	No	-	-
8/770	Fill of [8/764]	1.70m	1.60m	1.60m	No	-	-
8/771	Mixed layer	2.20m	1.00m	0.06m	8/771	-	-
8/772	Fill of [8/785]	0.64m	-	0.17m	No	-	9
8/773	Fill of [8/772]	0.51m	-	0.04m	No	-	9
8/774	Fill of [8/785]	0.46m	-	0.03m	No	-	9
8/775	Fill of [8/785]	0.55m	-	0.09m	No	-	9
8/776	Fill of [8/785]	0.50m	-	0.10m	No	-	9
8/777	Fill of [8/785]	1.24m	-	0.19m	No	-	9
8/778	Fill of [8/785]	1.25m	-	0.69m	No	-	9
8/779	Fill of [8/785]	0.31	-	0.21m	No	-	9
8/780	Fill of [8/785]	0.47m	-	0.25m	No	-	9
8/781	Fill of [8/785]	0.59m	-	0.20m	No	-	9
8/782	Fill of [8/785]	0.56m	-	0.07m	No	-	9
8/783	Fill of [8/785]	1.54m	-	0.35m	No	-	9
8/784	Fill of	1.64m	?		No	-	-
8/785	Well cut	1.64m	?	1.68m	8/785	-	9
8/786	Gravel layer	?	?	0.15m	8/786	-	-
8/787	Clean clay layer	1.90m	1.80m	0.15m	8/787	-	-
8/788	Yellow gravel layer	0.98m	0.82m	0.05m	8/788	-	-
8/789	Grey sand silt layer	6.60m	5.20m	0.20m	8/789	-	-
8/790	Pit cut	2.37m	2.30m	0.81m	8/790	-	-
8/791	Green silt layer	2.00m	1.50m	0.08m	8/791	-	-

Context Number	Context Description	Length	Width	Depth	Single Context Plan?	Plan No	Section No.
8/792	Fill of [8/793]	0.32m	0.26m	0.07m	8/793	-	-
8/793	Posthole	0.32m	0.26m	0.07m	8/793	-	-
8/794	Cut for post-med drain	?	?	?	?	-	-
8/795	Cut for post-med brick structure	?	?	?	?	-	-
8/796	Gravel clay layer	1.70m	1.40m	0.10m	8/796	-	
8/797	Fill of [8/798]	1.90m	1.40m	0.33m	No	-	-
8/798	Pit cut	1.90m	1.40m	0.33m	8/798	-	-
8/799	Sand silt layer	6.40m	4.40m	0.20m	8/799	-	-
8/800	Grey layer	7.60m	4.70m	0.20m	8/800		-
8/801	Secondary fill of [8/803]	2.00m	1.12m	0.73m	No	-	-
8/802	Primary fill of [8/803]	0.80m	0.50m	0.39m	No	-	-
8/803	Rubbish pit cut	2.00m	1.12m	0.98m	8/803	-	-
8/804	Grey sandy silt layer	3.00m	1.40m	0.20m	8/804	-	-
8/805	Latest fill of [8/808]	1.60m	0.40m	0.03m	No	-	-
8/806	Secondary fill of [8/808]	2.12m	0.22m	0.05m	No	-	-
8/807	Primary fill of [8/808]	3.00m	0.60m	0.14m	No	-	-
8/808	Possible linear cut	3.00m	0.60m	0.14m	8/808	-	-
8/809	Sandy clay layer	1.60m	0.90m	0.04m	8/809	-	-
8/810	Sandy silt layer	1.40m	0.90m	0.12m	8/810	-	-
8/811	Yellow/brown silty sand layer	0.36m	0.32m	0.12m	8/811	-	-
8/812	Fill of [8/813]	0.70m	0.47m	0.07m	No	-	-
8/813	Possible beam slot	0.70m	0.47m	0.07m	8/813	-	-
8/814	Pit cut	0.70m	0.70m	0.28m	8/814	-	-
8/815	Secondary fill of [8/814]	0.70m	0.70m	0.18m	No	-	-
8/816	Fill of [8/817]	0.08m	0.08m	0.13m	No	-	-
8/817	Stakehole cut	0.08m	0.08m	0.13m	8/817	-	-
8/818	Fill of [8/819]	0.12m	0.12m	0.16m	No	-	-
8/819	Stakehole cut	0.12m	0.12m	0.16m	8/817	-	-
8/820	Fill of [8/821]	0.07m	0.07m	0.15m	No	-	-
8/821	Stakehole cut	0.07m	0.07m	0.15m	8/821	-	-
8/822	Fill of [8/823]	0.13m	0.11m	0.13m	No	-	-
8/823	Stakehole cut	0.13m	0.11m	0.13m	8/821	-	-
8/824	Fill of [8/825]	0.12m	0.09m	0.14m	No	-	-
8/825	Stakehole cut	0.12m	0.09m	0.14m	8/821	-	-
8/826	Fill of [8/827]	0.10m	0.08m	0.12m	No	-	-
8/827	Stakehole cut	0.10m	0.08m	0.12m	8/821	-	-
8/828	Pit cut containing cremations 38 + 39	1.30m	1.10m	0.20m	8/828	-	-
8/829	Fill of [8/828]	1.30m	1.10m	0.20m	No	-	-
8/830	Spread of silty sand	1.47m	0.78m	0.11m	8/830	-	-
8/831	Discoloured natural deposit	7.60m	3.00m	0.20m	No	PX	-
8/832	Fill of [8/833]	0.28m	0.26m	0.26m	No	-	-
8/833	Pit cut	0.28m	0.26m	0.26m	8/833	-	-
8/834	Discoloured natural deposit	2.70m	1.90m	0.19m	8/834	-	-
8/835	Brown silty clay layer	2.22m	1.64m	0.05m	8/835	-	-
8/836	Fill of [8/837]	2.08m	0.65m	0.19m	No	-	-

Context Number	Context Description	Length	Width	Depth	Single Context Plan?	Plan No	Section No.
8/837	Pit cut	2.08m	0.65m	0.19m	8/837	-	-
8/838	Fill of [8/839]	0.12m	0.10m	0.10m	No	-	-
8/839	Pit cut containing cremation 41	0.12m	0.10m	0.10m	8/839	-	-
8/840	Fill of [8/841]	0.24m	0.10m	0.03m	No	-	-
8/841	Pit cut containing cremation 42	0.24m	0.10m	0.03m	8/839	-	-
8/842	Fill of [8/843]	0.47m	0.37m	0.10m	No	-	-
8/843	Pit cut	0.47m	0.37m	0.10m	8/843	-	-
8/844	Fill of [8/845]	0.14m	0.10m	0.30m	No	-	-
8/845	Posthole cut	0.14m	0.10m	0.30m	8/845	-	-
8/846	Green silty clay layer	4.90m	3.06m	0.15m	8/846	-	-
8/847	Primary fill of [8/814]	0.30m	0.30m	0.05m	No	-	-
8/848	Pit cut	0.30m	0.25m	0.28m	8/848	-	-
8/849	Fill of [8/848]	0.30m	0.25m	0.28m	No	-	-
8/850	Pit cut	0.80m	0.40m	0.12m	8/850	-	-
8/851	Fill of [8/850]	0.80m	0.40m	0.12m	No	-	-
8/852	Grey sandy silt layer			0.15m	8/852	-	-
8/853	Fill of [8/854]	0.30m	0.13m	0.08m	No	-	-
8/854	Pit cut for cremation 45	0.30m	0.13m	0.08m	8/854	-	-
8/855	Fill of vessel 46	0.38m	0.24m	0.25m	No	-	-
8/856	Pit cut for cremation 46	0.38m	0.24m	0.25m	8/856	-	-
8/857	Burnt deposit	0.78m	0.50m	0.02m	8/857	-	-
8/858	Fill of [8/859]	0.25m	0.21m	0.28m	No	-	-
8/859	Pit cut for cremation 47	0.25m	0.21m	0.28m	8/859	-	-
8/860	Discoloured natural deposit	8.30m	1.98m	0.25m	No	PX	-
8/861	Discoloured natural deposit	7.04m	6.95m	0.28m	No	PX	-
8/862	Natural brickearth	Area	Area	0.60m	No	PX	-
8/863	Primary fill of [8/758]	0.91m	0.91m	0.37m	No	-	-
8/864	Linear cut for p-med wall (8/071)	3.36m	0.30m	0.40m	No	4	-
8/865	Fill of [8/198]	2.20m	1.06m	0.20m+	No	-	-
8/866	Fill of [8/856]	0.38m	0.24m	0.25m	No	-	-
8/867	Fill of cremation vessel 38	0.10m	0.10m	0.14m	8/828	-	-
8/868	Fill of cremation vessel 39				8/828	-	-

Appendix X – Landuse Matrix

Please note – The Open Area and Structure numbers in the Landscape matrix are as defined in the Assessment report. The Structure numbers have been changed for the publication.


Period X: Late 19th - late 20th century
Period IX: Mid 19th century
Period VIII: Late 17th - early 19th century
Period VII: Mid - late 17th century
Period VI: Late 8th - mid 9th century
Period V: Mid - late 8th century
Period IV: Early - mid 8th century
Period III: Mid 7th - early 8th century
Period III: Mid 6th - mid 7th
Period I: Natural deposits and pre-Saxon residual material
+
OA25
OA24
BDG1
BDG2
OA23
OA22
OA21
OA20
OA19
OA18
OA17
STR9
OA16
OA15
OA14
OA13
OA12
STR8
OA11
OA10
STR7
STR6
STR4
OA9
OA8
STR5
STR3
OA7
OA6
STR2
OA5
OA4
STR1
OA3
OA2
OA1
NFE

Appendix Y – OASIS Form

OASIS ID: aocarcha1-25631

Project details

Project name	London's Transport Museum, Covent Garden, City of Westminster: A Post-Excavation Assessment
Short description of the project	Between June and October 2005 a programme of archaeological work was undertaken by AOC Archaeology Group at London's Transport Museum on behalf of Wates Group. The work was carried out ahead of the scheme to extend the museum basement and comprised an initial watching brief on seven pile holes, followed by a full excavation of the area affected by the development. The earliest archaeological features were dated to the Early Saxon period (mid 6th to early 7th centuries) and consisted of two inhumation and nine cremation burials cut into the natural deposits, concentrated in the southwest part of the site. Several grave goods were retrieved from one inhumation burial including approximately 19 amber beads from a necklace and an oval loop and cello-shaped shield buckle. By the early to mid 7th century the area of the site was abandoned as a burial ground, probably as a result of the settlement of Lundenwic expanding in a northerly direction. Between the early to mid 8th century occupation of the site occurred and was represented by a series of large waste pits, wells and stake and postholes. Dumped deposits of burnt debris were also prevalent towards the mid 8th century. A series of gravel layers dating to the mid to late 8th centuries probably represented yard or alley surfaces. From the late 8th to the mid 9th century a series of dumped deposits and waste pits were the latest evidence for Saxon activity on the site. Truncating the Saxon deposits were substantial postmedieval drains, pits and walls. These were the remnants of the late 17th and 18th century basements and their associated features.
Project dates	Start: 21-03-2005 End: 07-10-2005
Previous/future work	Yes / No
Any associated project reference codes	LTM03 - Sitecode
Type of project	Recording project
Site status	Conservation Area
Site status (other)	Area of Archaeological Priority
Current Land use	Other 2 - In use as a building
Significant Finds	POTTERY Early Medieval
Significant Finds	ANIMAL BONE Early Medieval
Significant Finds	POTTERY Post Medieval
Significant Finds	ANIMAL BONE Post Medieval
Investigation type	'Full excavation','Watching Brief'
Prompt	Direction from Local Planning Authority - PPG16

Project location

Country	England
Site location	GREATER LONDON CITY OF WESTMINSTER CITY OF WESTMINSTER London's Transport Museum, Covent Garden, City of Westminster
Postcode	WC2E 7BB
Study area	430.00 Square metres
Site coordinates	TQ 3042 8085 51.5110078744 -0.120384175022 51 30 39 N 000 07 13 W Point
Height OD	Min: 16.55m Max: 16.90m

Project creators

Name of Organisation	AOC Archaeology Group
Project brief originator	Contractor (design and execute)
Project design originator	AOC Archaeology Group
Project director/manager	Ron Humphrey
Project supervisor	Andy Leonard
Type of sponsor/funding body	Developer
Name of sponsor/funding body	London's Transport Museum

Project archives

Physical Archive recipient	Museum of London
Physical Archive ID	LTM03
Physical Contents	'Animal Bones','Ceramics','Environmental','Glass','Human Bones','Metal','Worked bone'
Physical Archive notes	Archive to be stored at AOC Archaeology until completion of project
Digital Archive recipient	Museum of London
Digital Archive ID	LTM03
Digital Contents	'Stratigraphic','Survey'
Digital Media available	'Images raster / digital photography','Images vector','Spreadsheets','Text'
Digital Archive	Archive to be stored at AOC Archaeology until completion of project

notes	
Paper Archive recipient	Museum of London
Paper Archive ID	LTM03
Paper Contents	'Stratigraphic','Survey'
Paper Media available	'Context sheet','Manuscript','Map','Matrices','Microfilm','Photograph','Plan','Report','Section','Survey','Unpublished Text'
Paper Archive notes	Archive to be stored at AOC Archaeology until completion of project

Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)
Title	An Archaeological Evaluation at London Transport Museum, Covent Garden WC2.
Author(s)/Editor(s)	Stevens, T.
Date	2001
Issuer or publisher	AOC Archaeology Group
Place of issue or publication	AOC Archaeology Group
Description	A4 bound document

Project bibliography 2

Publication type	Grey literature (unpublished document/manuscript)
Title	An Archaeological Watching Brief at London Transport Museum, Covent Garden, London WC2E 7BB
Author(s)/Editor(s)	Fitz, P.
Date	2003
Issuer or publisher	AOC Archaeology
Place of issue or publication	AOC Archaeology
Description	A4 bound document

Project bibliography 3

Publication type	Grey literature (unpublished document/manuscript)
Title	An Archaeological Impact Assessment of London Transport Museum, Covent Garden, City of Westminster

Author(s)/Editor(s)	Hemley, S.
Date	2003
Issuer or publisher	AOC Archaeology
Place of issue or publication	AOC Archaeology
Description	A4 bound document

Project bibliography 4

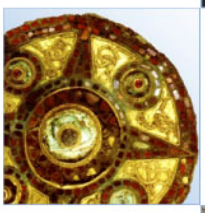
Publication type	Grey literature (unpublished document/manuscript)
Title	London's Transport Museum, Covent Garden, City of Westminster: Archaeological Excavation - Project Design
Author(s)/Editor(s)	Humphrey, R.
Author(s)/Editor(s)	Beasley, M.
Date	2004
Issuer or publisher	AOC Archaeology
Place of issue or publication	AOC Archaeology
Description	A4 bound document

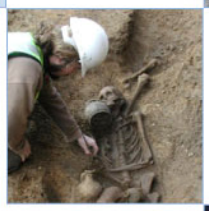
Project bibliography 5

Publication type	Grey literature (unpublished document/manuscript)
Title	London's Transport Museum, Covent Garden, City of Westminster - A Post-Excavation Assessment Report
Author(s)/Editor(s)	Leonard, A.
Date	2007
Issuer or publisher	AOC Archaeology Group
Place of issue or publication	AOC Archaeology Group
Description	A4 bound document

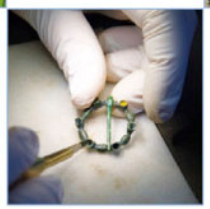
Entered by	Andy Leonard (andyleonard@aocarchaeology.co.uk)
Entered on	27 March 2007











AOC Archaeology Group

AOC Archaeology Group, Unit 7, St Margarets Business Centre, Moor Mead Road, Twickenham TW1 1JS
tel: 020 8843 7380 | **fax:** 020 8892 0549 | **e-mail:** london@aocarchaeology.com