THE POST-ROMAN POTTERY: ONLINE REPORT

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PREVIOUS STUDIES

A few sherds from the abbey were published prior to the 1980s: the Saintonge polychrome jug appeared on John Hurst's lists of imported pottery, compiled in the 1960s and later,[1] and Rahtz included two spouts in his review of Anglo-Saxon pottery from Somerset.[2] It was, however, only in the early 1990s that the entire collection was examined by one of the writers (OK).[3] At that stage an attempt was made to track down all the elements of the collection, parcels of which had been dispersed to English Heritage, the British Museum, the Museum of London and elsewhere. The project led on to publication of a selection of the most interesting pieces, emphasising the early medieval sherds, the imports and the medieval wares with unusual functions.[4] That paper has formed the starting point for the present report; in the light of new petrological and chemical analyses, its sections dealing with the Anglo-Saxon and imported wares have now been superseded, but the discussion of the specialist forms and highly decorated pottery are repeated here, slightly abbreviated, in the online report. For the sake of comprehensive coverage, a note discussing an unusual jug with lettering, likewise slightly abbreviated, is also republished there.[5] Finally, the South Netherlands maiolica, and the Spanish and Italian wares, have received consideration when these classes of ceramics were the subject of regional reviews.[6]

Regarding earlier studies in the region, Philip Rahtz's pioneering analysis and publication of the late Saxon and Norman pottery at Cheddar, only 15km to the north, remains of fundamental importance.[7] The other key local study is Alejandra Gutiérrez' fine report on the ceramics from Shapwick, which offers a remarkably full picture of the pattern of pottery consumption on one of the abbey's rural manors from the late Saxon period into the nineteenth century.[8] It offers revealing contrasts with the finds from the abbey.

CATALOGUE OF ILLUSTRATED VESSELS

If no context information is provided for an object it should be presumed that its precise provenance is lost.

Post-Roman imported wares

1–17. Sherds of LRA1 (Late Roman Amphora 1), nos 14 and 17 with internal coat probably representing pitching; all discussed by R. McBride in main text.

Late Saxon Winchester ware

By Katherine Barclay

Ten sherds of glazed ware were compared with Winchester Ware (WW) included in the defining study of the type[9] and are of sub-fabric MSR (the commonest variant found in Winchester, with smaller sand temper to *c*. 0.5mm). They are from at least five vessels. Three (18, 19, 20a) are illustrated in the text of the published report.

18. Body sherd probably from the shoulder of a pitcher, from beside the springing of a handle or spout. Decoration consists of a horizontal cordon with vertical to diagonal notching thus – \\\\\, bordered by three rows of incised parallel lines below, and at least two above. At the site of the springing, below and to the left, these meet at least three rows of not quite vertical incised lines. The lines may be forming the border of a panel. Parallel to and inside both remaining borders of the surmised panel are two rows of stamped circles.

    A body sherd from Winchester (CY rf [1900]) has decoration very like no. 18, with carefree circles below two, or perhaps three, parallel, horizontal, incised lines. It is of fabric MOF, source unknown (but not WW), and is from a vessel of similar diameter to no. 18. It is from an early twelfth-century construction deposit of the castle preliminaries. (Accession 1991/164).

19. Body sherd, glaze (though thicker), fabric and decoration as 1), though the stamped circles are bigger, the lines are neater, and notably, the notching is in the opposite direction – ////. The surface of the sherd is damaged, and the circles

within the centre of the panel remain only as impressions. (P188, no provenance details.)

Plain body sherds from a different vessel:

20a. (Figured). Three plain glazed sherds including no. 20 were excavated in stratified contexts in Radford's excavations in the cloister in 1955–7 ; no context information survives regarding the others. P1136 , from Radford 1956 CLA 12.

20b. P1044 from Radford 1955 EWC 6.

21. Body sherd, thinner walled than 18 and 19, of the same fabric but with sparser inclusions, so arguably from a different vessel. It is broken across a set of three, probably a horizontal row of, stabbed oval 'notches', of which one entire notch and part and a trace of two more remain. cf. e.g. WW 39. P1007, From Radford excavations 1955.

22. Body sherd of similar fabric and decoration, with incised lines and the edges of two circles. P1410

Sherds from at least one other vessel:

23. Base sherd, very sagging base. P1117

24a. Tiny body sherd. P1108

24b. Tiny body sherds. P411

Late Saxon coarsewares

Unprovenanced, probably from pre-Radford

25–8. Fabric 1 jars; petrological descriptions by Taylor in Appendix 1 below (P280; P27; P268; P246 and P281).

29–30. Fabric 1 handles (P278.3; P243.10).

31–3. Fabric 2 jars/pitchers (31 with combing) and (33) lamp (P579; P242.5; P277.30). For the distinctive straight rim-form of no. 26 see Rahtz 1974, 114, fig 4, nos 46–52.

34–6. Fabric 3 jars and (36) wide-mouthed vessel (P278.2; P1317.4, P278.1)

Radford 1955

37–9. Fabric 1 jars (P1037.1; P1040.1; P1035). Contexts ECW12; EWC1; EWC1.

40–2. Fabric 2 jars (P608; P1030; P1037.2). Contexts: ECW 12; EWC1.

43–4. Fabric 3 jars (P1037; P1039). Contexts ECW12; EWC1.

Radford 1956

45–8. Fabric 1 jars (P1152, P1091.1; P1091.2). Contexts CLA14; CL1 7; CL1 7; CL1 9).

49–51. Fabric 2 combed wares, 49 pan, sooted under handle, 51 with stabbed combing (P1137; P1114; P1135.1). Contexts CLA15, CLC 2, CLA 12.

52. Fabric 3. (P1180.7). Context CL1 EX1.

Radford 1957

53–4. Fabric 1 jars (P1238, P1237). Contexts: CH1.

55–9. Fabric 2 jars (P1375, nn, P1407, nn, nn). Contexts: CL1.

60–3. Fabric 3 (nn, P1379, P1219, P1218). Contexts: CL1, unk, CH1, CH1.

Late twelfth- and thirteenth-century wares

North and West French wares, c 1170–1250

64–8. North French white ware jugs, 64–5 rims, 65 with incised wavy line and edge of handle; 66 with rouletting on shoulder, 67 with applied diagonal and horizontal strips, 68 base. Probably Lower Seine valley, possibly Rouen, *c* 1180–1250. (P237, 167.4, 2213/2, P204.37).

69. Sherds from a so-called 'Orleans-type' jug. External parallel incised grooves on the body, characteristic of these vessels, and the base of a handle with broad thumbing, another typical feature. White ware with fine quartz sand inclusions, external grooves on body, speckled yellowish to mottled green glaze. (P204.44, P291.109). Complete vessel from Exeter shown adjacent.

Tripod pitchers

70, 72. Spout and handle, fabric 2, both with combing (P42.5, P984.1).

71. Limestone-tempered sherd with impressed circles on rim top, rouletting on rim side, applied pellets below (P983). Radford 1954.

Ham Green wares (Fig. 7)

All vessels are hand-made and have the typical mid-grey or dark grey fabric of Ham Green wares,[10] with fine white inclusions, pale whitish-grey margins below a dull mid-green glaze; the glaze is more speckled in vessel 72.

73–4. Bridge spouts, 73 with applied pellet or strip below neck, 74 with scored 'beard'. (P315.7, P292.20).

75–6. Rims, 75 rouletted, with edge of spout, 76 with applied face-masks, the eyes stamped with dot-and-circle. (P292.5, P292.13).

77. Cylindrical rod with applied clay pad, probably a bridge to a spout, the pad perhaps a hand. (P315.17).

78–81. Handles (P142.1, P169.9, P315.12, P155.3).

82–3. Necks (P292.16, P190.9).

84–94. Bodysherds with applied decoration, for which Ponsford now proposes the date *c.* 1175–1225.[11] 84 stick figure, the ?legs with slashing (P190, P190.15), 85–6 possibly from same vessel (P211.5–6), 87 ?horned deer (P190, P211.10), 88 rouletted (P211.21), 89 large leaf-shaped or ?shield-shaped pad (P211.21), 90–1 as 84–6 (P211, P211.2), 92 with applied and incised ornament (P211.26), 93–4 with rouletted applied strip (P554, P554.2).

High medieval wares, 1250–1450

Saintonge wares (Fig 8)

95. Sherds forming much of a Saintonge polychrome jug with foliage painting in yellow, green and black, with a black eye below the lowest leaf stem. Rim with scars of beak spout, handle and applied face mask. (P329).

The vessel was not mentioned in Dunning's initial survey of Saintonge polychrome finds;[12] the type was already so well known by that date that its omission suggests that it had not been found at that time. Described as 'recently restored' in 1938.[13]

96–7, 99–100. Handle sherds from *pégaux,* probably all different vessels, 96 with graffito, 97 with applied bosses, 98 with rouletting, 99 handle base (P154, P231, P298, P167.2, P298).

101. Sherds from body of a mottled green-glazed jug with notched rouletting (P204.11).

102. Handle of a jug with all-over-green glaze (P158.2).

Bristol Redcliffe ware (Figs 9–10)

This type of pottery (Bristol Pottery Type 118) was made in the suburb of Redcliffe in Bristol and no doubt elsewhere in or adjacent to the city. It was first produced *c* 1250,

came to dominate the Bristol pottery market in the late thirteenth century, and circulated as late as *c* 1500.[14] Its fabric characterized by its low iron content, firing to off-white, buff, is highly distinctive in South-West England, where most clays are rich in iron oxide and thus fire to red or grey.

103. Sherds from the rim (a–b) and upper body (c–e) probably all from one elaborate jug with bird ornament on the shoulder, and with copper-mottled internal glaze, (P98, P252.1–4, P252).

104. Fragment of a curved rod of Redcliffe ware with the applied eyes and projecting nose of a face, with iron-rich clay pads above – from either a handle or a modelled rod applied to the side of the vessel. Pale yellow-buff fabric with pale olive-green glaze; applied decoration in iron-rich glaze, glazed black-brown (P41.1). Possibly a further sherd of 103.

105 A further body sherd with applied clay pad, possibly related to 103–4.

106–9. Rims, 106–8 with applied masks, 107 with edge of spout (P641, P224.1, P15, P1222).

110–14. Body decoration, 110 with impressed dot-and-circle and edge of circle, 111 horseshoes and pellets, 112 with scales and applied strips below scar of applied spout, 113 applied scales at foot of a small handle, 114 with brown slip over impressed arcs (P328.67, P328.39, nn from Radford 1956, CLC 3, nn, nn from Radford 1957 CLE2)

115–17. Necks of barrel costrels.

118–77. Jug details (P numbers not quoted).

Other South-West English medieval pottery (Fig 11)

176–82. Redwares possibly made at Bove Town, Glastonbury (P438.1, .2 and .3, P212.28).

183–6. Sand-tempered redwares, sources uncertain, perhaps from rural Somerset kilns.

187. Jug with inscription, discussed by O. Kent (Appendix 6 below).

188. Fine sand-tempered redware, source uncertain, as 183–6, the type discussed by Kent (1994, 34, 'fabric C'). Late medieval, late 14th- or 15th-century?

South Somerset wares (Fig 12)

189. Jug with ring foot, two bands of slip, restored. Radford 1963, Abbot's Hall cross-trench, E extension, 3S, cut 1, disturbance area, 88–112', 15ft deep, post-Dissolution context. (P343).

190–5. Jugs with thin bands of slip, horizontal and wavy lines in sgraffito. Chemical analysis indicates that they are probably all attributable to the Donyatt kilns. (P221.1–2, 36, 47, 221.3–4). Unstratified.

196–8. Rim and two restored jars with internal mid-green glaze. (nn, P363–4).

Fifteenth- and sixteenth-century wares

Imports

The Italian and Iberian sherds are discussed in Appendices 4 and 5 below.

199. Knob from the rim of a Saintonge polychrome chafing dish of Hurst type C.VI.[15] Usual fine white fabric, glazed green and purple, possibly with a patch of yellow. The polychrome glazes suggest that there would have been a moulded motif below the knob, as on several of the finds illustrated by Hurst; face masks are the most common.[16] Probably end sixteenth/early seventeenth century.[17] (P94C).

200–1. Beauvais yellow-glazed drinking jugs, 200 the standard form but with the unusual feature of a blob of thick brown-glazed slip – presumably the red clay used in production of Beauvais sgraffito wares. (P208, P320, P217).

202–4. Three South Netherlands maiolica vessels, probably vases:

202. Narrow neck with the edge of a handle. Brilliant dark blue painting showing the pair of vertical lines flanking the handle, with the edge of a foliage spray. ICP sample 4. (P25.4).

203. Base with duller mid-blue painting – probably the edge of a YHS trigram within a circular frame. ICP sample 5. (P92).

204. Bodysherd with dull dark blue painting, the central motif with a splodge of orange ICP sample 6. (P25.2).

Not drawn: Edge of a frame of a circular medallion painted mid blue (ICP sample 10). (P25.1).

205–6. Raeren stonewares. (P83.1, P83.2).

207–9. Malling jugs late sixteenth-century. This class of pottery, named after the vessel formerly held in West Malling church, Kent,[18] has been shown to come from Antwerp.[19] All have a buff fabric without gross inclusions.

207. Handle of a large jug, the buff fabric without gross inclusions, painted with long brush-strokes of yellow, white and blue glaze, with a splash of purple. ICP sample 2. (P94B2).

208. Sherd of a tall and quite broad neck, the buff fabric without gross inclusions, and with dull all-over-blue tin glaze. ICP sample 9, indicating a Low Countries source. The form, with a wide upright neck, makes an early sixteenth-century date unlikely, and favours identification as a Malling jug. (P94A).

209. Sherd from the lower body with random blue, purple, orange and green painting over a white tin glaze; the interior green-tinged tin glaze. ICP sample 7. (P25.3).

210. Standard Frechen drinking jug of late sixteenth- or very early seventeenth-century type (P68).

211–12. Two examples of the most common form of Wanstrow-type bowl (P103.6, 9 & 14, P103.2).

213–15. Italian sherds discussed by Blake (Appendix 3).

216–19 Spanish pottery discussed by Gutiérrez (Appendix 4): Malagan (216) and Valencian (217–18) lustrewares, Seville green-glazed (219).

220–1. Portuguese redwares discussed by Gutiérrez (Appendix 4):

222–8. Specialist wares discussed by Kent: 222–3 perforated, 224–6 cucurbits, 227–8 crucibles.

Ceramic roofing materials

Five standard boxfuls of ceramic roofing material were retained from the abbey excavations. Most of the material consists of ridge tile, but there is one exceptional object – a medieval ceramic cross – along with two louver fragments and a few flat tiles. It is obvious that these are the sherds remaining after a process of fairly ruthless discarding, since plain fragments, which normally form the bulk of a collection of this sort of material, are poorly represented, and eye-catching decorative crests are far more common than would normally be the case. Therefore no numerical analysis has been carried out; the types of product and range of fabric types is briefly described.

Cross, louvers and finial

1. Cross from the end of the crest of a ridge tile. Fine sand-tempered redware, all-over dull green glaze (P195).
2. Louver fragment: the lower left corner of a projecting baffle around a window. Redware with rounded brown stone inclusions (1988/882/36).
3. Probable louver fragment. Very fine redware with white mica and calcareous inclusions, close to the Bove Town wasters. Slab-built, two applied vertical strips, each with a pierced hole at the bottom edge of the sherd (1988/886/31).
4. Sherd from a ball finial. Fine grey-fired fabric with a little quartz sand, probably wheel-thrown, crimped projecting ridge, green-brown external glaze (Radford 1959, D17).

Bristol white ware ridge tiles

5. High knife-cut crest, pale green speckled glaze with iron bleeding (1988/882/14).

6. Knife-cut crests, stabbed both sides and from below (T192).

7. ?Knife-cut crest, stabbed both sides (1988/882/22).

8. ?Knife-cut crest; single hole stabbed with point (1988/883/18).

Other ridge tiles

9. Moulded crest. Redware with calcareous inclusions, perhaps local. Stabbed both sides, mottled mid-green glaze with iron bleeding (1988/881/25).

10. Redware with plain moulded crest (no number).

11. Redware. Low moulded crests, no stabbing (no number).

12. Possibly Bristol? With knife-cut crests and stabbing (1988/881/6).

13–14. Redwares, the crests with distinctive flattened tops and stabbing, with orange-green and dark olive green glaze (T190; 1988/880/10).

15. (View from above). Redware with narrow applied thumbed strip (1988/882/13).

16. Redware with moulded crest (1988/882/26).

17. Sand-tempered redware with long raised horizontal strip (1988/882/27).

18. (View from above). Redware with a few limestone inclusions. Moulded crest, dull mid-green glaze (1988/982/2).

19. Sand-tempered redware with moulded crests (1988/881/16).

20. Sand-tempered redware with ?knife-cut crests (1988/882/2).

21–8. Fragments of sand-tempered redware tiles decorated with applied diagonal thumbed strips, with mid-green and orange-green glazes (1988/886/13, 22, 25, 26, 34, 46, 51; 1988/883/24; T191).

29. Sand-tempered redware with unusually high moulded crest (1988/882/8).

30. Unglazed redware with calcareous and round brown stone inclusions, the crest with a long narrow raised strip (viewed from above). (1988/886/3).

Tiles of uncertain function

31–2. Unglazed flat redware tiles with holes pierced before firing (?ridge tiles or peg tiles, but see No. 33 below) (1988/885/67; 1988/886/57).

33–5. Unglazed flat tiles 160–170mm thick with numerous fine stabbed perforations of circular section, 33 also with hole pierced before firing, all with rough unsanded backs. Part of finished lower edge on 34; the other two have no original edges. All with the same fabric: redware with very fine white mica inclusions, rounded iron oxide lumps, 35 with laminated grey stone inclusion, possibly Lias. Mortar covers most of the back of 34, but there is an unmortared strip 30mm wide along the lower edge. Faint patchy sooting on upper surface of 33. The perforations make their use as roofing materials unlikely, and the mortared back of 34 precludes use as malting tiles unless it represents reuse. Perhaps oven tiles? (1988/886/35, 47 and 37).

APPENDIX 1: PETROLOGICAL STUDY OF SAXO-NORMAN COARSE POTTERY FROM GLASTONBURY ABBEY

By Roger T. Taylor

Following sorting of a large sample of the Saxo-Norman wares in hand specimen, a series of 20 vessels representing the range of fabrics identified was studied by the writer. The following petrological descriptions are based upon detailed examination of surfaces and broken edges of sherds under a binocular microscope at X20–40 magnification. Inclusions are described in approximate descending order of frequency.

Three Saxo-Norman fabric groups are distinguished; all have previously been identified elsewhere in the county. A fourth fabric of uncertain date (fabric 4) is also described.

Fabric 1. Limestone-tempered wares

Fig 3, no. 25 (P280; Kent 1996, 81, no. 18, fabric 6)

Rim and shoulder of a small jar. Thinly oxidised surfaces with medium grey reduced core, 4.4–6.5mm thick at the body edge. Moderately hard-fired, abrasion 1–2. Temper *c* 20% on surfaces, less in core.

Limestone: pale grey, mainly calcined white, finely granular sub-rounded fragments, 0.05–2mm, rarely 5.1mm.

Calcite: a scatter of colourless translucent cleaved grains, 0.5–2mm.

Quartz: a scatter of translucent to transparent colourless and some brown angular to rounded grains, 0.3–2mm. One sub-rounded pitted quartz pebble, 5.5mm.

Chert: grey sub-rounded, 2.5mm and 4mm; light grey angular 1.2mm; off-white sub-angular 2mm.

Sandstone: quartzose sub-angular fragment, 1mm.

Matrix: smooth weakly calcareous finely micaceous clay.

Comment: A limestone-tempered fabric.

Fig 3, no. 26 (P27; Kent 1996, 81, no. 17, fabric 5)

Rim and shoulder of a jar. Moderately oxidised surfaces grading into a medium grey reduced core, 4.7–5.2mm thick at the body edge. Hard-fired, abrasion 1. Temper forms *c* 20% of the fabric.

Limestone: light grey, finely crystalline or granular calcined white. Angular to rounded fragments, 0.1–2mm, rarely 4.5mm.

Calcite: rare cleaved crystalline grains, 0.5–0.8mm.

Quartz: a scatter of translucent colourless and opaque rough-surfaced sub-angular to rounded grains, 0.1–1.1mm.

Sandstone with colourless quartz in a calcareous matrix quartz sparse angular, fine-grained quartzitic angular, 1.5 and 2mm.

Chert: light grey sub-angular fragment 1.1mm.

Matrix: smooth, finely micaceous clay. Very weakly and patchily calcareous.

Comment: A limestone-tempered fabric with a minor content of quartz and rock fragments. There is no evidence for a southerly Upper Greensand provenance for this vessel. The calcareous sandstone, chert, etc. could be from a more south-easterly Upper Greensand source.

Fig. 3, no. 27 (P268)

Rim sherd, reduced with thinly oxidised surfaces. Pitted where calcined limestone has eroded out. Hard-fired; abrasion 1–2. Temper *c* 20%.

Limestone: light grey, some finely crystalline, calcined white angular to rounded fragments, 1–2.1mm.

Calcite sparse cleaved crystalline grains, 0.6–2mm.

Quartz: a scatter of translucent colourless, angular to rounded grains, 0.1–1.5mm.

Sandstone: buff angular siliceous fragments 2mm and 2.2mm.

Chert: angular fragments, buff 1mm, greyish-buff 2mm.

Matrix: smooth clay, weakly and patchily calcareous.

Comment. A limestone-tempered fabric, similar to P27.

P245

Base angle. Reduced with surface of base oxidised, moderately hard-fired. Temper *c* 20%.

Limestone: finely crystalline or granular calcined white sub-angular to rounded fragments, 0.05–3mm.

Calcite: Sparse translucent cleaved crystalline grains, 0.5–0.8mm.

Quartz: sparse translucent colourless angular to sub-angular rarely rounded grains, 0.2–2.0mm.

Sandstone: a quartzose angular fragment, 2mm.

Chert: a grey angular fragment, 1.1mm.

Ferruginous: rare soft red rounded grains, 0.5–1.15mm

Matrix: smooth calcareous clay, probably with fine-grained limestone fragments, less than 0.05mm.

Comment: A limestone-tempered fabric with sparse content of quartz and other fragments. Comparable to P27.

P22

Rim and base angle sherds. Temper *c* 25%.

Limestone: pale grey rounded to sub-rounded fragments, 0.5–3mm.

Calcite: one translucent cleaved crystalline fragment, 2.5mm.

Quartz: a scatter of transparent colourless to translucent rounded to sub-rounded polished grains, 0.1–1.4mm. One sub-angular translucent colourless grain, 3mm.

Shell: white curved fragments, 1.5mm.

Mudstone: one grey sub-angular non-calcareous fragment, 6mm.

Gypsum: one fibrous grain, 0.8mm.

Ferruginous grain: reddish-brown heamatitic sub-angular grain, 1mm.

Matrix: weakly calcareous with very fine mica flakes.

Fabric 2. Upper Greensand-Derived wares tempered with chert

Fig 3, no. 31 (P579)

Shoulder with combed ornament. Thin oxidised surfaces, medium-grey reduced core. Temper *c* 20%.

Quartz: colourless transparent to white translucent, some yellow-orange and brown-stained and transparent and brown opaque grains, angular and many well-rounded and polished grains; one crystalline grain, 0.05–1.5mm.

Chert: bark grey, dark brown, off-white and grey/white pink/white mottled angular to sub-angular fragments, 0.8–3mm.

Tourmaline: black vitreous angular to well-rounded and polished grains, 0.1–0.5mm.

Silicified shell: ribbed bivalve fragment, 0.7mm.

White grains: soft ?altered feldspar, sub-angular to sub-rounded, 0.2–1.5mm.

Ferruginous grains: a scatter soft brownish-red, probably reoxidised limonite, grains, 0.1–1.5mm.

Matrix: smooth clay, finely micaceous.

Comment: Upper Greensand-Derived.

P373 (Radford 1954; GLSGA 1991/116/1)

Glazed tripod pitcher rim and handle attachment; combed ornament. Reduced, 5.6–7.35mm thick. Hard-fired, abrasion 1–2. Temper *c* 20%.

Quartz: transparent, translucent and white opaque, mainly colourless grains. Angular to well-rounded, many grains polished, 0.1–1mm, rarely 2mm.

Silicified sandstone: a scatter of white sub-angular fragments, 1–4mm.

Chert: sparse white angular fragments, 1.5–4mm.

Tourmaline?: rare black rounded polished grains, 0.5mm.

Silicified shell: white tabular fragments, 1.1mm and 1.5mm.

Comment: Upper Greensand-Derived. A non-calcareous fabric; the light-coloured fragments are chert or quartz.

P982.a1. (Radford 1954: GLSGA 1998/3/8)

Tripod pitcher foot. Medium grey reduced, pale yellowish-green devitrified glaze; black inner surface. Hard-fired, abrasion 2–3. Temper *c* 40%.

Quartz: transparent to translucent colourless angular to well-rounded and polished grains 0.1–1.1mm. Broken rounded vein quartz, 3mm.

Chert: scatter of angular to sub-angular fragments; off-white grey translucent and grey, 0.4–3.5mm.

Sandstone: silicified off-white angular fragments, 2.2mm and 3.5mm.

Tourmaline: sparse black rounded grains, 0.2–0.3mm.

Matrix: slightly silty clay.

Comment: Upper Greensand-Derived.

P982.a2. (Radford 1954: GLSGA 1998/3/8)

Tripod pitcher foot and body sherds. Pale yellow-green glaze, light grey reduced throughout. Temper *c* 40%.

Quartz: transparent to translucent colourless angular to well-rounded and polished grains, 0.05–0.6mm, rarely 1.3mm.

Sandstone: buff angular silicified fragment, 3mm.

Chert: translucent off-white to pale grey angular fragment, 2.2mm.

Shell: silicified fragments, 2.5mm and 3mm.

Tourmaline: sparse black angular to rounded, sometimes polished grains, 0.1–0.3mm.

Mica: rare muscovite cleavage flakes, 1mm.

Ferruginous pellets: soft red oxidised on surface, brown limonitic in the core of the sherd, 0.11–1.5mm.

Matrix: smooth finely micaceous clay.

Comment: Upper Greensand-Derived.

P986.1a. (Radford 1954, GLGSA 1998/3/20)

Tripod pitcher rim with handle attachment. Oxidised outer surface, devitrified glaze, very dark reduced core and inner surface. Hard-fired, abrasion 2, surface erosion 2–3. Temper *c* 40%.

Quartz: transparent to translucent colourless, white and some brownish stained, angular to rounded and some polished grains, 0.1–1.2mm, rarely 2.2mm.

Chert: a scatter of white, grey mottled, and medium-grey angular fragments, 1–4mm.

Shell: sparse silicified white tabular fragments, 1.5–3mm.

Tourmaline: sparse black sub-angular to rounded and polished grains, 0.1–0.2mm.

Matrix: smooth very finely micaceous clay.

Comment: Upper Greensand-Derived.

P968.1b. (Radford 1954, GLGSA 1998/3/20)

Tripod pitcher foot with remnants of devitrified glaze, uniform buff surfaces and core. Hard-fired, abrasion 2–3; surface erosion 1–2. Temper *c* 50%.

Quartz: transparent to translucent colourless, white and some brownish stained, angular to rounded and some polished grains, 0.1–0.8mm.

Chert: sparse translucent light grey, grey and brown mottled angular fragments, 2–3mm.

Shell: silicified tabular fragment, 3.5mm.

Ferruginous pellets: a scatter on inner surface, soft red sub-angular to rounded, 0.5–2mm.

Matrix: smooth very finely micaceous clay.

Comment: Upper Greensand-Derived.

P986.1c. (Radford 1954, GLGSA 1998/3/20)

Body sherds, pale greenish translucent and light brown glazed over a patchily and lightly oxidised outer surface; pale buff inner surface; light grey core, 5.1–6.1mm thick. Hard-fired, abrasion 1–2, surface erosion 1–2. Temper *c* 40%.

Quartz: transparent to translucent colourless and white angular to rounded grains, 0.5–0.7mm.

Ferruginous pellets: a scatter, soft red sub-angular, 1–4mm.

Tourmaline: rare black sub-angular to rounded polished grains, 0.2–0.3mm.

Shell: silicified tabular curved, 1mm and 2.1mm.

Chert: angular grey fragment, 1.1mm.

Matrix: smooth finely micaceous clay.

Comment: Upper Greensand-Derived.

P986.1d. (Radford 1954, GLGSA 1998/3/20)

Body sherds, greenish glaze over patchily oxidised outer surface with faint brushing/combing; core and inner surface oxidised, 5–6.2mm thick. Hard-fired, abrasion 1–2, surface erosion 1.

Quartz: clear to transparent rounded polished grains.

Shell: white silicified tabular laminated fragments, 1–2mm.

Chert: sparse grey to off-white angular fragments, 1.1, 1.2 and 2.5mm.

Ferruginous particles: sparse soft red, sub-angular to rounded, 0.8–3mm.

Tourmaline: rare black sub-angular and rounded grains, 0.2mm.

Comment: Upper Greensand-Derived.

P982.c2. (Radford 1954: GLSGA 1998/3/8)

Body sherds, probably from one or two vessels, colourless pale yellow transparent glaze over a thin lightly oxidised outer surface. Pale grey core and inner surface, 4.8–5.8mm thick. Hard-fired, abrasion 1–2. Temper *c* 35%.

Quartz: transparent to translucent colourless, occasionally brown-stained, angular to rounded with some polished grains, 0.05–0.7mm.

Tourmaline: sparse black sub-angular to rounded, some polished grains, 0.1–0.2mm.

Shell: tabular silicified fragments, 3.2 and 2mm.

Chert: a grey angular fragment, 1.2mm.

Sandstone: a silicified sub-rounded fragment, 3.5mm.

Matrix: slightly silty and finely micaceous clay.

Comment: A more refined Upper Greensand fabric with generally finer-grained quartz, the coarser grains of chert, sandstone and shell mainly (?deliberately) screened

out from the tempering sand. The silicified shell, chert and sandstone fragments were the only ones found in separate sherds among the thirteen examined.

The other groups of sherds submitted appear mainly to be Upper Greensand-Derived wares, although there are considerable variations in their quality and thickness, and the degree to which they display the characteristic UGS-Derived indicators (polished sand, chert, silicified sandstone, silicified shell, tourmaline, etc.). These variations may indicate that more than one pottery exploiting Upper Greensand-Derived temper supplied the abbey. Some sherds are of indeterminate provenance.

Fabric 3. Mix of Upper Greensand-derived and calcareous inclusions

P982b (Radford 1954: GLSGA 1998/3/8)

?Tripod pitcher with glaze over edge and roughly finished outer surface. Pale yellow to colourless glaze on outer and inner surfaces. Light grey reduced, 9.5–11.1mm thick. Moderately hard-fired. Temper *c* 60%.

Quartz: abundant angular to rounded grains, some showing polish, mainly 0.1–0.3mm, with a small proportion, 0.3–0.8mm, rarely 1.5mm.

Shell: silicified white tabular 0.5, 1.0 and 1.1mm.

Chert: angular off-white, 1.1mm.

Matrix: weakly calcareous.

Comment: Although this shows elements of an Upper Greensand-Derived fabric, its calcareous matrix distinguishes it from fabric 2 above.

General comment on fabrics 2/3

These fabrics are similar to wares examined from other medieval sites in Somerset. The polished grains and chert fragments in these vessels can be attributed to deposits derived from the Cretaceous Upper Greensand. In those containing limestone (fabric 3) there is a probable input from the Lower Lias clay. The analysis of other collections of these fabrics from Taunton (some limestone-tempered), Castle Neroche, South Cadbury, Ilchester, and also at Haycroft Farm, Membury, Devon (some limestone-tempered), Sherborne Old Castle, Dorset, and elsewhere are discussed in Allan *et al* 2010.

Fabric 4: possible Glastonbury local ware

Two examples of this fabric of uncertain date (?twelfth- to fourteenth-century) are described:

P982.c1 (Radford 1954: GLSGA 1998/3/8)

Body sherds, possibly from one vessel, with very pale brownish-yellow to greenish-yellow glaze over patchily oxidised outer surface, with some combed ornament. Medium grey reduced core and oxidised inner surface, 4–5.4mm thick. Moderately hard-fired, abrasion 1-2, temper *c* 25%.

Quartz: transparent to translucent colourless, occasionally brown-stained, angular to rounded, some becoming polished, 0.05–0.3mm, occasionally 1mm.

Matrix: smooth finely micaceous calcareous clay.

Comment: The calcareous matrix, the rather low quantity and general fineness of the sand temper, and the absence of UGS-Derived indicators, distinguish this fabric, which could be local to Glastonbury.

P20 (165)

Rim sherd, moderately oxidised exterior, reduced core and interior. Moderately hard-fired, with parts of surface pitted where limestone has dissolved. Temper 25–30%, unevenly distributed.

Limestone: pale grey angular, sub-angular and rounded fragments, 0.1–2.5mm.

Quartz: scatter of transparent colourless to white and greyish translucent, rounded and angular polished and matte-surfaced grains, 0.2–1.4mm, rarely 4mm.

Gypsum: white fibrous elongated fragments, 2mm and 3.5mm, cross-fibre vein fragment, 3mm.

Angular surface cavities, possibly impressions of small selenite (gypsum) crystals.

Shell: curved elongate cavities after shell fragments, 0.5–4mm.

Chert: white greyish mottled sub-angular, three fragments, 3mm and one grey sub-angular fragment, 2.5mm.

Matrix: weakly and patchily calcareous with fine muscovite mica flakes.

Comment: Possibly a local Glastonbury fabric.

APPENDIX 2. REPORT ON INDUCTIVELY COUPLED PLASMA SPECTROMETRY (ICPS) ANALYSIS OF POTTERY FROM GLASTONBURY ABBEY

By M J Hughes

INTRODUCTION

The aim of this project was to identify the place of production of ten examples of tin-glazed pottery found at Glastonbury Abbey. The identification of maiolica of this period as English, South Netherlandish or Italian can be quite uncertain, given the widespread copying of vessel shape and design by different production centres, the use of clays which fire to a very similar fabric colour, and the regular interchange of goods between these production areas. However, as a previous scientific project has shown,[20] chemical analysis of the body fabric can provide an independent and positive identification, since the clays used at the respective centres differ in their chemical composition. In the present study, four of the sherds (nos 2, 8, 9 and 10) could have been Spanish, Italian or South Netherlandish, so it was important to use independent scientific evidence to decide between these possibilities. In the event, the scientific study showed that seven of the sherds were of South Netherlands Maiolica, and three Italian tin-glazed wares. Small databases of previously analysed examples of South Netherlands and Italian tin-glazed wares were available for comparison against the analyses of these sherds. Databases of ICPS analyses of English[21] and Spanish tin-glazed ceramics were also examined to consider whether the Glastonbury sherds were inconsistent with either South Netherlandish or Italian tin-glazed wares.

Chemical analysis using inductively-coupled plasma spectrometry (ICPS) of the fabric of pottery gives a chemical fingerprint and thus information on its source, reflecting the clay from which it was made. For this project, a combination of two versions of ICPS was used: inductively-coupled plasma atomic emission spectrometry (ICP-AES) and the mass spectrometry version of ICP (ICP-MS). The atomic emission version of ICP analyses all the major elements in the ceramic (except silicon), plus a good range of trace elements. The mass spectrometry version complements this with accurate analyses of trace elements present at very low levels in the ceramics which cannot be measured by the atomic emission version, including all the rare earth

elements, plus important alkali metals rubidium and caesium, and other important elements such as uranium and thorium. While earlier work on identifying the origins of tin-glazed pottery from London, the Low Countries and Italy used neutron activation,[22] NAA is effectively no longer carried out in the UK for archaeological projects. However ICPS, especially the combination of the two versions used on the same sample, covers almost all the original chemical elements previously analysed in tin-glazed pottery by NAA except hafnium, plus a much larger range of other major and trace elements, about double the number originally analysed by NAA.

Conclusions drawn from the use of such a wide range of elements on each pottery sample are significantly more secure when there are so many elements to take into consideration. It also considerably lessens the risk that pottery of different origins but made from clays of similar age and mineralogical make-up could be confused by chemical analysis. In the case of ICPS analysis of tin-glazed pottery from London, the Low Countries and Italy, it has proved important to have the elements measured by the mass spectrometry version available when interpreting the analysis results, as a number of the distinguishing elements previously recognised as such in the NAA project can only be analysed by the mass spectrometry version.

ICPS Analysis (Inductively-Coupled Plasma Atomic Emission Spectrometry (ICP-AES) and Mass Spectrometry (ICP-MS))

Powdered samples were obtained from the ten sherds by drilling with a 2mm- or 3mm-diameter tungsten carbide drill. In addition, the samples sent for ICPS analysis included several portions of a Certified Reference Material (NBS679 Brick Clay, produced by the US National Institute for Standards and Technology, Washington DC) spaced out in the analysis batch but without identification to the laboratory as such; these acted as analysis quality control samples. The analysis results on these control samples gave entirely satisfactory results. The powdered samples were analysed at Royal Holloway, Department of Earth Sciences, University of London, using their standard techniques for ICP-AES and ICP-MS. All the ICP results are given in full in Table 1, arranged according to presumed place of production.

Interpretation of the ICP analyses using Principal Components Analysis and Discriminant Analysis

Detailed interpretation of the analyses was carried out with multivariate statistics, which simultaneously considers the concentrations of many elements in each sample. For this investigation, Principal Components Analysis (PCA) and Discriminant Analysis (DA) was used;[23] descriptions of their application to archaeology are given elsewhere.[24] The statistical package SPSS Version 15 was used for this work.[25]

A Discriminant Analysis comparing the ten samples to the database of London delftwares, South Netherlands and Italian maiolica showed that all the samples plotted away from the London delftware and close to either the South Netherlands or Italian maiolica. None of them, therefore, are London products. Further statistical tests were carried out therefore to check the samples' attribution to the other two production areas.

Principal Component Analysis on all the samples analysed

A principal component analysis was carried out in which the ICPS analyses of the ten samples were combined with a larger number of representative analyses of South Netherlands maiolica and Italian tin glaze. It was clear from this that seven of the sherds were consistent in chemistry with South Netherlands maiolica (samples 2, 4–7, 9 and 10) and three were Italian tin glaze (1, 3 and 8). These are discussed separately below.

Results and Discussion on the analysed samples from Glastonbury

South Netherlands maiolica: Glastonbury samples 2, 4–7, 9–10

A major neutron activation analysis project was undertaken in the 1990s on tin-glazed pottery from London, the Low Countries and Italy, concentrating on exported wares.[26] Following the original publication, the work was extended and the opportunity taken to republish the original analyses with a correction to the sample numbering.[27] The project showed that neutron activation analysis could differentiate between the export wares of these three regions, and make further distinctions between production sites within the regions and even (where sufficient material was made available for analysis) different sites within the major production centre of Antwerp. Since that original project, further examples of tin glaze from all three regions have been analysed, now by the technique of ICPS, including tiles and pottery from delftware production sites in London in Southwark and Lambeth.[28]

A range of tin-glazed tiles found in London have proved to be Low Countries products,[29] as have tiles found at Hill Hall, Essex.[30] A single sherd of South Netherlands maiolica was identified at Cleeve Abbey[31] while more recently three Low Countries tiles, six dishes and one hollow ware were analysed from a site at Jeffrey Street, Edinburgh.[32] Of tin-glazed wares from Godolphin House, Cornwall analysed by ICPS,[33] two sherds were Italian, two tiles were Spanish and four tiles were Low Countries, more specifically Antwerp products.

While it is also possible to use the earlier NAA database for comparison, one obstacle is that NAA and ICPS do not analyse for all the same elements – those in common amount to about 15, whereas either technique alone analyses up to 28 (NAA) or 45 (ICPS). The smaller number of common elements may introduce less certainty with which individual ceramics can be assigned to their place of production.

However there is now a significant database of ICPS analyses from London, the Low Countries and Italy against which new ICPS analyses can be compared. Many of the analyses of Low Countries ceramics were unfortunately made before it was possible to simultaneously analyse them by mass spectrometry as well as the regular atomic emission, so in order to compare the Glastonbury results with ICPS analyses on as wide a selection of South Netherlands maiolica as possible, only the atomic emission elements were used for the statistical comparisons with the database. The Low Countries ICPS database included tiles from Hill Hall, Godolphin House, Limpsfield, Guildford, Herkenrode Abbey in Belgium, pottery and tiles from Jeffrey St, Edinburgh, and pottery from Southampton and Cleeve Abbey. The analyses from the London Delftwares ICPS project was also used to check against the Glastonbury analyses.

A principal component analysis (Fig. 1) was carried out after combining the ICPS analyses (atomic emission results only) on the Glastonbury samples with all those ICPS analyses on South Netherlands maiolica available up to the present. The plot of the resulting second and third principal components is shown in Figure 1. It is noticeable that all the tiles analyses form a cluster of points on the right hand side of the Figure, intermixed with some of the pottery from Jeffrey Street, Edinburgh, Southampton, Shapwick and Cleeve Abbey. With the exception of sample 7, the pottery from Glastonbury is ranged round the periphery of this central cluster. From a practical point of view, clays used for making tiles are generally considered less well prepared that that for pottery, and the PCA plot does suggest a relatively consistent

clay chemistry for the tiles, slightly different to some of the pottery. In fact practically all the pottery and tiles previously analysed (from the database of ICPS analyses) has been concluded from ICPS analysis (and comparison with previous analyses made by NAA) to be Antwerp products.

The Malling jug (sample 7) is almost exactly identical chemically, apart from slightly higher rare earth elements, to the average clay chemistry of Malling jugs found in London analysed by neutron activation.[34] Fig. 1 shows that this Malling jug is also very close chemically to another found at Shapwick,[35] a sherd of South Netherlands maiolica from Crediton Vicarage (RA26),[36] two maiolica tiles from Jeffrey Street (JSE21 and 22) and a tile from Herkenrode Abbey, Belgium. The South Netherlands maiolica sherd from Cleeve Abbey is slightly different but does have chemical similarities to these maiolica ceramics.[37]

The two other Malling jugs analysed from Glastonbury (samples 2 and 9) are slightly different in chemistry from sample 7, but show a fairly close similarity to each other in chemistry with an overall 'spread' in differences in elements concentrations between the two of about ten per cent. Sherds of finewares analysed from the same vessel tend to show a rather smaller spread, perhaps five per cent, so it is more likely that 2 and 9 are just from the same production centre. They are very similar in chemistry to analyses of three tiles and two dishes from Jeffrey Street, Edinburgh (JSE 11-15; Fig. 1), and all are not unlike the NAA analyses of maiolica made at the production centre near the National Museum of Navigation, Antwerp.[38] Despite the slight chemical difference to sample 7, all three show affinity to the same production centre. In the earlier NAA study, five out of eight examples of Malling jugs found in London and some found in Antwerp itself overlapped with the National Museum clay composition, though a few did not, indicating production took place at more than one centre.[39]

Of the flower vases/jugs analysed, sample 6 is almost exactly identical to the average chemical composition of maiolica from the kilns found at Steenhowersvest, Antwerp, analysed by neutron activation.[40] The maiolica from the latter kiln differs from the production sites at the National Museum of Navigation and Schoytestraat also analysed in that investigation in having slightly higher iron and also differs in the concentrations of several other elements. Flower vases/jugs samples 4 and 10 are a little further away from the average analysis for the Steenhowersvest kiln, as their position on Figure 1 relative to sample 6 shows. Compared to the close similarity of

the pair 2 and 9, the samples 4 and 10 had an overall spread of twenty-two per cent and are therefore too different chemically as a pair to represent two fragments of the same vessel. They might however be from the same production centre though at different times. They are also chemically different from the Malling jug samples 2 and 9, and seem to represent clay from a different production centre or use of different clays (perhaps chronological differences) at the same centre. Flower vase/jug sample 5 shares a very similar clay chemistry to Malling jugs 2 and 9 for many elements (cf Table 1), so it its production is probably related to them, although it contains lower lime and magnesium (which might be related to a mixture containing less 'white' clay) and lower alkalis sodium and potassium.

Italian tin glaze: Glastonbury samples 1, 3 and 8

One sample from Glastonbury was identified by visual examination as a Montelupo net dish pattern (sample 3), and another as a Montelupo bowl (sample 1). Their chemistry, and that of sample 8, was quite consistent with previous ICPS and NAA analyses of Montelupo ceramics, which confirms their identified origin. Among recent analyses of Italian tin glaze, a majolica jar with grotesque decoration from New Street, Plymouth, has been compared to two samples typical of the workshop of Cantagalli in Tuscany.[41] The average composition for the three Cantagalli items analysed differs only very slightly from the average composition of Montelupo sherds. Unlike South Netherlands maiolica, however, there are not sufficient comparison analyses by ICPS of Montelupo ceramics to draw any more detailed conclusions apart from the general consistency between the three Glastonbury sherds and the chemical pattern for Montelupo. All the other pottery analysed from Glastonbury proved to have clay chemistry consistent with the Low Countries (see above).

The three Glastonbury sherds differ chemically from recent analyses of six early sixteenth-century tin-glazed vessels found in South-West England which proved to be Italian-made: three from Polsloe Priory, Devon, two from Queen Street, Exeter, and one from Preston Street, Exeter.[42] Quite remarkably, all six share a very similar clay chemistry signature, very distinctive, and unlike any tin-glazed pottery made in London or the Low Countries. They appear to be further examples of the 'Italian' version of tin-glazed pottery, first identified in 1999 by chemical analysis.[43] Since that initial publication, one analysed sherd from Cleeve Abbey has also been identified as

having the typical 'Italian' chemistry[44] and another identified by ICPS from a ceramic assemblage on the seabed near Kinlochbervie, Scotland.[45]

APPENDIX 3: SUMMARY REPORT ON THE ICP PLASMA SPECTROMETRY RESULTS ON SAXON COARSEWARES AND LATE MEDIEVAL JUGS FROM GLASTONBURY ABBEY

By MJ HUGHES

Two series of samples from the abbey were submitted for analysis by ICP: eight late medieval jugs of South Somerset type and six samples of late Saxon coarseware. The results were considered along with those from the decorated floor tiles from Glastonbury Abbey and Cleeve Abbey, as well as previous analyses of pottery from a variety of sites in west and south Somerset including Cleeve Abbey, Donyatt, Castle Neroche, and from Hemyock, and Haycroft Farm, Membury, in east Devon.

The principal component analysis showed that the analysis results on the coarse pottery spilt the samples into three groups, all of which appear to be Donyatt products, or chemically similar to such. The Donyatt reference material for comparison, i.e. pottery from kiln sites 3, 4 and 1, has slightly different clay chemistry for the products of each kiln, and the Glastonbury coarse ware seems to follow this pattern. The coarse ware does fall into three distinctive groups rather than a scatter of individual analyses. The RF/RG numbers which follow are the laboratory numbers which I assigned to them. All the Glastonbury coarse pottery analysed here is unlike the composition of pottery from Hemyock, and has the characteristic clay chemistry of south Somerset.

The group of late medieval jugs consists of:
RF14 Glast 7 P36
RF17 Glast 10 P221.3
RF18 Glast 11 P221.4
RF19 Glast 12 P221.5
RF20 Glast 13 P33
RF21 Glast 14 P46

These samples are close to the two analyses made of pottery from kiln 13 at Donyatt, and are close to the analysis of one pot from Cleeve Abbey, namely 1981: 478 III 6 (8)

A smaller group of three sherds are similar to each other, and lie between samples analysed from Donyatt kiln site 3 and 4, and is close in chemistry to a medieval (Allan 1999 (Cleeve Abbey), 62, Table 6, no. 13) and three post-medieval sherds (*op cit*, nos 17, 28 and 29) from Cleeve Abbey previously analyzed:
RF15 Glast 8 P221.1
RF16 Glast 9 P221.2
RG7 2/7 jar rim P265.2

The third group consists of:
RG8 2/8 jar rim P1048.2 (from G55, EWC15)
RG9 2/9 bodysherd P1081.1
RG10 2/10 base angle P1025 (from G55, EWC18)
RG11 2/11 bodysherd P1001 (from G55)
RG12 2/12 bodysherd P1019.2

This third group is rather away from all the other samples from the other comparison sites, though its nearest site is a mixture of samples from Donyatt kiln sites 3 and 4. Some tiles from Cleeve Abbey fall within the range of this group, and are also presumed from analysis to be Donyatt products.

The patterning by RF/RG numbers is quite noticeable, and presumably reflects a different selection of samples between the earlier batch analysed (RF) and the later batch analysed (RG).

The following tables correlate the sample numbers of sherds from the first and second batches of Glastonbury Abbey samples with their illustration numbers and museum catalogue numbers.

Batch 1: late medieval jugs

	Sa no., Batch 1	*Museum number*	*Pottery report no.*
Glastonbury Abbey	7	P36	189

"	8	P221.1	190
"	9	P221.2	191
"	10	P221.3	194
"	11	P221.4	195
"	12	P221.5	Not drawn
"	13	P33	Not drawn
"	14	P47	193

Batch 2: Late Saxon coarsewares from Glastonbury

		Sa. no. Batch 2	*Museum number*	*Excavation year & context (where known)*
RG7	Glast Abbey	2/7	P265.2 jar rim	
RG8	"	2/8	P1048.2 jar rim	Glas 1955, EWC15
RG9	"	2/9	P1081.1	
RG10	"	2/10	P1025 base angle	Glas 1955, EWC18
RG11	"	2/11	P1001 bodysherd	Glas 1955
RG12	"	2/12	P1019.2 small bodysherd	1955 CLE-W. Debris above glass furnace 1.

APPENDIX 4: ITALIAN WARES

By Hugo Blake

Three of the fragments analysed by Hughes have a chemistry consistent with Montelupo in the lower Arno valley.

ICP sample 8 (Fig 14, no. 213)

Cylindrical wall of what may have been a drug jar. Fairly hard pale pinkish-brown fabric. Dull greyish tin glaze on both sides. Herringbone pattern formed of broad diagonal lines within three vertical lines delimited by a horizontal one

below (or above), all in dull dark blue, flanked by blank bands alongside and below (or above).

Est. body diam. approx. 140mm.

Whereas ICP samples 1 and 3 below share the same fairly soft buff fabric, shiny white glaze which on the outside has a pinkish tinge, and bright polychrome colours, this sherd's fairly hard fabric is more a light brown and its greyish glaze is dull. The blue decoration seems to be formed of vertical bands, one filled with a herringbone or stylized leaf pattern with – on the surviving part – the 'needle leaves' arrayed alternately on the stem and flanked by two blank bands (more clearly so to one side than the other). They are delimited (below?) by a horizontal line. There is no apparent trace of lustre.

The closest parallel is a complete drug jar, once owned by Bode.[46] Its ornament, which is wholly in blue, is divided into horizontal tiers separated by blank bands. The lowest tier is filled with vertical rectangular areas consisting of a herringbone or upright pinnate needle-like leaf pattern alternating with areas less populated by a linear crossed element and a hanging tuft of grass or splayed needle leaves. It resembles in form and decoration jars found in Spain.[47] The same narrow shape with a straight-sided or only slightly waisted body and a bevelled shoulder and foot, the former steeply sloped, was used for more obviously Tuscan products which were decorated with touches of yellow within the predominately blue décor.[48] Cora published Bode's jar and another in the Victorian and Albert Museum as Tuscan.[49] The two drug jars share a number of motifs and bear in about the same location on the body a tier of pinnately veined ovate leaves springing from a scroll. Since then Berti has re-attributed both to Spain and Ray has assigned the V&A's jar to Paterna or Manises on the basis of close decorative similarities with 'striated' leaves on pottery from Paterna.[50] One of the last, a bowl in the Instituto Valencia di Don Juan in Madrid, has an almost identical pattern in its cavity to that on the lowest tier of Bode's jar, the one which resembles the Glastonbury find.[51] As the oblique bones or needle leaves on the Glastonbury Abbey fragment differ from the Spanish examples in being thicker than the lines of the frame and in being arranged alternately, the apparent contradiction between the ICP analysis, which rules out Spain as the source of sa 8, and the Spanish analogues could be resolved by suggesting that the Tuscan decoration is more schematic. However, Rackham noted that the V&A jar – in

common with Tuscan drug jars – has a flat base, whereas the base of Spanish drug jars is 'concave'.[52] Indeed all the Spanish drug jars in that museum have a footring,[53] including one of the two lustred jars described by Ray as having a flat base.[54] The base of the other on display in the Islamic Middle East Gallery cannot be seen.[55] So, the ICP analysis provides independent and new evidence for the Tuscan source of some of these drug jars.

Cora placed the decoration of the two drug jars within Ballardini's wider *famiglia italo-moresca* (italo-moresque family), datable to 1430–60.[56] Ray proposed a date about 1400 for the V&A jar and Berti dated Bode's to 1430–40.[57] The Italian chronology is probably derived from that of the so-called Master of Flémalle's *Annunciation* in Brussels, datable to the 1430s or earlier, in which a jug of Cora's related variant was represented.[58] Headgear in fashion around 1430 was painted on other examples of the Brussels type.[59] The Spanish dating to *c.* 1400[60] may derive from the presence of another blue-decorated type in the vaults of a Barcelona hospital of 1404/6–14 and from the assumption that this class in general represented a stage between the 14th-century green-and-brown and the 15th-century lustrewares.[61] 'Valencian' pottery similar in style to sa 8 was excavated at Rougiers in south France in contexts datable to the second half of the 14th and to the start of the 15th century.[62]

The fabrics found at Montelupo are either red or buff.[63] Analysis of a range of products found there show that the tin-glazed pottery datable from between towards the end of the 15th century and about 1700 contain more calcium than the 'archaic maiolica' samples, whose chemical characteristics resemble the later slipped wares. The whiter fabric of the former was also more porous and fired at a slightly lower temperature.[64] Hughes's ICPS analysis of the Italian pottery found at Glastonbury demonstrate that samples 1 and 3 contain almost twice as much calcium as sample 8 (Hughes, above, Table 1). Berti[65] does not recognise the pinkish-brown fabric of sample 8, concurs that its uniform colour precludes an attribution to Valencia, and would expect blue-decorated tin-glazed pottery of this period to have a buff fabric.[66]

The dull glaze is similar to the blue-speckled covering of both the drug jar re-attributed to Valencia and of a pale blue decorated one assigned to Montelupo.[67] It also resembles the early blue decorated ware, to which the Brussels jug belong, on display in the Museo della Ceramica di Montelupo, which Berti now calls *domaschino monocromo* (monochrome damascene).[68] None of these, however, are as grey as sa 8, which may be caused by the darker colour of its underlying fabric or by

the conditions in which it lay underground. Their glaze contrasts markedly with the shiny white surface – perhaps caused by an additional coat of lead glaze[69] – of the contemporary Italian jars decorated with oak leaves in relief blue exhibited in the same case at the Victoria and Albert Museum.

As the diameter of sa 8 seems to be almost the same as that of the similarly decorated and glazed drug jar in that museum, the Glastonbury Abbey fragment may once have been part of a vessel of the same height of nearly 320mm, taller than Bode's at 295mm and similar jars in Spain reported as 305 and 250mm high.[70]

Jars decorated only in blue may have been 'common' in Valencia[71] but the representation of an Italian jug in the Brussels *Annunciation* suggest that this ware may have been prized more highly in north-west Europe. It is possible that the jar's content was more important than the container. As very similar items were produced in both Valencia and north Tuscany in the early 15th century, the Glastonbury jar may have been chosen by an Italian merchant in order to mislead a north European consumer about the origin of the commodity enclosed.[72] It does suggest – if such evidence is needed of the abbey's or the abbot's connections and consumption – that someone may have acquired an unusually packaged exotic product early in the 15th century. This jar could, of course, have been passed on after its original contents had been consumed elsewhere. However it reached Glastonbury, this tall and strangely decorated pot would have been a striking possession.

ICP Sample 1 (Fig. 14, no. 214)

Junction of broad brim and deep cavity of a dish. Fairly soft buff fabric. Parts of tin glaze flaked off, shiny white on the brim, dull outside and tinged pink, also pinkish inside cavity. Upper side of brim painted with foliage outlined in blue, central tear drop filled with yellow and marked by two longitudinal blue lines, flanked by darker blue elements, one marked in orange, another crossed by four blue lines, and a green-filled frond. Trace of blue inside cavity, which is otherwise plain, as is the outside.

Est. diam. inner cavity approx. 80mm.

Similar to the orange tear drop and lush green and blue leaves of the palmettes on the wide brim of a 'plate' in the Victoria and Albert Museum, which does, however, lack the blue lines along the tear drop and across the blue leaf. It is attributed to Deruta or

Siena and a date of about 1500 is proposed.[73] Similar fronds are on Berti's *girali fioriti* (floral scrolls) and *grottesche* (grotesques) decorative 'genera', examples of which are dated 1544 and 1509 respectively.[74] On display in the Museo della Ceramica di Montelupo[75] are two *grottesche* decorated with blue and white palmettes on an orange ground. Their cornucopia-like fronds are marked by three or four horizontal blue lines, similar to sa 1. One is on the wide brim of a 'bowl' with a relatively small cavity. The upper side of the cavity wall is plain white with a coat of arms in the centre.[76] The plain white side of sa 1 – apart from a trace of blue – suggests that it too may have once been decorated with a coat of arms or an emblem in the missing cavity centre.[77] The second is a 'tray' or plaque whose border is marked by a series of palmettes and green fronds, which resembles the surviving one on sa 1. The museum display labels propose dates of 1490–1500 for the first and 1490–1510 for the second. The form of the Glastonbury Abbey fragment resembles the slightly inclined broad-brimmed dishes with a narrow deep cavity illustrated by Berti, which can have a concave or a flat base.[78] The diameter of the V&A 'plate' is 245mm,[79] whereas that of the Montelupo 'bowl' is 155mm.[80] Sample 3 probably lay in between.

ICP Sample 3 (Fig 14, no. 215)

Narrow brim with simple rounded rim of a dish. Fairly soft buff fabric. Shiny white glaze on upper surface, tinged pink outside, now chipped off parts of rim. Decoration outlined in pale blue with crossed diamond delimited also in darker blue, yellow merging into orange band on rim marked by one and flanked by two other concentric blue lines, within spandrel formed by the rim and the diamond are hooks and curls framed by curved side return, within two remaining squares inside diamond small motif of orange crossed circle or yellow spot surrounded by four purple-black dots. Pale purple brown band around outside of cavity.

Est. rim diam. approx 200mm.

The fragment formed part of a decorative scheme, shown in its entirety in a restored example from Castle Street, Plymouth.[81] Berti once called it the *nodo orientale evoluto* ('developed oriental knot'), but now *a losanghe* (with lozenges). He dates the type to *c.* 1540–1620, when it was one of the commonest Montelupo decors.[82] The south-west English examples belong to what may have been the most

popular variant of this type, dated by Berti to 1550–90, and he assigned a polychrome example of this *decoro 'a losanghe' policromo* to 1570–90.[83] The dates given on the labels in the Museo della Ceramica di Montelupo, room 16, case 90, vary between 1580 and 1630. Hurst called it the 'lozenge net design' and listed finds from Bristol (which he illustrated), Canterbury, London, Devon, east Yorkshire, and Ireland. He also stated that purple lines were common on the back of Montelupo dishes[83] and drew attention to the later English archaeological dating to the first half of the 17th century.[84] The type formed almost eight per cent of the over 18,000 tin-glazed sherds excavated in the garden of the S. Caterina della Rosa convent in Rome, suggesting that it may have formed a service in the first period of the convent's life between about 1550 and 1630. One fragment has the date [...]84 – presumably once 1584 – painted on its reverse.[85] Allan calls the type the 'net pattern' and reports that it is one of the two most common types of Montelupo pottery found in south-west England.[86] It was as well the most numerous of the Montelupo types from a ship wrecked off the coast of north-west Scotland, perhaps in the 1590s or later.[87] Cora in his extensive study of pottery found in or attributed to the Florentine area (which includes, of course, Montelupo Fiorentino) was the first to publish items similar to these, which he called *agli intrecci* ('interlace').[88] Between 1973 and 1976 Vannini excavated analogues in a well filled with wasters at Montelupo.[89] In Blake's report of both these pioneering works, he referred to them under 'network'.[90] Berti places Vannini's examples and some of Cora's in his earlier *nodo orientale.*[91] Italian archaeologists usually describe the decoration instead of labelling the type in their reports, but more recently Carta has called the commoner variant like the one found at Glastonbury *italo-moresco tardo* (late italo-moresque) or *a losanghe*. She has also listed where some have been found in Italy, Spain and north-west Europe.[92] As sa 3 and its ilk are distinguished by the diamond or 'lozenge' from other net patterns, perhaps it would be better to use the name 'lozenge net design', employed by Hurst.

The Glastonbury Abbey fragment seems to belong to a smaller dish than those published from elsewhere in south-west England and in Italy, whose diameters vary from 230 to 335mm.[93] Lacking the yellow- or orange-filled oval or another motif which separates the diamond from the band on the rim, the simpler ornament on sa 3 is commensurate with a smaller item. However, this element is present on all the examples – including the small bowls on the top shelf – on display in the Museo di Ceramica di Montelupo.[94]

That these three fragments – even the well known lozenge net design sa 3 cannot be matched exactly with material found at Montelupo confirms the impression gained that at times there is a discrepancy between exported items and those common in their country of origin.[95] It also demonstrates the importance of analysing the chemistry of exotic fragments in order to provide independent evidence of their origin. Sample 3 is of the period between the middle of the 16th century and the middle of the 17th, when Montelupo's tin-glazed pottery was most copiously and widely exported to the Atlantic world,[96] probably stimulated by the English and Dutch mercantile presence in Livorno.[97] Sample 1 is one of a growing number of items datable to around 1500, which – thanks to Hughes's investigations of what were called South Netherlands maiolica and Faenza-type jugs – have been identified as Tuscan.[98] However, sa 8 is the first early 15th-century item in north-west Europe which has been identified with certainty as from Montelupo. Other 15th-century items found or represented in paintings in the North may also have been made in that town.[99] The conquest of Pisa by Florence in 1406 would not only have facilitated the export of Florentine products, but may also have privileged them.[100]

APPENDIX 5: SPANISH AND PORTUGUESE WARES *by* Alejandra Gutiérrez

A handful of Spanish finewares and coarsewares were found during the excavations but no record has survived of their stratigraphy or to indicate where they were found within the abbey. Some of this pottery had a long lifespan of production and is difficult to date in itself, although it seems very likely all the material catalogued here belongs to pre-Dissolution phases.

Spanish pottery

Malagan early lustreware

215. Unstratified. ?Late 13th century (Fig 15).

From excavations *c.* 1910–65 (GLSGA/1991/66/6; P199).

Previously published as Allan and Hurst 1995, no. 11.

Two joining sherds from a small dish with a flange and bevelled rim. Light orange fabric with buff surfaces. The fabric is fine, containing visible inclusions of red schist. The sherds were originally entirely covered with a white glaze, but this is much decayed and now only present in a few small patches (of white or brown

colour). This decay of the surface treatment is quite typical of early Malagan lustrewares and has led to suggestions that the covering was in fact a white slip under a thin transparent glaze, rather than a white glaze. Recent analyses have, however, confirmed that it is indeed tin glaze, although it has a relatively low lead content and what is described as a 'low interaction between body and glaze'[101] which seems to promote decay.

No decoration survives on this vessel but all the early Malagan products found in the UK and whose decoration is still visible have been identified as lustrewares, sometimes with the addition of motifs in blue.[102] The closest parallels in profile and characteristics to this particular find from Glastonbury are a small flanged bowl from Winchester, and two others from Southampton. That from Winchester (Fig 15a) comes from a pit fill now recognised to contain 14th-century local pottery[103] rather than being of earlier date as had previously been thought.[104] That from Bugle Street in Southampton is from a pit fill containing late 13th- and early 14th-century pottery,[105] while the sherd from Canute's Palace in Southampton is associated with 13th- or 14th-century pottery.[106]

Malagan lustrewares may have arrived in the UK with Eleanor of Castile in the second part of the 13th century.[107] Edward I's queen certainly brought with her other elements of Spanish culture, from interior design to the use of water in gardens,[108] and favoured Spanish merchants with concessions in the second half of the 13th century in order to establish regular contact with Spain, the Low Countries and Gascony.[109]

This type of early lustreware is uncommon in England, having been found at just 20 sites concentrated in the south.[110] So far no any other examples are known from Somerset and no further sherds have come to light since John Allan published his round-up of finds from the South West.[111]

Early Valencian lustreware

216. Unstratified. Late 14th century (Fig 16).

From excavations by H Woods in 1989 (; P890).

Previously published as Allan and Hurst 1995, no. 20.

Large flanged dish with orange fabric throughout, with some mica spots, clay relicts and small voids. Interior and exterior white tin-glazed. Originally decorated in

lustre and blue, but the lustre has now completely disappeared and the only parts of the pattern to survive are the blue lines on the interior surface.

This blue decoration resembles very closely the radiating pattern associated with a group of dishes of complex and intricate decoration, best illustrated by a complete example from the Cluny Museum (Fig 16a);[112] a similarly decorated rim sherd found in London also forms part of the Victoria and Albert Museum collections[113] (Fig 16b). In the past the use of minute lustre motifs and the overall design made it difficult to say whether this pattern was used by Malagan or Valencian potters, but chemical analysis of the sherd in the Victoria and Albert Museum has confirmed that they were made in Valencia.[114]

The vessel in the Cluny Museum is atypical in many respects because it is so large, with four lugs on the rim, no flange and a diameter of around 0.56m. The sherd in the Victoria and Albert is a smaller, plainer bowl with no lugs and it shows that the intricate and fine decoration was applied not only to exceptional profiles but also to simpler forms, perhaps like the example from Glastonbury.

Valencian lustreware

216. Unstratified. Late 14th–15th-century (Fig 17).

From excavations *c.* 1910–65 (P91).

Previously published as Allan and Hurst 1995, no. 19.

Large dish with dark orange fabric throughout. Interior and exterior white tin-glazed. Painted lustre and blue decoration; the lustre colour is very faint and has disappeared in some areas. The motifs are lustre 'dotted flowers' and blue Gothic writing on the interior surface; on the exterior are concentric bands of lustre lines with a ladder pattern of diagonal hatching.

Gothic writing decoration was used by Valencian potters during the 15th century.[115] The most common combination was the letters 'ihs' for *Iesus Hominis Salvator,*[116] although longer phrases (*Ave Maria Gracia Plena*, for example) could be placed along the flange of large dishes, and sometimes single initials or letters were also used. The usual combination of dotted flowers in lustre colour covering the whole interior surface together with a large blue central motif (animal, letter or flower) can be seen in numerous examples that survive today in museum collections (Fig 17a–b). It is not possible to identify the central motif on the Glastonbury dish,

although the letter is certainly large and this discounts the possibility of it being a long phrase. It could well be a single initial or the bottom part of the 'i' or 'h', as in 'ihs'.

Whereas early types of Valencian lustrewares, such as 217 above, are rare in England, and known from only 10 sites, Valencian lustrewares of the 15th century of a kind similar to 218 are far more commonly found. They have been identified from well over 100 sites all across the country, reaching inland sites which lie well away from the coast.[117] Their fame certainly preceded them. At the end of the 14th century such lustreware was described as 'the most beautiful pottery'; people simply 'fell in love with it ... from the pope to all the princes of the world'.[118] In Spain Valencian lustrewares were favoured by royalty, and when Queen Mary of Aragon demanded a long order in the middle of the 15th century, including dishes for serving food and for eating off, small bowls to drink broth, water jugs, large mortars, little bowls and small pieces, jugs with and without spouts as well as containers for drinking water.[119] Valencian lustrewares of the 15th century reached most of Europe and the Mediterranean, and they are found in small numbers from the north of Africa to the Holy Land.

Seville Morisco ware

219. 15th–early 16th centuries (Fig 18).

No provenance details (P202.).

Previously published as a lid in Kent 1997, no. 11.

Dish with buff fabric throughout, emerald green glazed on both surfaces. This is probably a Plain Green dish (covered in tin green glazed all-over), although given the small size of the sherd it could also have belonged to a Half Dipped White and Green dish where half the vessel (both interior and exterior surfaces) has been covered in green glaze and the other half in white glaze.[120] Very worn around the rim.

The fabric and profile are typical of dishes produced from the late 15th century in Seville, from where they were exported in vast quantities during the 16th century down the Guadalquivir river. What is is unusual about this vessel is its decoration, or the lack of it. Exported wares from Seville are typically white tin-glazed, sometimes with colourful decoration (blue and purple; or blue). Although these decorated examples appear in greater numbers in the Americas, where the main export trade was directed, they did reach England and northern Europe.[121] A range of less typical wares are also occasionally found; a good number are known from

Southampton,[122] the main port of the arrival for Mediterranean ships at this date, although finds can also reach further afield. A vase/jar similarly tin green-glazed was found in Scarborough in North Yorkshire, for example.[123] It is most likely that these atypical wares arrived by means other than regular trade in pottery, and we might speculate that they were given as gifts or exchanged through personal contact with Spaniards or Mediterranean merchants of other nationalities.

Seville-type early style olive jars

Four sherds from two different early olive jars were found. They are thinner (*c* 6mm) and with a finer sandy fabric than later olive jars. The shape is that of a barrel costrel with two handles and this early type is traditionally dated to the late 15th century and 16th centuries.[124]

Seville-type olive jars

Five sherds from two different vessels, two of them from a narrow base, typical of the 16th–18th centuries. Sandy fabric with mica; external walls with characteristic grooves. Unglazed.

These were the standard container used for the export primarily of oil and wine, but also a wide range of foodstuffs and other goods, from honey and chickpeas to coins, lead shot, turpentine or cinnabar.[125] Although the early type of olive jar is not so frequent in Britain (they are known just from around 15 sites in the country), the later 16th–18th-century jars are relatively common, having been found in more than 100 sites, especially in the south of England and around the coast.[126]

These utilitarian containers are unlikely to have travelled for reasons other than a culinary or commercial interest in their contents, and their arrival at the abbey and their purpose once there is therefore very different to that of the decorated dishes described above. The latter could have only been used as tablewares, most likely for the serving or presentation of food at the table. These exotic wares not only differed visually from locally produced pots, they would also have been rare and difficult to obtain. It is hard to say who might have purchased and used this selection of decorated pottery, not least because the sherds themselves are unstratified and their precise findspots on the site are unknown to us. Perhaps the pots were associated with the guest house and belonged to a passing visitor rather than to the abbey itself, as collections from other abbeys would seem to suggest.[127] If they were indeed

purchased for use at the abbey, the low numbers of vessels recovered surely suggest that they were reserved for special occasions or restricted to the use of guests rather than being for the religious community as a whole. Unfortunately, although lustrewares are known from other monastic sites, their distribution on site is generally unhelpful in answering this question. Most of the identified sherds of this type derive from fills or demolition layers associated with the Dissolution, sometimes re-deposited, as for example at Denny Abbey (Cambridgeshire), Polsloe Priory (Devon), or Waltham Abbey.[128]

Portuguese pottery

Four fragments of Portuguese micaceous redware, also known as 'Merida-type ware', were recovered from the abbey excavations, including two wall sherds and a handle from two different vessels, perhaps standing costrels, and the rim of a straight-sided vessel (Fig 19, no. 220). A further wall sherd is lightly incised on the exterior with what may be a merchant's mark (Fig 19, no. 221). This consists of a vertical line through which various scratches have been deliberately cut to create a unique identifying symbol. If that is indeed what this is then other examples are known from lead seals as well as from contemporary graffiti in late medieval buildings, and indeed from other pottery containers. Portuguese costrels from the *Mary Rose* and from the Studland Bay wreck, for example, also bear marks[129] and in Seville it known that lists of marks were recorded against the goods being readied for export. It is likely therefore that scratched marks on pottery containers identify the merchant as opposed to initials or other symbols on tablewares which identify personal property. Marks could also be made by the middleman who purchased or selected the pots at the point of sale. A documented example of this is a pot of treacle marked twice with the letters MP for Margaret Paston, made when the pot was personally selected in the shop by his son in this case,[130] John Paston observes that the merchant marks were on the cover of the pot (very likely an albarello with a cloth or parchment cover).

All these sherds have a dark orange fabric throughout, with slightly darker orange surfaces. The fabric is sandy with visible characteristic mica flecks and white quartz. All the sherds are unstratified and not east to date with any precision. It is traditionally asserted that vessels of orange fabric (rather than brown) date to the

16th-17th centuries (Hurst *et al* 1986, 69), but recently published assemblages display a variety of colours, from red and brown to grey/black.[131]

Portuguese coarsewares arrived in Britain from the 13th century onwards, the earliest type to arrive being the standing costrel. From the 16th century the range of forms becomes much wider, including bowls, jars and jugs, as evidenced by finds from Southampton and Plymouth where several large assemblages have been found.[132] Finds from Somerset include those from Chard, Axbridge, the Augustinian house at Woodspring, Taunton, Bridgwater and Shapwick, the latter being a Glastonbury manor during the Middle Ages.[133]

As work progresses in Portugal, more assemblages are coming to light which help with the identification of this type of pottery. Although neither kiln nor production sites have been discovered so far, several shipwrecks full of this type of pottery are now beginning to illustrate the wide range of wares that were traded. Portuguese micaceous redware is believed to have originated in the area around Aveiro in northern Portugal,[134] although this whole area, which also includes western Spain, produced micaceous wares which are still yet to be properly characterized.

APPENDIX 6: A MEDIEVAL JUG WITH LETTERING *by* OLIVER KENT

Amongst the small collection of pottery from Wedlake's excavation of the Abbot's Hall in 1979 is a sherd of a late medieval jug with incised lettering (Fig 11, no. 187).[135] Since lettering is extremely rare on north European pottery, the find is discussed here in a wider setting.

Context

The excavation was carried out at the south-west corner of the Abbot's Hall and its porch; its purpose was to locate their robbed wall foundations so that they could be marked out on the ground.[136] The Department of the Environment specified that pre-Dissolution levels should not be disturbed; the trench followed the east wall of the porch from the north to the south door, leaving most of the interior and west side undisturbed. All finds from the excavation should therefore have come from post-Dissolution deposits.

The position of the sherd is recorded on an accompanying label, which states that it was found under the paving of the Abbot's Hall porch. Unfortunately there is

no reference in the excavation notebooks, or in unpublished interim reports, either to the paving or to the sherd.

Form, fabric and dating

The sherd forms about one fifth of the rim of a finely thrown slip-decorated jug. Below the flattened everted rim runs a raised cordon, connected to it by a series of evenly spaced applied strips whose lower ends are pushed upwards to form projections. Below this is a horizontal band of white slip 16–17mm wide, through which the letters …]ASOT[… are cut in Lombardic capitals in sgraffito technique. The fabric is a sandy reoxidized orange-red internally, turning pale blue-grey on the outer surface under an olive green reduced lead/iron glaze. Visual examination suggests that it contains large amounts of very fine sand, some mica and scattered larger dark red clay fragments.

The form of the rim with its applied strips (sometimes thought to be human heads) is paralleled by a number of thirteenth/early fourteenth-century wares from South-West England. The type occurs amongst the material from kilns 1 and 5 at Laverstock (the earlier kilns in a range dated *c* 1230–75);[137] at Nash Hill, Lacock, Wiltshire;[138] on type 1C jugs in fabric 40/42 at Exeter (1250–1350), and on thirteenth-century jugs from Exeter of fabrics 44 and 45.[139]

The fabric and glaze, particularly in combination with the use of slip and sgraffito, are paralleled in the local wares of South and East Somerset. The fabric group defined as Exeter fabrics 40 and 42;[140] DTP 4 at Donyatt[141] and PT 132 at Taunton[142] represent more than one centre of production but nonetheless form a closely related range of late thirteenth/fourteenth-century decorated wares. Donyatt is the only excavated production centre. The use of a horizontal slip band in combination with the rim form probably indicates a late date in this range, perhaps around the mid-fourteenth century.

A further local production centre appears to be represented in the later medieval material at Glastonbury: some of the local jugs are difficult to fit into the Donyatt mould and show closer affinities with the sixteenth-century fabrics from east Somerset.[143] These medieval wares share with their post-medieval counterparts a fineness and delicacy, as well as a more restrained range of decoration, lacking at Donyatt. Excavations at Glastonbury Abbey in advance of the new museum have produced stratified examples and a substantially complete jug, giving a possible date

range for these jugs in the fifteenth century, perhaps into the early sixteenth. Whilst the match is not close, the inscribed jug has most affinity with this group of wares, and it is possible that it belongs to an earlier phase of this production source.

Discussion

Gerald Dunning first drew attention to medieval pottery with lettering in two papers in *Medieval Archaeology;*[144] the subject was subsequently explored further by John Cherry.[145] The use of lettering is extremely rare on Northern European medieval pottery. There are a few examples of vessels with stamped inscriptions from early medieval France[146] but it was not until the thirteenth century that inscribed vessels began to appear more widely, and the sixteenth century before they become more common.[147] This is in contrast to the widespread use of lettering on allied objects such as floor tiles and copper-alloy vessels.

The lettering

The inscription is written in Lombardic capitals with a V-barred 'A' and a rounded uncial 'T'. Such lettering came into general use during the thirteenth century. A similar combination of letter forms occurs on the late thirteenth/early fourteenth-century Syrian/Venetian enamelled glass beakers from Fosters Lane, London.[148] Here the V-barred 'A' occurs amongst a variety of letter forms described as Lombardic, although some are conventional Roman forms, amongst them a 'T'.[149]

The nature of the inscription is obviously difficult to determine. It is possible that it is nothing but a string of letters, as in the examples from Abthorpe[150] and Canons Ashby[151] (both Northamptonshire) and Coventry.[152] In this case the carefully incised letter forms, and perhaps the monastic context suggest otherwise.

Comparison with the Fosters Lane glasses and with inscribed bronze vessels suggests that the irregular spacing of the letters is meaningless. A cross indicating the beginning of a word and two dots marking a new starting point are typical features; otherwise the words are occasionally distinguished by a dot. A rough calculation of the number of letters in the entire decorated band suggests that, depending on whether the vessel had a spout, there could have been between 16 and 20 letters. The lower parts of the jug might have accommodated further bands of lettering.

Conclusion

In contrast with most other medieval inscribed pottery vessels from England, the Glastonbury inscribed jug is of particularly fine quality, both as a pot and in its lettering. Elsewhere, when lettering was used, it was frequently as decoration rather than as a legible text. By contrast, lettering is used relatively frequently on tiles, metalware and seals, where it is generally intelligible. There is a distinction amongst the pottery between those vessels such as the Coventry, Abthorpe, and Canons Ashby jugs, where the effect would appear to be mainly visual – an imitation of more prestigious objects – and others like those from Spilsby, Lincolnshire,[153] Rye, Sussex[154] Utrecht and perhaps Glastonbury which seem to be inscribed with a legible text.

That pottery should be inscribed at all is a measure of its growing status in the thirteenth and fourteenth centuries. It is one aspect of developments that produce a flowering of highly decorated pottery and a demand for prestigious imports like the Saintonge polychrome wares.

Whilst the placing of an inscribed band below the rim of the Glastonbury jug is probably derived from contemporary metalware, the use of a white slip band, sgraffito and the rim form are all part of the range of processes commonly employed by the potters of South-West England. The care with which this fusion of ideas has been carried out has implications for ideas about the changing role of the late medieval potter.

APPENDIX 7: SPECIALIST AND INDUSTRIAL VESSELS

By Oliver Kent

Eight vessels in the collection – two perforated jars, four distilling bases and two crucibles – can be associated with specialist scientific or industrial activities.

Perforated vessels

Two vessels have been perforated by drilling holes in their walls after firing:

222. A hand-built jar with a coarse fabric, now so heavily burnt to black and brown that identification is difficult (?Upper Greensand-derived). There are four perforations, arranged in a vertical row down the body, all cut from the inner face – perhaps drilled with a sharp point. Two further holes, drilled from the outer face, are present on the right-hand edge of the fragment. If further

vertical rows of holes were spaced equally around the pot, there would have been eight of them. Since the sherds are heavily sooted internally, the pot seems to have contained a fire.

The vessel shows interesting evidence of its construction. Vertical paddle or rib marks on the external face of the belly correspond to finger impressions on the inner face. Horizontal striations on the outer face of the rim suggest the use of a scraper to define and form the shoulder and neck of the vessel. Smudging of the last coil on the top of the rim suggests the use of a damp cloth or a piece of leather to finish off (P244 and P279.1; possibly also a group of sherds catalogued as P267).

223. Rim of a hand-built jar with a hard grey to black sand-tempered fabric. The vessel interior is blackened but not sooted. The distinctive rim form is paralleled by material from Taunton, believed to date from *c* 1300–1500.[155] (P279).

The functions of perforated vessels have been discussed by Moorhouse, who has shown that such pots had various purposes. He has noted documentary evidence for the use of pierced earthenware vessels for the production of white lead, and for a variety of distillation and fermentation processes.[156] He suggests they may also have served as containers for coals (either as braziers, curfews or as heat sources); vessels with particularly large holes might have served as lanterns.[157]

Braziers and lanterns would not need vessels with regularly arranged rows of holes. However, one of the recipes quoted by Moorhouse requires a vessel to be pierced at opposing points so that rods could be pushed through it. The regular arrangement of holes in vessel 001 suggests that it served a specialist function, rather than simply being a brazier.

White lead was the most important white pigment available to the medieval artist. It was widely used in illumination and panel painting, although rarely employed in architecture, since it blackened with time when in contact with lime plaster. Medieval texts describe two types of recipe for its manufacture. One required the suspension of lead over vinegar in a sealed container. Some versions of this recipe require the vessel to be perforated in order to carry rods from which the lead was suspended. Strictly speaking, this process made lead acetate rather than lead carbonate; a recipe for its production which mentions the use of earthenware containers circulated widely from the twelfth century:

Vorte maken blankplum [white lead]. Tac a vessel of eorthe, other of treo, of a galun other more other lasse, cheos thu. Et seththe bore holes acros ithe .iiij. sides, that is to siggen, the verste .iiij. holes an .v. unchun, other more other lasse, from the grount to the mesure of thi vessel that is. Et seththe an .iij. unchun other more herre other .iiij. holes acros, and so herre ant herre vorte thu come to the ovemoste ende, whether the vessel beo more other lasse. Et seththe tac led ant melt hit. Et jef hit nis nout fin ant clene i-noh, cast hit into clene water, ant bote hit beo fin ant clene thenne, eft sone meltit ant cast hit into watur. Et so pure hit vorte hit beo fin ant clene i-noh. Et seththe meltit ajeyn, ant cast hit into an empti bacyn, other into whet vessel thu wolt of bras, that hit vleote*' abrod vorte beo thunne. Et jef hit nis nout thunne i-noh, tac an homur ant bet hit as thunne as thu myht. Et seththen tac stikken ant pute acros ithe .iiij. holes, in everuch degre herre ant herre. Et uppon everuch stikke honge of that thunne led, as thicke as thu miht, from gre to gre, so that no degre touche other. Et seththe tac vinegre ant held into the vessel i-noh, so that the nethemoste led ne touche nout the vinegre. Et seththe tac a ston, other a bord, that wol kevere the vessel, ant clos hit above wel ant faste. Et seththe tac fin cley ant good, ant dute al the vessel that non eyr ne go out, bothen the holes ant eken above ryht wel. Et thenne tac thi vessel ant sete hit into horsse dunge depe, bi the space of .ix. niht, other more, ant thenne tac up thi vessel, ant unclosit above, ant jef thu findest eni led uppon the stikkes undefijet", hit is in defaute of to lutel vinegre; ant jef thi led is defijet al ant findest vinegre ithe grounde, thenne hit is wel, thenne held out softeliche that vinegre, ant tac up thi blankplum, ant do therwith whet thu wolt. Ant thah thu finde eni led, as ic sayde er, unde- fijet, kep hit that another time, that thu wolle make more.[158]

By the late fourteenth century the author of the text *De Arte Illuminandi* wrote:

I have found that there is only one white colour which is fit for the practice of illuminating, namely white lead, known also as ceruse, for the white from calcined bones will not do because it is too pasty. And it is not worthwhile to include a method for making white lead because it is common enough knowledge to practically everyone that it is made out of lead, and it is readily available everywhere.[159]

The excavation of two oyster shell palettes containing red and blue pigments may also be noted here.

Distillation bases

The collection contains four distillation bases: one medieval hand-built vessel (224) and three wheel-thrown wares of fifteenth- or sixteenth-century date (incl. 225–6). When stood on a trivet over a flame, they may have contained the substance from which the distillate was produced, or have acted as the base on which a cucurbit containing the substance would have stood.[160] The gallery was designed to seat an alembic, a domed vessel with an internal rim and a projecting spout. Such vessels were usually of pewter or glass, but pottery examples are known. The distillate collected within its dome, then ran down to the rim before running off through the spout into a collecting vessel.

224. Sherd with the full profile of rim, wall and gallery. Orange to grey fabric with fine sand temper, and with occasional larger inclusions of ironstone and quartz; interior grey with yellow to black discolouration on the lower wall and base. Hand-built; the rim and base diverge.

225. Vessel restored in plaster and coated with brown varnish. Only small areas of fabric now visible: orange-brown without gross inclusions. Fairly even internal and external olive green glaze, except on the top of the gallery and the outside of the rim. Traces of burning on part of the gallery. South Somerset, fifteenth- or sixteenth-century (P344).

226. Sherd forming almost the full height of a distilling-base. Fine sand-tempered fabric, fired reddish-orange to grey; olive green to brown glaze on the interior; external glaze confined to a few splashes on the gallery. South or West Somerset, fifteenth- or sixteenth-century (P205).

Not drawn: A single sherd of gallery and wall. Soft orange fabric tempered with fine and coarse sand, clay pellets and ironstone inclusions. South or West Somerset, fifteenth- or sixteenth-century (P304).

A similar vessel to no. 224, excavated at the Wool House, Southampton, has a distorted elliptical rim and patchy internal glaze, and probably dates from the late thirteenth or fourteenth century.[161] The forms of vessels 225–6 fit into the general

range of distilling bases published by Moorhouse; an unglazed example from the fourteenth-century kiln B at Brill, Bucks, is the closest parallel.[162] Another find from the kiln site of Pottersbury, Northamptonshire, and a related group of forms from Oxfordshire, were published by Jope in the 1940s.[163]

Comparison with more local material has produced no exact parallels, although a mid-seventeenth-century example shows certain similarities.[164] A number of vessels with projecting external lid seatings, identified as cucurbits, are known from other parts of the South West. Several late sixteenth-century vessels with external lid seatings from Narrow Quay, Bristol, attributed to Nether Stowey or West Somerset, have been published as definite or possible examples, but none of them is convincingly distinct from domestic ware forms.[165] An alternative form with a collared rim leaving an external shelf is represented by two vessels from Exeter.[166]

The first references to distillation in this country date from the early fourteenth century, but it is likely that they had been in use before that time. Numerous illustrations in treatises on metallurgy and alchemy illustrate the processes and equipment used; they seem to have varied little. The apparatus could be made from a variety of materials, the bases commonly ceramic, the other parts of ceramic, glass or metal. The pottery bases are the most recognizable survivors in the archaeological record, although Moorhouse identified ceramic alembics, cucurbits and receivers, and these forms are also found occasionally in South-West England.[167] No chemical equipment is represented among the small collection of vessel glass from the abbey.

In his introduction Moorhouse's paper of 1972, Frank Greenaway set out four possible explanations of archaeological finds of distillation equipment in medieval England.[168] The first – the manufacture of distilling equipment – can be discounted here. The other three – the production of alcohol (both for its own sake and for medicinal purposes), the practice of alchemy, and the manufacture of nitric acid – all deserve consideration.

The most likely context for these vessels is the use of stills in the production of medicines. Distillation for this purpose was certainly practised at Glastonbury, as the surviving Obedientiary Roll of 1538–9 shows.[169] This records the income and expenditure of leading abbey officials. Chief among the expenses of the infirmarian were the supplies and labour entailed in running the four stills of the abbey, in which cordials and liqueurs were produced for the sick. It is likely that distillation for medical purposes would have been practised in earlier centuries; documentary

evidence for the abbey's interest in medical matters can be found in its Great Cartulary, in the library catalogue of 1247–8, and in other records of the abbey's book collection.[170] The catalogue of 1247–8 lists several Italian texts on medicine, including an English translation of the *Medicinale*, one of only six books in English in the library's collection of more than 500 works.

It would not have been unusual if there were also an interest in alchemy at the abbey in the thirteenth and early fourteenth centuries, although the practice subsequently became progressively more unpopular with the church. Pope John XXII's ban of 1317 was aimed at charlatans,[171] but some clerics continued to pursue an interest in the subject at a later date. At the end of the century Chaucer, for example, exposed the shady business of his master the canon in the Canon's Yeoman's Tale.[172]

Being a major landowner in regular receipt of rents, the abbey may also have used chemical apparatus in assaying – for example in checking the quality of coinage received in rents and other transactions.

Finally, in view of the possibility that some of the distillation bases are in fact of post-medieval date, the abbey's connection to a bizarre post-Reformation episode in the history of alchemy may be mentioned briefly. In the 1580s the clairvoyant alchemist Edward Kelley acquired an illustrated treatise about alchemy which he called *The Book of St Dunstan*, together with some 'red powder' which would change base metal to gold. According to Elias Ashmole's later account, the powder and the book were found in the ruins of Glastonbury Abbey, but this is contradicted by a contemporary source. Later, Kelley sought patronage in Poland and Bohemia, where he was imprisoned and died.[173]

Crucibles

In addition to the crucibles found in the Anglo-Saxon glass furnace, two sherds from different crucibles are present in the collection.

227. About half a wheel-thrown crucible with part of a pinched pouring lip. Heavily sand-tempered fabric, black internally, especially the base, buff to black externally. The vessel appears to have been open-fired, but the colouration may result from later use. No evidence of internal residues or external slag. ?Tenth- to thirteenth-century (P275).

228. Base sherd of a small pinched clay container, maximum height 30mm. Orange fabric with rounded quartz sand and occasional larger pieces of limestone (one erupting through the surface), reduced to blue-grey on external surfaces and on some fractures. The vessel appears to have been disintegrating when last heated. Patch of olive green glaze on exterior, partly reduced to a copper red. No visible internal residues or external slag. ?Tenth- to thirteenth-century (P195).

Small crucibles of this type appear to have been used in the production and processing of precious metals, or in small-scale work with copper alloys or enamels. The lack of residues precludes detailed discussion. Documentary evidence, however, sheds a little light on the kind of small-scale metalworking which may have taken place at Glastonbury. The Great Cartulary informs us that the post of goldsmith was one of the offices of the abbey's hereditary servants. One Thurstin was given the position by Bishop Henry of Blois (abbot 1126–71); his brother Andrew held the post in 1189. The hereditary servants caused the abbey various problems, and they were gradually bought out. In 1262 William the Goldsmith, who had been the abbey's goldsmith from *c* 1220, relinquished the lands and corrody which went with it to Abbot Robert de Petherton.[174] By this means the abbot recovered abbey lands and removed an inefficient method of payment to the abbey.[175] There is no evidence that the goldsmiths worked within the abbey precinct, but this evidence shows that the abbey retained the services of a professional goldsmith in the twelfth and thirteenth centuries.

APPENDIX 8: THE SIXTEENTH-CENTURY REDWARES

By David Dawson and Oliver Kent

The collection of sixteenth-century Somerset redwares forms approximately 80% of the total post-medieval sherd count. It is by far the largest collection of its kind from any archaeological excavation in the region. Although nothing certain is known of its stratigraphical context, it appears to represent a single act of discard rather than an accumulation of rubbish.

The largest component consists of a minimum of 1201 jars and bowls which are identified as deriving from a group of pottery kilns near Frome in east Somerset (Fig 13, 211–12). A substantial deposit of wasters was recovered from new road

building at Nunney Catch in the early 1980s and further evidence of a site of a pottery in the adjoining parish of Wanstrow was published in 1998.[176] Further waste has since been recorded from other locations in Trudoxhill, Wanstrow and the centre of Nunney.[177] The fabric of 'Wanstrow or East Somerset ware' is a fine sandy iron-rich body which characteristically tends to fracture into distinct laminar plates. It generally fires to an oxidised orange to brick red sometimes with a reduced grey core though occasionally the whole may be reduced. The plain lead glaze is usually very rich and varies from oxidised orange to a distinctive reduced deep olive green. It corresponds with type 96/98 in the Bristol pottery type series.[178] The distribution of these wares between the sixteenth and eighteenth centuries is fairly wide. It has been identified from King Street, Bristol, and significant eighteenth-century groups from Redcliffe Hill, Bristol, and Wells Museum in the Close at Wells are awaiting publication.

The second-largest component consists of a minimum of 800 jugs identified as deriving from the South Somerset series of production sites as initially located between Donyatt and Horton Cross by Richard Coleman-Smith and Terry Pearson.[179] The characteristics and distribution of these wares are discussed above and elsewhere.[180]

The small proportion of other contemporary vessel forms from both East (a minimum of 159 vessels) and South Somerset (a minimum of 176), all of an apparently domestic nature, is set out in Table 4.

Although the context of the collection is uncertain, the most likely source is Wedlake's excavations of the Abbot's Hall – in which case the clearance which occasioned the deposition of the collection might well be associated with the end of the cloth manufactory rather than an earlier clearance of the Abbot's Hall. The Protestant Flemish cloth manufactory was a short-lived venture founded in 1547 but cut short by the accession of Queen Mary in 1553, after which the town went into a sharp economic decline.[181] The manufactory and its community of workers were located in part of the Abbot's Hall which had rebuilt as the 'Galley', a substantial three-storeyed building with long seven-light windows.[182] It was located on the north side of a walled enclosure with the Abbot's Kitchen serving as the dyehouse on the south. It is possible that the twenty-nine sherds of olive oil jar and some of the exotic pottery were also associated with this phase of the abbey's history.

It is acknowledged that the collection is worthy of more detailed study and publication than has been possible within the confines of this project.

NOTES

[1] Held at English Heritage; privately circulated.

[2] Rahtz 1974, 118, Nos 67–8

[3] The survey was commissioned by the Trustees of the abbey.

[4] Kent 1996

[5] Kent 1995

[6] Allan 1995; 1999; in press

[7] Rahtz 1979,308–51

[8] Gutiérrez 2007

[9] Biddle and Barclay 1974

[10] Barton 1963

[11] Ponsford 1991; 2002, 78

[12] Dunning 1933

[13] Captain Bowen's Journal for 1938, GA archive

[14] Bristol Pottery Type 118; Ponsford 1998

[15] Hurst 1974, 245–6, 'round knobs'

[16] Hurst 1974, 245–7, nos 38–41

[17] For a Saintonge chafing dish from Amsterdam with this form of knob see Hurst *et al* 1986, 80, fig 36.106. There are several finds of this type from Castle Street, Plymouth, where the bulk of the finds date to *c* 1580–1650

[18] Dawson 2010, 160–1, which also shows other examples of such jugs with a range of glaze colours

[19] Hughes and Gaimster 1999

[20] Hughes and Gaimster 1999

[21] Hughes 2008

[22] Hughes and Gaimster 1999

[23] Tabachnick and Fidell 2007

[24] See for example Baxter 1994; 2003; Shennan 1997

[25] Pellant 2007

[26] Hughes and Gaimster 1999

[27] Hughes and Gaimster 2002

[28] Hughes 2008

[29] Hughes 2010

[30] Hughes 2009

[31] Hughes 1998

[32] Hughes in prep

[33] Allan forthcoming

[34] Hughes and Gaimster 1999; data has been converted to be consistent with ICPS

[35] Gerrard 1999

[36] Results of analysis presented in Hughes forthcoming

[37] Hughes 1998

[38] Hughes and Gaimster 1999

[39] Hughes and Gaimster 1999, fig 3.8

[40] Hughes and Gaimster 1999

[41] Curnow forthcoming

[42] Allan 1999, 160, nos 1–6

[43] Hughes and Gaimster 1999

[44] Hughes 1998

[45] Brown and Curnow 2004

[46] Schmidt 1929, cat no. 33

[47] Ainaud de Lasarte 1952, figs 41, 45; González Martí 1944, fig 489; Martínez Caviro 1968, cat. no. 41

[48] Cora 1973, pls 142a–b, 144–5, group VIIB; Berti 1999, pl 21

[49] Cora 1973, 131, pls 130a–b; V&A acc. no. 47-1907

[50] Berti 1997, figs 32–3; Ray 2000, cat. no. 96

[51] Martínez Caviro 1968, cat. no. 30

[52] Rackham 1940, cat. no. 50

[53] Ray 2000, cat. nos 86–8, 94–5, 98–100, 127, 134–7, 165–6, 168–9, 173–6, 181–2, 187, 195–6, 325, 364–5

[54] Ray 2000, cat. no. 136; acc. no. C.122-1931

[55] Ray 2000, cat. no. 122; acc. no. C.123-1931

[56] Cora 1973, 129–31, group VIIA

[57] Ray 2000, cat. no. 96; Berti 1987, fig 33

[58] Blake 1999, 35, n. 148; Cora 1973, 131-2, tav. 138a-b, group VIIB; see also Berti 2008, pl. 5a

[59] Thornton and Wilson 2009, no. 20

[60] Ray 2000, cat no. 96

[61] Blake 1972, 62–3

[62] Démians d'Archimbaud 1980, 393–4, fig 390

[63] Berti 2008, 145–8

[64] Baldi 2003, 88–100

[65] pers comm

[66] Berti 2008, 147

[67] display label; Rackham 1940, cat no. 52; acc no. 1150-1904

[68] room 2, cases 4–6

[69] Blake 1999, 27

[70] Ray 2000, cat. no. 96; Schmidt 1929, cat no. 33; Martínez Caviro 1968, cat no. 41; González Martí 1944, fig 489

[71] González Martí 1944, fig 489

[72] Blake 1999, 39, n. 216).

[73] display label; Rackham 1940, cat no. 393; acc no. C.2509-1910

[74] Berti 1998, pls 99–102, 107–9, 112

[75] room 8, case 49, central shelf to the right

[76] Berti 2008, pl. 25d

[77] cp Berti 2008, pl 25e; 1998, pl 103

[78] Berti 1998, 414–16

[79] Rackham 1940, cat no. 393

[80] Berti 2008, pl 25d

[81] Allan forthcoming, fig. 3.1

[82] Berti 1998, 192–3, genus 56.2, pls 282, 284; 2008, 333-4

[83] Berti 2008, pl 50b

[84] Hurst 1991, 213–14, table 1, fig 3

[85] Ricci 1985, 303–4, 394–5, 419, figs 109, H, no. 19, table 6, dec. no. 139; Manacorda 1985a, 19.

[86] Allan forthcoming, table 1

[87] Brown and Curnow 2004, 36, 45

[88] Cora 1973, 150–1, pls 250-2a-b, group XIIIC

[89] Vannini 1977, pls 8–11

[90] Blake 1981, 103

[91] Berti 1998, p. 151, pls 160-4, genus 43

[92] Carta 2003, 41–2, cat no. 96, fig 22a–b

[93] Barton 1964, fig. 66, no. 2; Gaskell Brown 1979, fig. 26, no. 193; Ricci 1985, figs 109, H, no. 19; Berti 1998, pls 282, 284; 2008, pl 50b

[94] room 16, case 90

[95] e.g. Blake 1999, 25; Hurst 1991, 213, 216

[96] Hurst 1991, 213–14

[97] Blake 1999, n 224; 2006

[98] Hurst 1991, 214; Blake 1999, n 151; Hughes and Gaimster 1999, 66; Blake and Hughes forthcoming

[99] Blake 1999, nn. 148, 151

[100] Najemy 2006, 194–200; Blake 1999, n 145; Hanlon 2000, 82, 85

[101] Molera *et al* 2001, under 'Granada'

[102] see for example those published in Hurst 1977, figs 25–7

[103] Barton and King nd, no. 15

[104] Dunning 1961, fig 9

[105] Hurst 1977, no. 6

[106] Hurst 1977, no. 7

[107] Gutiérrez 2000, 178

[108] Tolley 1995

[109] Ruddock 1951; Platt 1973

[110] Gerrard *et al* 1995, 283

[111] Allan 1995

[112] Dectot 2007, 37, no. 5

[113] Ray 2000, no. 125

[114] Blake *et al* 1992

[115] Gutiérrez 2000, fig 2.20a

[116] Cope 1959, 41; rather than the 'yhs' favoured by Italian potters; Blake 1999

[117] Gerrard *et al* 1995, 286–7

[118] Osma 1912

[119] Osma 1912

[120] Gutiérrez 2000, figs 2.27 and 2.31

[121] Hurst *et al* 1986; Gutiérrez 2003

[122] Brown 1995

[123] Pearson 2005, fig 82, no. 91

[124] Gutiérrez 2000, fig 2.37

[125] Pleguezuelo 1993, 40; Evans 1987, 285

[126] Gerrard *et al* 1995, 285

[127] Moorhouse 1983, 66

[128] Christie and Coad 1980, 235; Allan 1984, nos 1533, 1547; Lewis 1985, no. 20

[129] Gutiérrez 2000, Fig 5.19, no. 2; forthcoming 2012

[130] Davis 1971, 512–13, no. 313

[131] Bettencourt and Carvalho 2003

[132] Gutiérrez 2007b; Clark 1979

[133] Gutiérrez 2007a, 628

[134] Alves *et al* 1998; 2001; Bettencourt and Carvalho 2011

[135] Accession GLSGA/1989/4/1, P8

[136] Wedlake 1980

[137] Musty *et al* 1969, Figs 13, 15

[138] McCarthy 1974

[139] Allan, 1984, Figs 4, 26, 44, 50, 52

[140] Allan 1984, 5

[141] Coleman-Smith and Pearson 1988

[142] Pearson 1983

[143] Good 1987, fabric 7

[144] Dunning 1967; 1974

[145] Cherry 1985

[146] Hodges 1981, 68, 80

[147] Examples include early fifteenth-century storage jar wasters from the Utrecht (II) kiln site, Holland, with rouletted inscriptions on the shoulder reading 'AVE MARIA': Hoekstra in Bruin 1969; Janssen 1983, 167; Cherry, 1895, 7. For an excavated example from Amsterdam see Dunning 1974, 162–3, pl. XXXI, quoting van Regteren Altena, 1969, fig. 5; fig. 11, no. 1, pls xxxii–xxxiii. For a Saintonge redware *pégau* of *c* 1250–1350 from Southampton, decorated in white slip with four heraldic shields and the sgraffito inscription 'S gairant' see Brown 2002, 28–9 and 62, fig. 24, no.

218. Further afield, a group of large jars stamped on the shoulder with the word 'MARIA' and one with part of a Hussite chorale, roller-stamped in three bands, are known from Southern Bohemia/Czechoslovakia: Dunning 1974, 163, quoting Anon 1962, 29, pl. 12; Reichertova 1965, 73, fig. 28, no. 2; fig. 29, nos 1, 3.

[148] Clark 1983

[149] The glasses bear inscriptions such as '[MAGI]STER BAR[…' and '…]SBARTOLAMEUSFE[CIT]' (Fosters Lane), 'ALDREVANDIN ME FECI[T]' (British Museum) and '[AVE MA]RIA GRACI[A PLENA]' (Launceston Castle, Victoria and Albert Museum Cat. 8344).

[150] A fifteenth-century jug handle in Midland Purple ware with vertical roller-stamped decoration in two bands formed from the letters 'RACICX' reversed in Lombardic capitals and a cross.

[151] A fifteenth-century jug in Midland Purple ware. The decoration consists of two horizontal roller-stamped bands of Lombardic capitals on the vessel shoulder reading 'CONMMQEIDM': Dunning 1974.

[152] A fifteenth-century jug in Midlands Purple ware, the body decorated with roller-stamped Lombardic capitals reading 'MEAMQODMQ'. Fabric and glaze suggest an identical source to the Abthorpe and Canons Ashby vessels: Cherry 1985, 6; Dunning 1967; McCarthy and Brooks 1988, 131, 133.

[153] A small fifteenth-century jug with the word 'Binedice' incised into the side: Dunning 1967, 238–9; Cherry 1985, 6; McCarthy and Brooks 1988, 131, 133. A thirteenth/fourteenth-century cooking/storage pot from Norwich, scratched after firing 'ADAM VE[..]RM'.., may also be noted here. Although this does not strictly belong with the others since it is an example of a graffito, it appears to be the only literate example amongst the many signs and symbols scratched into fired pots: Jennings 1981, 47–8; Cherry 1985, 7; McCarthy and Brooks 1988, 131, 133.

[154] A jug dated to the first half of the fourteenth century, with drawings of fish and a group of letters interpreted as an alphabet: Barton 1979, 184–99, 222, 234; Cherry 1985, 7.

[155] Taunton Fabric 47 (Leach 1984, 142 and MF1.B12; 11.A13 figs 587, 590; 11.B4 fig 629).

[156] Moorhouse 1981, 117

[157] Moorhouse 1986, 112

[158] Wright 1846, 64

[159] Thompson 1933, 2–3

[160] For discussion of the process see Moorhouse 1972

[161] Moorhouse 1972, 117, previously published by Platt and Coleman-Smith (1975, 207–10, fig 146). The vessel was initially dated to the early thirteenth century.

[162] Moorhouse 1972, 112, fig 32, no. 3

[163] Jope 11949

[164] Radford and Hallam 1955

[165] Good 1987, nos 103, 174, 176, 484

[166] Allan 1984, nos 1754 (South Somerset, early sixteenth-century), 2137 (possibly Totnes-type ware, in a group closing *c* 1660 but containing many sixteenth- and early seventeenth-century finds).

[167] For an early sixteenth-century alembic spout and cucurbit from Exeter see Allan 1984, nos 1754 and 1782. An early sixteenth-century furnace, probably part of an assembly of chemical apparatus, is also recorded there: *ibid*, no. 1686.

[168] Greenaway 1972, 83–7

[169] Carley 1988, 76

[170] For the Chartulary see Watkin 1952; for the other records, Williams 1897

[171] *De Crimine Falsi Titulus VI. I Joannis XXII*

[172] Bryan and Dempster 1941

[173] Burland 1967

[174] Watkin 1952, xcix–cii, civ–cv, 254–5.

[175] Carley 1985, 233–7

[176] Somerset HER 25673: Dennison 1985, Vranch 1988; Somerset HER 25661; Coleman-Smith 1998.

[177] For example Somerset HER entries 28273, 28268

[178] Good & Russett 1987, 38–9

[179] Coleman-Smith and Pearson 1988; Coleman-Smith 2002

[180] Allan 2000

[181] Cowell, 1923–9; Dunning 1994

[182] Keystone 2004, 93–4

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CATALOGUE: LIST OF ADDITIONAL FIGS

Fig 1. Ceramic roof furniture. Scale 1: 4. *(Photo: G. Young).*

Fig 2. Ceramic roof furniture. Scale 1: 4. *(Photo: G. Young).*

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Hughes Table 1. List of tin-glazed pottery samples analysed from Glastonbury Abbey and full set of ICPS analyses obtained in this project.

Hughes Fig. 1. Plot of the second and third principal components arising from all the South Netherlands Maiolica samples analyzed by ICPS in this project from Glastonbury Abbey, combined with a range of other ICPS analyses of maiolica tiles and pottery from various sites (Principal Components test used only ICP-atomic emission elements). Numbers shown are the Glastonbury sample numbers; other labels refer to selected comparison ceramics mentioned in the text.

Table 1 List of tin-glazed pottery samples analysed from Glastonbury Abbey and full set of ICPS analyses obtained in this project.

sample	lab no.	cat/ find no.	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	MnO	Ba	Co	Cr	Cu
South Netherlands Maiolica clay composition - by chemical groups															
	Malling jugs (early 16th C)														
7	**RA9**	P25/3	11.0	4.23	1.02	20.9	0.36	1.46	0.65	0.16	0.03	250	12	91	216
2	**RA2**	handle P94B	12.8	5.18	3.06	17.1	0.75	2.20	0.63	0.56	0.08	500	13	59	57
9	**RA11**	all over blue P94A	11.1	5.77	2.52	15.1	0.69	1.79	0.56	0.69	0.09	517	13	67	55
	Flower vases/jugs (late 16th C)														
4	**RA5**	P25/4	10.7	4.73	0.91	20.8	0.29	0.66	0.63	1.19	0.06	285	12	78	54
6	**RA8**	P25/2	11.0	6.04	0.65	14.1	0.20	1.01	0.73	0.91	0.08	354	12	82	195
10	**RA13**	Spanish? Italian? P25/1	9.3	4.23	0.53	15.3	0.24	0.66	0.63	0.69	0.10	277	9	72	65
5	**RA6**	Glastonbury sa.5 P92	9.8	4.52	0.76	13.7	0.30	1.03	0.62	0.41	0.06	379	12	75	47
Italian clay composition															
1	**RA1**	Montelupo bowl P94A/1	12.0	5.07	2.36	24.1	0.17	1.33	0.54	0.60	0.14	599	16	105	62
3	**RA4**	Montelupo net dish 1991/45/2	13.9	5.50	3.00	22.6	0.39	2.47	0.53	2.37	0.17	399	16	108	71
8	**RA10**	Spanish? Italian? P94B	15.7	6.73	3.01	12.5	0.90	2.42	0.79	0.37	0.14	381	30	112	62

chemical element symbols: Al2O3 aluminium; Fe2O3 iron; MgO magnesium; CaO calcium; Na2O sodium; K2O potassium; TiO2 titanium; P2O5 phosphorus; MnO manganese
Ba barium; Co cobalt; Cr chromium; Cu copper; Li lithium; Ni nickel; Sc scandium; Sr strontium; V vanadium; Zn zinc; Zr zirconium;
U uranium; Th thorium; Rb rubidium; Nb niobium; Cs Caesium; Y yttrium;
Rare earth elements: La lanthanum; Ce cerium; Nd neodymium; Sm samarium; Eu europium; Dy dysprosium; Yb ytterbium; Lu lutetium

The results from Al2O3 to MnO inclusive are given as the oxide, in weight percent; all the rest are given as the element, in parts per million.

	Li	Ni	Sc	Sr	V	Y	Zn	As	Rb	Zr	Nb	Mo	Cd	Sb	Cs	Tl	Pb
Malling jugs (early 16th C)																	
7	43	27	11.1	363	87	20	66	13	87	69	7.8	1.3	0.1	4.1	4.84	0.9	7173
2	49	37	12.0	489	61	22	97	7	161	160	12.7	1.0	0.1	4.3	9.11	1.1	29
9	35	31	10.7	443	65	23	92	6	157	187	12.1	0.9	0.1	7.0	8.89	1.1	23
Flower vases/jugs (late 16th C)																	
4	16	27	11.1	367	94	26	55	12	50	59	6.6	0.4	0.1	55.8	3.85	0.8	5372
6	26	33	11.1	319	103	24	53	18	67	42	6.2	0.4	0.0	6.7	5.33	0.6	3623
10	20	18	9.3	291	92	24	53	7	65	94	8.0	0.5	0.2	8.7	3.66	0.4	2452
5	28	24	10.5	301	75	23	60	6	159	165	13.5	1.0	0.1	4.3	8.95	1.1	24
Italian clay composition																	
1	45	61	12.5	683	73	30	101	10	75	55	7.1	0.6	0.1	1.5	4.21	0.4	1919
3	60	69	13.3	835	70	31	119	13	26	93	10.3	0.4	0.1	1.5	1.76	1.1	8344
8	49	69	16.0	373	118	26	87	13	70	89	6.6	0.9	0.1	3.1	4.64	0.7	4447

	Bi	Th	U	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Malling jugs (early 16th C)																	
7	0.3	10.3	2.2	38.9	75.9	8.3	36.4	6.18	1.30	5.94	0.83	4.44	0.85	2.50	0.37	2.16	0.31
2	0.3	12.8	2.6	48.2	94.9	10.8	47.6	8.01	1.62	7.74	1.10	6.08	1.23	3.72	0.53	3.36	0.49
9	0.3	12.2	2.6	46.8	92.7	10.4	46.1	7.78	1.59	7.51	1.08	5.89	1.20	3.55	0.52	3.26	0.48
4	0.5	8.7	1.8	36.7	69.2	7.6	32.3	5.22	1.05	4.75	0.71	3.80	0.75	2.32	0.35	2.16	0.32
6	4.9	8.5	2.4	30.9	56.0	6.3	26.3	4.28	0.84	3.76	0.61	3.34	0.66	2.07	0.33	1.98	0.30
10	0.5	7.1	2.1	29.6	52.7	6.4	27.8	4.88	1.02	4.52	0.73	4.09	0.81	2.48	0.38	2.24	0.32
5	0.3	12.7	2.6	47.5	93.0	10.6	47.1	7.84	1.59	7.54	1.08	6.02	1.24	3.61	0.51	3.26	0.49
Italian clay composition																	
1	0.2	9.1	2.2	33.2	62.1	7.3	31.5	5.42	1.15	4.99	0.74	3.91	0.76	2.33	0.34	2.07	0.30
3	0.2	8.6	1.9	33.3	60.3	6.9	28.8	4.70	0.94	4.27	0.68	3.80	0.77	2.42	0.38	2.38	0.34
8	0.7	8.2	2.4	29.8	56.2	6.7	29.1	5.07	1.10	4.63	0.73	3.94	0.77	2.33	0.36	2.11	0.31

Figure 1 A plot of the second and third principal components arising from all the South Netherlands Maiolica samples analysed by ICPS in this project from Glastonbury Abbey, combined with a range of other ICPS analyses of maiolica tiles and pottery from various sites (Principal Components test used only ICP-atomic emission elements). Numbers shown are the Glastonbury sample numbers; other labels refer to selected comparison ceramics mentioned in the text.

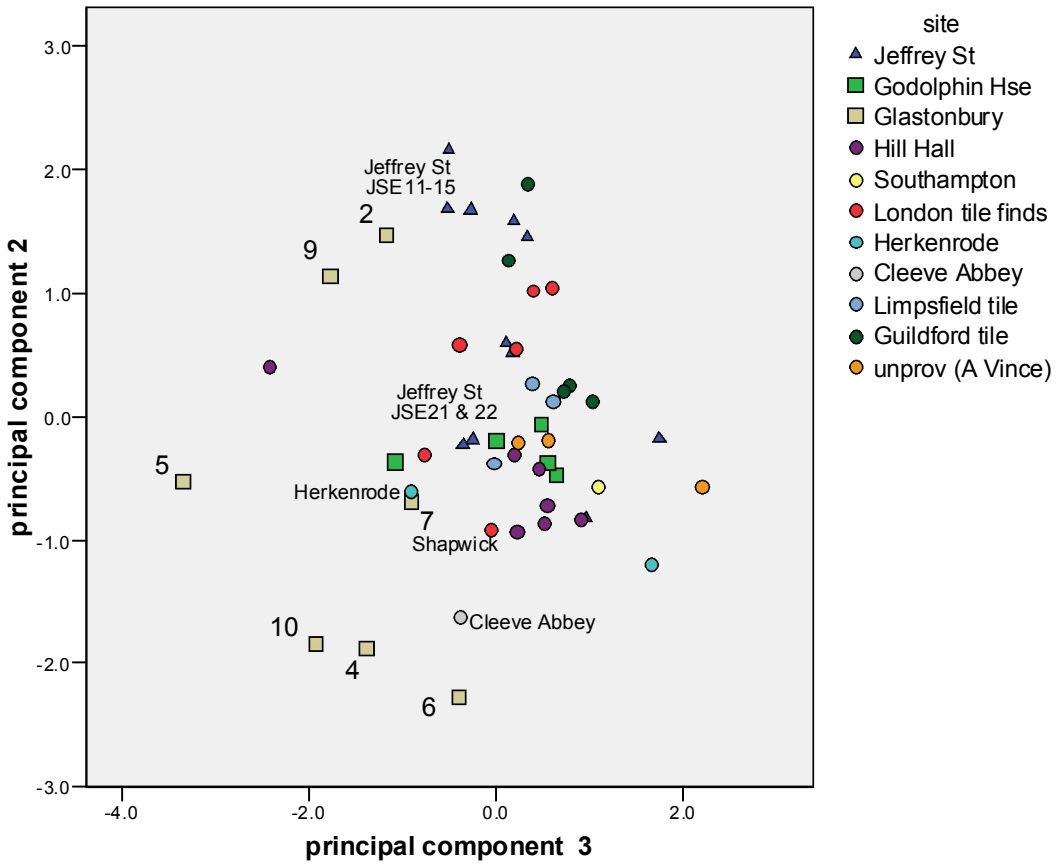

Figure 1