The Stained and Painted Medieval Window Glass from Glastonbury Abbey

Dr Pam Graves
Department of Archaeology
Durham University
Durham DH1 3LE

Tel. 0191 334 1136
Email: c.p.graves@durham.ac.uk

Introduction

Many of the past excavation reports from Glastonbury Abbey mention that window glass was found, but give no detailed account of find spot, description or quantity of glass recovered (for example Bond 1910; Fyfe 1926; Peers, Clapham and Horne 1938). In his seminal work on Somerset window glass, Woodforde discussed the miscellaneous fragments remaining in windows in St John's Church and St Patrick's Chapel, Glastonbury, but did not take any account of the excavated material, other than the lead ventilator panels (1946, 278 and Pls.L and LI). He only mentioned one medieval documentary reference in relation to the window glass of Glastonbury Abbey (1946, 4: the building of the private chapel for the abbot in 1334, for which the abbot left money for marble and glass), and a few indirect antiquarian references to medieval documentation.

The major work on the excavated glass is Lewis 1991 (an unpublished report produced for the Trustees of Glastonbury Abbey). This work is largely art-historical, and attempts to survey all the glass from the Saxon period to the 16th century, but only considers the painted material: the plain glazing is omitted. The only published product of this work is Lewis 1997, which is extremely abbreviated, extremely selective and refers only to two categories of material. It is not accompanied by any illustrations, gives only two references and has no bibliography. This report has re-examined the excavated material in order to identify not only the various painted patterns present and their date, but also to attempt to establish what kinds of window they may represent. Examples of painting not previously picked out for discussion have come to light in the course of this examination. In conjunction with such spatial and stratigraphic data as there is, it attempts to make suggestions about glazing schemes, locations, and any transformative processes the material may have undergone, such as burning, or Dissolution period treatment and dumping. Glass related to post-Dissolution, post-medieval activity on the site has also been of interest due to the quantities of clear, or white glass, found. Technical considerations have also been a component of the examination of the glass, for all periods.

Methods Statement

i) Categorisation and quantification:

Relatively little of the glass was recovered in contexts for which there is good archaeological contextual information. Much of the material has already been sorted by colour, and some by stylistic identification of painted pattern. This categorisation seems to have been carried out by A.R. Lewis in 1989 (Lewis 1991, 4), but did not produce any quantification. The separation by colour introduced a certain complexity to the process of examination, as the material still had to be sorted by style and date.

This report has sorted the material according to stylistic motifs and date range, characteristics of production method, grozed shape, colour and colouring technique, and taken into consideration any other archaeological data such as post-installation treatment and post-depositional factors. The glass was quantified by area, since area related to function, that is the area of window it

would occupy, using gridded overlays where appropriate. The quantification was made as a cumulative process and existing packing arrangements were not altered. Thicknesses of each relevant fragment were measured as this may give an indication of associated batches due to manufacturing technique, but much medieval glass varied in thickness across the width of a single table of glass. On the other hand, there are noticeable differences in the general thickness of the 13th- and early 14th-century glass, contrasted with the later 15th-century glass. There was a certain amount of consistency in the thickness of the Romanesque glass. Where the glass had been heat-distorted or broken or laminated, the measurements reflect those areas where the glass was closest to its original dimensions, rather than the distorted or abraded dimensions.

ii) Comparanda:

'Ornament is not easy to date when it is detached from its monumental context' (Caviness 1992, 183) and this makes the proposition with regard to excavated glass equally difficult, as the archaeological context may include glass of several different periods brought together for dismantling. In order to confirm all the identifications of motif, and to establish as far as possible any difference of stylistic 'school' or origin within the excavated assemblage, the material has been compared with glass of known and suggested connection to Glastonbury. This has been undertaken through site visits, examination of the *Corpus Vitrearum Medii Aevi* archives, and other relevant archives such as the Newton Collection, at the Centre for Medieval Studies, King's Manor, University of York. Faculties relating to St John's church and St Benignus's church, Glastonbury may also be relevant. Further comparative research will be carried out by examination of relevant excavated assemblages of window glass to which it is possible to gain access; and other media such as, for example, the Corpus of Romanesque Sculpture, and contemporary manuscripts and other media have been consulted.

The Excavated Material

Romanesque Glass

Palmette and acanthus scrolls and leaves

1. One fragment (area: 4cm^2; thickness: 2.43-2.16mm) of now completely opaque glass, cracked and in a very delicate condition, but with some evidence in the chipped corrosion product suggesting that it may have been blue pot metal (see photograph). Slight pitting beginning on outer face. Grozed to one curved outer edge, and one slightly concave edge at the foot of the design. Painted with an acanthus leaf in reserve, curling in two directions and emphasized by thinner secondary lines, and with a central stem indicated by three thin lines. [GLSGA G22 1989/1339]. Photographed.

2. One fragment (area: 6cm^2; thickness: 3.30-3.06mm) of translucent mid-blue pot metal, with

iridescent corrosion product. Carefully grozed to a shape with a concave curve cut out of a partial rounded end. May indicate that it was intended to fit around a round piece of glass. The paintwork is extremely faint, and partly obscured, partly revealed by a white surface deposit. One side of a curled acanthus leaf in reserve from a plain ground, and a number of tapering lines of different thickness to one side of it. [GLSGA G23]. Photographed.

3. One fragment (area: 5.5cm^2; thickness: 3.74-3.32mm) of translucent mid-blue pot metal, slightly beveled, possibly from heat distortion. Grozed on one curved edge to what looks like a quarter-leaf shape; lead ghosting on the same edge. Painted with two obvious curling tapered lines, and some finer subsidiary lines. Looks like the veins of a leaf or stamens of a flower. The grozed shape suggests some form of acanthus or palmette. [GLSGA G14 1988/1226]. Photographed.

4. One fragment (area: 7cm^2; thickness: 3.00-2.80mm) of translucent mid-blue pot metal, with iridescent corrosion product on the inner, painted face which has been scratched or scraped to form linear strands; and the outer face has had some form of corrosion or treatment leaving a swirling pattern, but this is not paintwork. Slightly beveled, perhaps due to heat distortion. Grozed to a tapering vesica or leaf shape, with one broken edge. The piece has been painted around the edge with rounded leaf lobes and tapering indents. [GLSGA G22 1989/1339]. Photographed.

5. One fragment (area: 6.5cm^2; thickness: 3.76-3.51mm) of translucent mid-blue pot metal. Beveled due to heat distortion. Grozed on one curved side. Painted with fine lines concentric to the curved edge, with one side curling leaf and upright lobe in reserve on a ground which has one bead picked out between the leaves. The scroll of the side lobe is accentuated with finer lines. The complete design no doubt mirrored this on the other, now broken, side. Form of palmette. [In Museum display photograph]

6. One fragment (area: 11cm^2; thickness: 4.71-3.51mm) of translucent mid-blue pot metal. Beveled in at least two directions due to heat distortion, although the disruption to the surface of the glass is worst on the outer face. Grozed on the curved side, and possibly on the straight edge but this now too distorted to be absolutely certain. Paint remarkably well preserved. Painted with fine lines concentric to the curved edge, with one left curling lobe and three right-curling lobes in reserve on a ground which has one bead picked out between the leaves on the left-hand side. All the scrolls are accentuated with finer lines and there is a central stem with subsidiary fine lines. There are short curved lines emphasizing the indent of the lobes on each side. Form of acanthus. [In Museum display photograph]

7. One fragment (area: 11.5cm^2; thickness: 5.78mm (where heat-distorted) - 4.42-4.40 mm) of translucent mid-blue pot metal. Beveled in at least two directions due to heat distortion, although the disruption to the surface of the glass is worst on the outer face. Grozed on the curved side, and possibly on the straight edge but this less certain and now distorted. Painted with a seeming cut line and finer lines concentric to the curved edge, with one upright lobe and two side curling lobes in reserve on a ground which has one bead picked out between the lobes, either side of the upright. The scrolls of the side lobes are accentuated with finer lines, as is the central stem in the

upright. Form of palmette or more familiarly fleur-de-lys. [In Museum display photograph]

8. One fragment (area: 6.5cm^2; thickness: 3.65-3.46mm) of translucent mid-blue pot metal. Slightly beveled due to heat distortion. Grozed on all curved sides to a partial leaf or vesica shape. The concave curve may suggest that it was leaded around a circular shape? Painted with fine lines concentric to one curved edge, with one side curling lobe and two further lobes of a leaf in reserve on a matt ground. The scroll of the side lobe is not accentuated with finer lines, but the other two lobes are, and there are fine tapering veins in these two lobes. Form of palmette or acanthus. This leaf shape mirrors many in the excavated assemblage which have lost their painted decoration completely. [In Museum display photograph]

Acanthus or fleur-de-lys

9. One fragment (area: 8cm^2; thickness: 2.61-2.14mm) of translucent light green pot metal, some opaque outer surface only just remaining. Grozed to a slightly lop-sided leaf shape, although this cuts across the top of the design and may, in part, be a regrozing. This is exactly the same colour as the slightly narrower grozed leaf shape from GLSGA G17 1988/1229. Painted with a very finely executed fleur-de-lys-type leaf, in reserve and partly accentuated in line. This is more ornate than the usual heraldic fleur-de-lys. [In second Museum display photograph]

Scrolled paintwork

10. One fragment (area: 10.5cm^2; thickness: 5.18-2.16mm) of translucent mid-blue pot metal, a great deal of iridescent surface corrosion. Slightly beveled, may be due to heat-distortion. Appears to be grozed on one long and one short edge. The paint appears very white and flaking. Painted with one large curl, with both wide and thin subsidiary curls. Could be a portion of drapery, but resembles the swirled grounds on which figures stand in several 12th- and early 13th-century images. [GLSGA G14 1988/1226]. Photographed.

11. One fragment (area: 5cm^2; thickness: 3.99-3.60mm) of translucent mid-blue pot metal, grozed to a partial vesica shape, with very deep iridescent weathering product. Some fine lines painted to follow one curved edge, and part of a curling form visible, but not in its entirety. [GLSGA G23]

Palmette borders

12. One fragment (area: 2cm^2; thickness: 3.45-2.62mm) of translucent mid-blue pot metal, two parallel grozed edges with lead ghosting. Slightly beveled. Painted with a minutely detailed palmette or acanthus leaf with side curls, and the beginning of a third leaf, probably upside down, picked and scratched out of the wash. [GLSGA G14 1988/1226]. Photographed.

13-15. Three fragments (area: 6cm^2; thickness: 3.47-3.41mm), one completely opaque, slightly beveled and heat-distorted; the other partially translucent mid-blue pot metal, but practically melted (thickness not measured). One grozed to a border 12.92mm wide, paint only just discernible, a very intricate pattern of large and small curls, possibly interspersed by stickwork detail, executed in stickwork from a band of matt paint. The melted piece was probably of similar original

dimensions, with part of the same or a similar pattern still discernible. A third piece (area: 7.5cm^2) of heat-distorted, partially melted translucent mid-blue pot metal, possibly originally grozed to a curved bulging edge on one side of straight edge. The inner surface not heat pitted, but a trace of the curling patterns is preserved in the upstanding glass. [GLSGA G22]. Number 13 photographed.

16-19. Four fragments (combined area: >16.5cm^2; thickness: 4.47-3.03mm) of translucent mid-blue pot metal, all of which are heat distorted to some extent. All grozed along each of their parallel long and/or curved edges, only two have evidence of one of each of their short edges having been grozed. The longest straight piece (area: slightly > 3.5cm^2; max length one edge: 36.65mm, max width: 12.61mm) is executed entirely in stickwork with a rinceau of side-alternate leaves employing side curling lobes and a central upright reduced to a tiny sub-circular element. The areas between the leaves have been scraped to produce subsidiary fine lines in the 'spandrels' and tiny beads in reserve from the main ground. Two partial leaves are at each end of the broken fragment. Very finely worked. The second, shortest, piece (c.2.5cm^2; max length: 27.53mm; max width: 13.64mm, but heat distorted) is slightly curved has one almost complete, one half and one very partial leaf to each side. The two remaining pieces are each grozed to encompass a slightly convex and a more accentuated concave linear feature. The best-preserved of these is painted with a large curling leaf, and a swirling curl, and subsidiary curl to one side. The 'spandrel' has a definite tear-drop shape picked out. At the joint or apex of the two grozed shapes there are two fine converging but not touching lines with highlighted areas picked on either side, and a similar curling scroll pattern, but not exactly the same, on the other side of these lines (area: 5cm^2; max length: 38.65mm; max width: 16.05mm at the apex). The second of these grozed shapes (area: 5.5cm2; max length: 39.50mm; max width: 15.26mm) is painted with half a leaf and left-hand scroll on one side of the two converging lines, and a full leaf and attendant large scroll on the right-hand side of the lines. [In Museum display photograph]

20. One fragment (area: 3.5cm2; thickness: 4.45-4.34mm) of translucent mid-blue pot metal, heat distorted but grozed along its long edges to a slightly tapering shape. Painted with the same design in stickwork from a broad wash, no edge lines visible. [In Museum display photograph]

21. One fragment (area: c.4cm^2; thickness: 4.21-4.14mm) of translucent mid-blue pot metal. The inner, painted surface appears to have a slightly combed surface patina (corrosion or treatment?) Grozed to a convex curve on one side, straight on the opposite side (cf. the grozed shape from G22 now completely heat-distorted). Painted with a variation on the above theme, all executed in stickwork from a broad band with a line just inside the edge of the shape. [In Museum display photograph]

Discussion

Palmettes and acanthus leaves are amongst the most frequently occurring of Romanesque and early 13th-century vegetal motifs in all media, having their origins in Classical art, and transmitted through late Antique and Byzantine decoration. They occur both as individually drawn leaves and as composites in borders in major windows in England and France (see the range of detailed border patterns in Caviness 1977 and Caviness *et al*.1987). The semi-circular grozed shapes, and at least one

portion of a broken or recut semi-circle probably formed the central point of an arrangement. It is accepted that 'the design principles of reliquaries and windows are similar' (Raguin 2003, 15) and the central re-used Byzantine cloisonné cross panel of the Mosan Stavelot Triptych of c.1150/1156-58, thought to originate at the Imperial abbey of that name in Belgium, is bordered with a small-scale palmette frieze reminiscent of the Glastonbury borders (Raguin 2003, 14; Petzold 1995, 64-5, Fig.44). Palmette and acanthus borders, finely detailed in outline and in internal articulation, are used throughout the Winchester Bible (Oakeshott 1945; Donovan 1993).

Foliate scroll / trefoil foliage meander borders

22-24. Three fragments (combined area: >9.5cm^2; thickness: 4.71 heat-distorted, 2.86-2.64mm) of translucent mid-blue pot-metal, each grozed to a linear border shape, all heat distorted to some extent. The longest piece (area: >4cm^2; max length: 41.84mm; max width: 12.79mm) with the paintwork executed entirely in stickwork, depicting a tendril-like side-alternate scrolling vine-type pattern in reserve from a matt wash, within two thin stickwork lines echoing the long edges. The second piece is more heat distorted (area: >3cm^2; max length: 34.23mm; max width: 12.32mm) painted with three units of the design; the third (area: c.2.5cm^2; max length: 24.04mm; max width: 11.84mm) is painted with two units of the design. [In Museum display photograph]

25-26. Two fragments (area: c.4cm^2; thickness: 2.98-2.57mm; area: c.3cm^2; thickness: 5.03mm-4.62mm but heat distorted) of mid-blue pot metal, both heat distorted, the second one very badly melted. The first (max length: 40.30mm; max width: 12.80mm at the apex), has been grozed to a shape of a concave curve and a straight edge. Has been painted with two parallel thin lines at each edge, and there has been a wash of paint in the middle. Pattern within this is almost impossible to ascertain, although curling shapes are possible. The second piece (max length: 35.46mm; max width: 12.10mm at the apex) is now completely illegible in terms of decoration. [In Museum display photograph]

Discussion

The tendril-like stickwork pattern is very similar to border patterns excavated in Winchester and dated to the 14th century (Kerr and Biddle 1990, 409-10, Fig. 100 898.1, 898.4A and 898.4B). The length and basic form of the side-alternating units, however, is the same as that of the palmette borders, but whereas the palmettes have at least two widths of stickwork detail, this pattern generally eschews fine detail. Side-alternating trails on a ground picked with extensive stickwork detail occur on both the base and body of the cross of the Crucifixion panel in the *Arche d'Alliance* window of the mid-12th century at Saint-Denis (Grodecki 1947, Planche 1), in the Moses window and in the Annunciation scene in a choir window, both of 1140-44, in the same church. It is also a pattern that is found directly paralleled in metalwork of the second or third quarter of the 12th century, including the detail of small protrusions where the tendrils split (Stratford 1984, 254, cat. entry 260, described as a trefoil foliage meander). Given this, and the facts that the glass is, visually, of the same blue pot metal as the Romanesque glass, and of the same width and grozing as the early glass, it seems more likely that these patterns are also of the 12th century in this case. One alternative suggestion, however, is made below in the overall discussion.

Drapery

27. One fragment (area: 7cm^2; thickness: 3.38-3.13mm) of translucent mid-blue pot metal, with one long grozed edge. Painted with slightly curved V-folds rather than the extremely angled lines of some of the other samples. [GLSGA G14 1988/1226]. Photographed.

28. One fragment (area: 5.5cm^2; thickness: 3.06-2.84mm) of translucent mid-blue pot metal, with soil accretions. Slightly beveled, may be heat-distortion. Appears to be grozed on one curved edge. Painted with a very faint series of lines, wide and thin, in deep, slightly curving, V-shaped drapery folds. [GLSGA G22 1989/1339]. Photographed.

29. One fragment (area: 4cm^2; thickness: 3.05-2.81mm) of translucent mid-blue pot metal, with soil accretions. Slightly beveled, possibly due to heat-distortion. Grozed to a point on two converging sides, the third edge broken. Painted with a series of thin lines, overlapping, and mainly V-shaped drapery folds. [GLSGA G22 1989/1339]. Photographed.

30. One fragment (area: 9.5cm^2; thickness: 3.02-2.95mm) of mostly translucent mid-blue pot metal, one curved grozed edge and another curved edge which may have been cut rather than broken, and indicates very skilled craftsmanship if this is the case. The weathering product has formed as a dull white surface on both faces, flaking in parts. Painted with a series of slightly curved and tapering lines and a deep V. Probably drapery folds. [GLSGA G23]. Photographed.

31. One fragment (area: 8cm^2; thickness: 3.32-2.10mm) of translucent mid-blue pot metal, with pale iridescent corrosion product. Slightly beveled from heat-distortion. Grozed to a triangular point, with a slight undulation to one side. The third edge appears to be broken. The paint appears very white, revealing a cut-line and deep, curling V-shape. Probably drapery. [GLSGA G24 1988/1341]

32. One fragment (area: 9cm^2; thickness: 3.86-2.13mm) of still translucent mid-blue pot metal , severely heat-distorted, producing a significant loss of legibility to both surfaces, rounding and heat stress marks to the edges. Two edges are nonetheless breaks, one may be an older break or possibly a melted grozed edge which does not respect the painted design, therefore possibly a regrozing; one long edge has a painted cut line and was most probably grozed but heavily distorted now. Painted with a series of tapering lines parallel to the cut line, and a deep V-fold with finer V-folds echoing this shape. Probable drapery. [In Museum display photograph]

Discussion

The paintwork identified as drapery mostly consists of deep recessed or nested V-folds or a number of V-folds set at 90 degrees (see the Virgin's robes in the Commentary of Saint Jerome from Cîteaux (Dijon, Biblioteque municipale, ms. 129, fol. 4v) c.1130 (Caviness 1986, 265 Fig.8)). According to Kerr and Biddle (1990, 388), 'Hook and V-folds arranged calligraphically, in combination with idiosyncratic thick and thin parallel lines to articulate the depth and folds and the movement of

material, are present in early twelfth century manuscript painting… but are difficult to locate before this date'. The variety of V-folds, and slightly curved V-folds, and especially the nested, overlapping V-folds of catalogue number 29, are all consistent with 12th-century, particularly mid-late 12th-century drapery forms. Catalogue number 10, if not a foliate detail, may be the kind of internally swirled highlight of drapery visible over the hips and thighs in figures in manuscript illumination as in the Bury Bible, c.1135, and the Winchester Psalter, c.1150 (Zarnecki, Holt and Holland 1984, 53, cat. entry 44, 55, cat. entry 61) and the Winchester Bible (Oakeshott 1945, *passim*.; Donovan 1993, *passim*.). Little more can be reconstructed from these pieces with regard to scale or nature of the iconography.

Miscellaneous narrative designs

Fragment with animal design

33. One fragment (area: 7cm^2; thickness: 3.83-3.65mm) of mid-blue pot metal, slightly darker in tint than most of this assemblage. Appears to have two grozed edges, one parallel to part of the painted design but the second at an angle which may indicate regrozing. Painted with a design in reserve and scratchwork from a wash, possibly representing the body of an animal. [GLSGA G23]. Photographed.

Possible sword scabbard

34. One fragment (area: 8cm^2; thickness: 3.12-2.96mm) of translucent mid-blue pot metal, with iridescent corrosion product. Grozed to a tapering, round-ended point. The paintwork is extremely faint, but there is a cut-line around the grozed edges, and a pattern of a series of parallel curved lines on each side almost forming ovals with a small circle between each, running up the centre. This may be a variant on the bead and reel pattern but there is no evidence for the subsidiary fine lines that the Museum display fragments have. Given the particular and deliberate grozed shape, and the centrality of the design, possibly a decorated sword scabbard or knife sheath. [GLSGA G14 1988/1226]. Illustrated.

Discussion

The deep slope of the animal's chest on fragment 33 almost suggests that the animal is kneeling on its front legs, the front paw of which divides into three very distinct claws. This appears to be a very small-scale lion or possibly griffin, cf. the elongated claws of the Saint-Denis griffins, dating to 1141-44 (Caviness 1992, 191, Fig.22).

The possible sword scabbard (number 34) suggests a narrative theme with soldiers or knights. Throughout the Romanesque period, in stained glass and in manuscript illumination, much armour and weaponry was portrayed in the colour blue, presumably as an approximation to the colour of steel (e.g. in the Story of David from the Book of Samuel in the Winchester Bible, c.1160-80, Zarnecki, Holt and Holland 1984, 57, Pl.65). At least one scabbard in the Winchester Bible is depicted as decorated with a central meander pattern highlighted from the main colour in a way analogous to stickwork in glass, although the main scabbar colour here is pink, against a general background of blue (Doeg slaying the

Priests, initial to Psalm 52, Oakeshott 1945, Pl.1; Donovan 1993, 21, Pl.19).

Border and diaper patterns

Stickwork beading

Type 1

35. One fragment (area: 6cm^2; thickness: 4.04-3.67mm) of translucent dark-mid-blue pot metal. One long edge and possibly both short ends grozed, the third cut. The paint exceedingly faint. Painted with cut-lines along the long edges, and thin parallel lines within which there is a pattern of repeated circles with internal dots picked in stickwork from solid beads. [GLSGA G14 1988/1226]. Photographed.

Type 2

36. One fragment (area: 3.5cm^2; thickness: 2.81-1.75mm) of translucent mid-blue pot metal glass, with iridescent corrosion products on both surfaces. Two grozed edges which respect the painted design. The paint very faint, and white-looking. Painted with a very fine beading pattern of small circles in reserve from a band of paint, with central dots in each bead, and a finer concentric line beyond. There is a line of smaller beads or circles in the smaller band. [GLSGA G23]. Illustrated.

37. One fragment (area: 1.5cm^2; thickness: 2.71-2.45mm) of translucent mid-blue pot metal, with iridescent corrosion product and soil accretions. All edges broken. The paint is extremely faint: a design of extremely small alternating circles and squares picked out in stickwork from a wash of paint. [GLSGA G14 1988/1226]

Type 3

38. One fragment (area: 3cm^2; thickness: 2.44-2.31mm) of translucent mid-blue pot metal with two grozed edges at right angles but one may be secondary as it cuts through the painted design. There is a painted cut line, and a row of very small beads, then another line parallel to the cut-line, and a series of lines of double concentric circles of equal size filling the ground, all picked out in stickwork from a wash. This may be more of a diaper than a border *per se*. [GLSGA G14 1988/1226]. Photographed.

Type 4

39. One fragment (area: 2cm^2; thickness: 3.35-3.08mm) of semi-translucent mid-blue pot metal with all broken edges. The surface has a flaking white iridescent weathering product in which it is possible to pick out the original painted design. This is constituted of a wash of paint from which a grid of fine lines has been picked and then a set of four circles picked out at the intersection of the grid lines. [GLSGA G14 1988/1226]. Photographed.

Stickwork lozenge and bead patterns

Type 1

40. One fragment (area: 5.5cm^2; thickness: 2.62-2.39mm) of translucent mid-blue pot metal, with iridescent corrosion product. One long and one short edge grozed. Slightly beveled from heat distortion. The paint is extremely faint and the design is only discernible in one corner of the fragment. This is a design of extremely small circles scratched at the apeces of a trellis of stickwork lozenges, picked from a wash of paint. This is exactly the same design as occurs in GLSGA G24 1988/1341. [GLSGA G14 1988/1226]. Photographed.

41. One fragment (area: 5cm^2; thickness: 2.38-1.99mm) of translucent mid-blue pot metal, slightly beveled and possibly due to heat distortion. Two curved, grozed edges tapering to a point, now broken. Painted with consistent cross-hatching, from which small crosses have been picked at the intersections, creating a repeated pattern of lozenges and circles in reserve. This is exactly the same design as occurs in GLSGA G14 1988/1226. [GLSGA G24 1988/1341]. Photographed.

Type 2

42. One fragment (area: 4.5cm^2; thickness: 3.17-2.14mm) of translucent mid-blue pot metal, with iridescent corrosion product on both surfaces. One curved edge grozed. Slightly beveled, possibly due to heat distortion. The paint appears faint and white. Painted with a design of a trellis of stickwork lozenges, picked from a wash of paint, and with tiny beads picked from the centre of each lozenge. This is similar to, but slightly different from, the design that occurs in catalogue numbers 40 GLSGA G24 1988/1341 and 41 GLSGA G14 1988/1226. [GLSGA G22 1989/1339]. Photographed.

Type 3

43. One fragment (area: 3cm^2; thickness: 3.22-3.07mm) of translucent mid-blue pot metal, has been subject to heat distortion. One possible grozed edge but the heat distortion has made it difficult to be confident. Painted with consistent cross-hatching, from which small crosses have been picked at the intersections, creating a repeated pattern of lozenges and crosses in reserve. [GLSGA G24 1988/1341]. Photographed.

Type 4

44. One fragment (area: 1.5cm^2; thickness: 2.71-2.45mm) of translucent mid-blue pot metal, painted with an alternating design of circles and squares picked out of a wash. [GLSGA G14 1988/1226]. Photgraphed.

Type 5

45. One fragment (area: 3cm^2; thickness: 3.27-3.21mm) of translucent mid-blue pot metal, with one large oval air bubble in the metal. Two parallel grozed edges. Painted with faint cut-lines at each edge and a parallel thin line inside one edge, with one rhomboid of paint inside these borders. [GLSGA G23]. Photographed.

Discussion

One characteristic of these repeated patterns or diapers (a description usually applied to later medieval

work) is their extremely small-scale and fine execution. There are at least two variations on the circles and squares or lozenges theme [GLSGA G14 1988/1226; GLSGA G22 1989/1339; GLSGA G24 1988/1341]. Lozenge and bead patterns (or 'crosshatch with pinpoints of light in the centers' Caviness 1992, 181) were used in ornament now in the retrochoir tribune, windows St II a (type R.o.1) and Nt IIa (type R.o.2) of the Abbey Church of Saint-Remi, Reims, dated to c.1170-1180 (Caviness 1992, 181, Fig.4, 186, Fig.12).

In manuscript illustration lozenge- based or cross-hatched patterns were used for textiles, for example, the bed on which King Henry is sleeping when he has his vision of peasants in the Chronicle of Florence and John of Worcester, c.1130-40, Worcester Cathedral Priory (Oxford, Corpus Christi College, MS 157, Kauffmann in 1984, 102, cat. entry 33); King Saul's leggings in the top left-hand corner image of a leaf related to the Winchester Bible, produced at Winchester Cathedral, Priory of St Swithun, c.1160-80 (Pierpont Morgan Library, M.619; Kauffmann 1984, 57, 122, cat. entry 65). Indeed, variations on the lozenge and bead design occur repeatedly throughout the Winchester Bible, as floor or roof tile patterns (Oakeshott 1945). The specific form of a lozenge shape with internal circles has been used for textile on the cushion of St John in Bede's Commentary on the Apocalypse, c.1160-70, possibly from Ramsey Abbey, Essex, Cambridge St John's College, MS H.6, (Kauffmann 1984, 122, cat. entry 66), but this convention was used in the late Anglo-Saxon period, and indeed into the later medieval period. A precedent of the pattern in catalogue number 39 can certainly be seen as a background design to figures in manuscripts like the Leofric Gospels of the late 9th or 10th century (Alexander 1984, 89, cat. entry 8), although it may ultimately derive from Roman metalwork. Cross-hatching was a technique used widely in metalwork, where chased surfaces bordered or formed the background for other metalwork techniques on champlevé enamels of the Romanesque period, particularly reliquaries, triptychs and ornaments of Mosan and Rhenish origin, and might be one of the patterns most easily evoked in glass painting. The larger lozenge / cross pattern represented by catalogue number 43 may be the glass equivalent of patterns found in architectural sculpture of the mid-late 12th century, for example fragments of 1140-45 from Lincoln Cathedral, and the door to the late 12th-century hall of Durham Castle.

The appearance of the glass, the metal itself and the consistent corrosion patterns strongly suggest that this is all one category and period of glazing. Consequently, patterns have been identified within the early glass which were not considered by Lewis (1991; 1997).

Bead and reel design

46. One fragment (area: 3cm^2; thicknesses: 5.16-5.0-mm) of dark blue pot metal, with iridescent corrosion product. Two, possibly three, grozed edges. Paint is exceptionally faint. Painted with a series of concentric lines, created by stickwork. Looks like a variation on bead and reel pattern. [GLSGA G23]

47. One fragment (area: 5cm^2; thickness: 3.77-2.80mm) of translucent mid-blue pot metal, with iridescent corrosion product. Grozed on three sides forming a long, narrow border. The original painted design is very difficult to see, but looks like bead and reel. [GLSGA G23]

48-51. Four fragments (combined area: >13cm^2; thickness: 4.29-3.10mm) of translucent mid-blue pot metal, two of which are heat distorted, two of which are relatively free of distortion. All grozed along each of their parallel long edges, the two longest fragments may have had one of their respective short ends grozed but this is difficult to tell now, and both cut through the painted design so may indicate regrozing. The longest piece (area: slightly > 4cm^2; max length: 36.94mm, max width: 13.52mm) is painted with two parallel fine lines on each long edge, and a central broad wash from which one whole and two partial solid lentoid shapes have been isolated echoed by a number of very fine lines, and with a single circle picked out from the ground between each. The second longest piece (c.4cm^2; max length: 34.42mm; max width: 14.17mm, but heat distorted) has one almost complete and on partial lentoid shape, one circular bead picked out and associated lines on either side of the lentoid shapes; the shortest piece (area: c. slightly > 2cm^2; max length: 22.19mm; max width: 12.09mm) is painted with one large lentoid shape, subsidiary lines, one circle picked out and the beginnings of a second lentoid only visible by its subsidiary fine lines. There may be a fine straight angled line painted at one of the short edges of this piece. The fourth piece is grozed to an obtuse angle (area: c.3cm^2; max length: 25.25mm; width at apex: 13.05mm), and is painted with one almost complete and one partial lentoid shape and subsidiary lines, separated by a pair of converging, but not touching fine straight lines, with picked plain spaces on either side. [In Museum display photograph]

Discussion

This pattern is not a conventional bead and reel, given that there are normally paired (or more) upright elements in Classical bead and reel, but here there are circles. The format is more like the medieval convention for a jeweled border or hem, used from the 11th century at least, throughout the Middle Ages. In such jeweled borders the elongated bead or ellipse often has at least one line of emphasis on one side. Here, however, the distinguishing element is the number of emphasizing lines on either side of the elongated bead or ellipse. Three fragments of durable blue early medieval window glass of the Winchester Group 3 were painted with drapery folds and a 'jewelled' border, dated by Kerr to the 12th century (two fragments from Cathedral Green and one from Wolvesey Palace; Biddle and Hunter 1990, 378 Fig. 90, nos 754-5, 782; Kerr and Biddle 1990, 387, drapery Type 4). Even so, the 'jewels' of these three fragments are very much simpler than the Glastonbury patterns.

The bead-and-reel passed into the Romanesque repertoire from Classical and late Antique art, and appeared in many media, in many variations not only as a border pattern, but as representative of lathe-turned stonework and woodwork balusters. A bead-and-reel pattern constructed mosaic-like from separate pieces of glass for each bead and reel was used to emulate lathe-turned wood on the uprights of an emperor's throne at Strasbourg in the late 12th century (Raguin 2003, 57). It occurs as an elaborate linear stickwork design in the glass borders preserved c.1170-80 in York Minster (Caviness 1984, 140 cat. entry 90 a and b).

Painted fragments with unidentified or miscellaneous designs

52. One fragment (area: c.6cm^2; thickness: 3.67-2.65mm) of translucent mid-blue pot metal, severely

beveled due to heat distortion. Possibly three grozed edges, all now rounded due to heat. The fourth edge clean break, but with paint seeping over the edge. Painted with a letter in Lombardic script in reserve from a matt ground, now quite grainy. Most probably a P, but part of a thin subsidiary line leading down from the opposite edge may indicate an R, but this is very minimal. [In Museum display photograph]

53. One fragment (area: 2cm^2; thickness: 2.74-2.54mm) of translucent mid-blue pot metal, slightly beveled and heat-distorted. One possible grozed edge now melted but with traces of the lead stain emphasized as a grainy deposit. Painted with extremely fine cross-hatching. [GLSGA G14 1988/1226]

54. One fragment (area: c.10cm^2; thickness: 3.29-2.91mm) of translucent mid-blue pot metal, heat distorted, with the surface badly pocked on the inner face but where the paint is absent. Two long curved edges possibly grozed but now too heat distorted to be certain. Either of the shorter edges may have been grozed originally, but this less certain. Painted with concentric lines of equal width along one curve, and with what may have been concentric lines on the other edge, but here the outer line looks to have been divided into three by fine stickwork lines. [In Museum display photograph]

55. One fragment (area: c.10cm^2; thickness: 3.91-2.65mm) of translucent mid-blue pot metal, heat distorted, with the surface badly pocked on the inner face. At least two edges possibly grozed and at right angles to each other as indicated by the painted cut line. One other edge may have been grozed as it has some linear paintwork remaining but is now greatly distorted. The two other edges are broken. Painted with parallel lines of unequal width along the longest edge, and at least one line up the edge at right angles to it. The main features are two lentoid shapes in line with smaller, solid lentoid shapes within. Possible jeweled border to a garment. [In Museum display photograph]

56. One fragment (area: 10cm^2; thickness: 3.29-2.41mm) of translucent mid-blue pot metal, with a highly iridescent weathering product. A swirl of darker metal visible within the metal itself, as if a reamy blue. Grozed on three edges. The paint is only just discernible as a pattern in the weathering. There is a cross-hatched pattern just visible and some curling lines and a broad unpainted border, but the rest is not clear. [GLSGA G22 1989/1339]. Illustrated

57. One fragment (area: 7.5cm^2; thickness: 3.82-3.24 mm) of semi-translucent mid-blue pot metal, with deep bevel and evidence of heat distortion. Painted with a series of tapering, radiating lines. Possible leaf or flower. May not be from the same assemblage, but is of the same hue as the early blue. [GLSGA G24 1988/1341]

58. One fragment (area: 2cm^2; thickness: 3.43-3.28mm) of translucent mid-blue pot metal with iridescent weathering product and one grozed edge. Painted with a cutline, a thin line and a possible lozenge in reserve, but this could be part of the surface corrosion. [GLSGA G14 1988/1226]

59. One fragment (area: 7cm^2; thickness: 3.21-3.13mm) of translucent mid-blue pot metal with iridescent corrosion product and pitting on both surfaces. Slightly beveled, probably due to heat distortion. Grozed to a narrow border, with an obtuse angle, and apparently grozed at each short end too, although these could be regrozings. Painted with fine lines defining a blank border area, and a cross line at the apex of the obtuse angle. Cannot discern painting within the painted border. [GLSGA G14 1988/1226]. Photographed.

60. One fragment (area: 2cm^2: thickness: 3.55-3.60mm; diameter: c.15-16mm) of translucent mid-blue pot metal with iridescent corrosion product on the inner surface, and grozed to a small roundel. Possibly painted with a concave-sided lozenge, but this is not certain. [GLSGA G14 1988/1226]. Photographed.

61. One fragment (area: 7.5cm^2; thickness: 2.66-2.15mm) of translucent mid-blue pot metal with iridescent corrosion product, grozed, extremely carefully, to a curve. Some paintwork, just discernible, appears to be a series of semi-circles, possibly an overlapping scale pattern that was common in large-scale windows and sculpture, as well as manuscript illumination, e.g. roof tiles in the Winchester Psalter (Haney 1986, Pl.19). [GLSGA G24 1988/1341]. Photographed.

Discussion

At least 1224cm^2 of the Glastonbury assemblage, not currently held in the Museum, has been identified as early blue. A further 111cm^2 (at least) is on display in the Museum, making a total of >1335cm^2, to which, in terms of early glass, should also be added the 4cm^2 of opaque glass with side-curling acanthus or palmette and 8cm^2 of light green glass painted with a variation on the fleur-de-lys or lily. In total then, more than 1347cm^2 may be early glass.

These identifications were not based on painted decoration alone: instead, the colour and nature of the glass was considered, how it has weathered (a distinctive iridescent weathering, often quite white/white opal but ranging through to a deep multi-coloured, or black opal, iridescence in some instances), the close-set, often very precise nature of the grozing, and the occasional heat-distortion of the material. In addition to this, it was evident that the paintwork survived in different ways, and to different extents. On very few pieces was the original dark paint still discernible. In most cases it was traceable as a faint fawn to white colouring; in many more instances the paint was hardly detectable to normal inspection at all. In these instances the glass had to be rotated under varying conditions of raking light to be detectable. Even then, in some instances the former decoration was highlighted as an aspect of the iridescent weathering pattern, in some instances there was a differential surface depth between areas that had been painted and areas that were free of paint. In some instances again, the former decoration was visible only as a ghostly difference in the colour of the surface. As a consequence, all the blue fragments were subjected to scrutiny under a variety of lighting conditions.

There are some extremely finely, deliberately grozed shapes amongst this material (many finely grozed convex and concave curves, two mid-sized half vesicas, a very small half vesica, a small almost complete vesica, a mid-sized curved ‘horn’, six very much smaller ‘horns’, a bow or bracket shape, and a concave-sided triangle or spandrel shape in G14 alone. A half vesica with painted indented leaf in

reserve, and a horn from G22. A partial bow and a mid-sized horn in G23. Vesica shape from G23, painted with acanthus curls; and a half vesica from the same. There are numerous curved or tapering round-ended shapes, c.16.25mm wide x c.53.68mm long or so G14, G22). The bow or bracket shape is similar to shapes used frequently to depict waves, e.g. Saint Peter walking on the water from the axial chapel window of Sens Cathedral, possibly of the 1150s (Caviness 1986, 268, Fig. 14).

The bead and reel, linear beaded patterns and linear palmette borders may all have been used in ornamental strips and knotwork which bounded some border designs, for example the two pieces of border from the Infancy of Christ window of Saint-Denis in the Victoria and Albert Museum, dating to c.1140-44 (Caviness 1986, 260, Fig.2). Given that the Glastonbury fragments tend to be grozed to particular repeated modules of length, width and shape (straight and curved), it seems likely that they did originate in borders, if not of these direct designs, then something in this vein. However, another source is possible, suggested by a combination of other shapes and designs. The repeated vesica shapes, one of which certainly had a grozed concave curve at the bottom, along with the partial roundel with a concave curve at the bottom, suggest repeated geometric shapes leaded around a relatively central roundel. Geometric shapes like quatrefoils and sexfoils, centred on roundels and squares, and bounded by strapwork, made up the principal design elements of windows such as those from the retrochoir tribune of Saint-Remi (Caviness 1992). Since two of the Saint-Remi designs employed variations on the crosshatch/lozenge and bead ornament it may be suggested that the Glastonbury assemblage includes several elements or design motifs which could be said to be part of the vocabulary of contemporary northern French glass-painting.

Some of the motifs are directly paralleled in metalwork and manuscript illumination in both France and England of the second to third quarter of the 12th century, Mosan and Rhenish *vernis brun* metalwork in particular shares characteristics of manufacture in that the darkened oil is scraped away to reveal an area of pattern (trefoil foliage meander; cross pattern or diaper) (Stratford 1994, 254). Many of the beaded borders, and stickwork borders and patterns in particular can be paralleled in metalwork and enamelwork of this period.

It is noticeable, however, that all these shapes and indeed the majority of this collection, consists of very small pieces. This, and the attention to minuscule detail in the paintwork, suggests something about the investment in this medium, both artistically and in terms of the patronage. It may also suggest something about the scale and visibility of the windows, and possibly the accessibility of the material whilst work was in progress: a patron might see the detail of work in progress laid out on the work bench within a workshop in a way he/she could never duplicate once the windows were installed. A high proportion of the early blue has been subjected to heat damage.

A number of sites have glass produced 12th-century glasses that have proved highly resistant to corrosion when compared to other contemporary and most later glass. The light blues of Saint-Denis and Chartres west have survived in this way, albeit that some of the Saint-Denis glass has not been exposed to weathering or industrial pollutants since the 18th century (Caviness 1986, 260). Excavated glass from York Minster and Winchester have similar durable properties, extraordinary given that they have lain in soil for such a long time. SEM analysis of three samples of the Glastonbury blue confirms that they have a mixed soda potash composition, with the presence of copper in all three and cobalt in

two of the three samples giving the distinctive blue colouration. These analyses correspond well with Cox and Gillies (1986) Group 1 glasses and Biddle and Hunter (1990) Group 3 glasses, a durable soda lime blue glass, primarily coloured by cobalt, or cobalt and copper. Normally derived from 10th-12th century contexts, it is frequently reused and present in later stained glass windows.

At least 28cm^2 of reamy or streaky blue were identified.

It was noticeable that in many cases the heat distortion was greater on the outer, unpainted sides than on the painted surfaces. In the case of the worst-affected of the border strips, the glass had almost folded around the unpainted surface, leaving the painted surface as an external skin. Could the paint have inhibited the rate of melt in the glass, protecting these surfaces? Or was the fire started on the exterior of the building, or at least exterior to the position in which this glass was installed?

Post-Romanesque Glass

13th-century grisaille

62-64. Three fragments (area: 36cm^2; thickness: 4.80-3.40mm) of now opaque glass, very friable, painted with cross-hatching and border lines. Probably 13th-century grisaille ground and edgework. [GLSGA G27 1988/9 1344]

65. One fragment (area: 30cm^2; thickness: 3.24-4.09mm) of almost completely opaque glass, but with an area in the cross-hatching still transparent demonstrating that this was white glass. One grozed edge, now broken but retaining a partial painted cut line; pitted surfaces, the original exterior pits all small; the internal ones large. Painted with a fairly crudely drawn leaf in outline on a thick-lined cross-hatched ground, probably originally five or six lobes to the leaf judging by the disposition of the lobes. The stem curves from the cutline and a band of paint-free surface implying a trellis or linear definition of the design edge. [GLSGA G30 1988/1347]

66. One fragment (area: 9cm^2; thickness: 2.92-2.52mm) of now opaque but once white glass, very friable; a number of pits on the exterior face and with accretions on both faces, mostly on the inner face. Painted with slight remains of curling stem in outline against partial remains of a finely cross-hatched ground. [GLSGA G318 1991/175]

67. One fragment (3cm^2; 2.35-2.16mm) of now opaque glass painted with a partial trefoil in reserve (although could be fleur-de-lys). [GLSGA G318 1991/175]. Illustrated.

68-69. Two fragments (area: 11cm^2; thickness 3.08-2.89mm) of now opaque glass, with accretions. Painted with parallel lines of different width, defining a finely cross-hatched ground. [GLSGA G318 1991/175]

Discussion

There were at least 89cm^2 of this type of grisaille (with a further 7cm^2 of possibly related stickwork beading). Compared with most excavated assemblages of window glass from monastic sites in Britain, there is surprisingly little identifiable 13th century grisaille. The scale and crudity of [GLSGA G30 1988/1347] implies that this may have been located in a position in a window far from the eye; whereas the scale and fineness of the cross-hatching from [GLSGA G318 1991/175] is more akin to most grisaille of this period. There is insufficient representation of this type of pattern to be able to make specific statements about comparison with Salisbury grisaille, the most famous representation *in situ* in the region (e.g. Marks 1993131 Fig.102 b). According to Marks (1993, 129), there is no evidence for this type of grisaille before the beginning of the 13th century: 'trefoil- and cinquefoil-headed "stiff leaf" foliage [emulated in the windows of Salisbury Cathedral, Lincoln Cathedral, Westminster Abbey, and York Minster] made its appearance in English sculpture at about the turn of the century'. There are stylistic distinctions between, for example, French and English grisailles, but these tend to relate to how either interlacing or 'layering' of geometric planes is represented in the treatment of the lead work and painted straps or bands (see Marks 1993, 129; 132 Fig. 103). Without a substantial representation of grisaille motifs and the relationship between the leading and the glass designs, it is difficult to make any more interpretative comment. However, the five lobed design and the relationship of the curling stem to the painted strap may be a characteristic feature (cf. design from Auxerre Cathedral, Marks 1993, 132 Fig. 103).

There are no identifiable pieces of 12th-century grisaille (as, for example, at Hickleton, South Yorkshire, Sprakes 2003; Graves unpub.).

Late 13th -/early 14th-century grisaille

70. One fragment (area: 13cm^2; thickness: 2.51-2.31mm) of translucent white glass, with pitting on the outer face. Two finely grozed edges, meeting at right angles. Painted with a wide bow or cup in reserve from a solid ground, with a central stem, highlighted in yellow stain, and an acorn to the right hand side. The acorn is drawn in reserve from a solid ground, with a cross-hatched cap. Given the shape and the central stem, this may be the beginning of an oak leaf and acorn grisaille design, or it may be a cup and acorn border pattern. Early to mid-14th-century. See also discussion of *Borders* (below) [GLSGA G29 1988/1346]. Illustrated.

71. One fragment (area: 5cm^2; thickness: 2.22-1.89mm) of now opaque glass, friable and laminating. All edges broken or crumbling. Painted with a leaf in outline, on a plain ground, with stem. Judging by the spread of the lower leaf edge, this looks like an ivy leaf. Possibly late 13th-/early-mid-14th-century grisaille. [GLSGA G29 1988/1346]. Illustrated.

72. One fragment (area: 15.5cm^2; thickness: 3.25-2.66mm) of semi-translucent white glass the degree of corrosion very advanced on the outer surface in particular, and with mortary accretions on both surfaces. One grozed edge, which respects the painted design. Painted with one thin and one parallel wide line defining the strapwork edge of a quarry. There is one very small portion at

right angles on the wide line indicating the corner of the quarry. Part of an oak leaf painted in outline on a plain ground in the centre of the quarry central stem and veins indicated by gently curving, tapering lines. No trace of yellow stain on the outer face. Looks like early 14th-mid-14th-century grisaille but note that Somerset quarries in the 15th century include oak leaves – these latter tend to be very upright, distinct from this. [GLSGA G30 1988/1347]. Illustrated.

73. One fragment (area: 15.5cm^2; thickness: 3.74-2.27mm) of almost completely opaque, but originally white glass (visible on outer face) subject to both opaque and iridescent corrosion products, and laminating. Two grozed edges meet at an acute angle. Painted with a design of narrow and wide lines crossing to indicate strapwork, and the uppermost curve of a foliate or floral design, probably an oak leaf in outline on a plain ground. No yellow staining apparent. Probably early-mid-14th-century. [GLSGA G30 1988/1347]. Illustrated.

74. One fragment (area: 17cm^2; thickness: 2.84-2.15mm) of white semi-transparent, white glass. Accretions on both surfaces, and much of the inner, painted face chipped off. One grozed edge respects the painted design; one cuts across it and is probably regrozing. Painted with thick and thin concentric curving lines to represent the quarry edge or trellis strapwork, and a partial straight-edged trilobed ivy leaf in fine outline, with veins. No yellow staining apparent. Most similar to the Museum display ivy leaf design. Late 13th-early-mid-14th-century. [GLSGA G31 1988/1348]. Illustrated.

75. One fragment (area: 9cm^2; thickness: 4.75-4.37mm) of almost opaque white glass. No grozed edges. Painted with two slightly curving lines, probably a stem, but possibly strapwork, leading to part of an oak leaf painted in outline on a plain ground, with the central stem outlined, and short curves to emphasise an indent of the leaf. No yellow staining apparent. Late 13th-/first half of the 14th-century. [GLSGA G36 1988/1390]. Illustrated.

76. One fragment (area: 16cm^2; thickness: 2.86-2.46mm) of almost completely opaque, but originally white glass (visible at chipped edge) subject to opaque corrosion products, and pitting. One cut edge, which respects the painted design, and one grozed edge which cuts across the design at a 45 degree angle. This may be regrozing or it may be original. Painted with a design of narrow and wide lines to indicate a quarry edge or strapwork, from which two thinner lines lead off, probably the stem of a leaf, as they are the same width and distance apart as those on the oak leaf fragment (above). No yellow staining apparent. Naturalistic grisaille, early-mid-14th-century. [GLSGA G36 1988/1390]

77. One fragment (area: 10.5cm^2; thickness: 3.10-3.06mm) of now opaque glass. One grozed edge that respects the painted design. Painted with a leaf in reserve from a solid ground, with indented edges like a hawthorn leaf, and a broad and thin line in reserve curving round as if a trellis. No yellow staining apparent. Possibly late 13th-/early-mid-14th grisaille of naturalistic leaves. [GLSGA G43 1991/417]. Illustrated.

78. One fragment (area: 49cm^2; thickness: 4.30-3.10mm where not chipped) of translucent, mostly transparent white glass with very definite green tint, quite thick although slightly beveled surface

due to manufacturing technique rather than any heat distortion. The outer surface very badly pitted, the inner, painted surface peppered with pits and a large accretion over the right-hand side, probably from another piece of glass. At least one elliptical seed or air bubble visible within the metal, probably indicating cylinder glass manufacture. Grozed on all sides to make a complete shape, almost a quarry, but with two concave curves to the bottom edges rather than straight edges. Painted with curving thick and thin edgework on the curved grozed edges, with a straight-edged trilobed ivy leaf in outline on a curling stem, with simple lines for the stem continuation within the leaf. One small curling tendril. The bottom of the lowest leaf is slightly wavy-edged as if the painted were about to paint an oak leaf instead of an ivy leaf in this instance. There is some yellowing in the glass, but this is due to corrosion rather than yellow staining. Lewis drawing. Late 13th/early-mid-14th-century grisaille of naturalistic leaves. [In second Museum display photograph]

79-82. Four fragments (area: 24cm^2, 22cm^2 and three conjoining, 37cm^2 respectively; total area: 83cm^2; thickness: 3.46-2.50mm, 4.10-3.43mm, 3.74-2.48mm respectively) of translucent, mostly transparent white glass with definite green tinge, markedly curved across the surface of the glass due to the manufacturing process rather than any post-use heat distortion. Each with pitting on both surfaces, although the onset of opaque corrosion is greater on the outer surfaces. One piece has bad pitting on the inner, painted surface, and is almost a complete grozed shape bar from one corner being broken (24cm^2). The conjoining pieces form a complete grozed shape (37cm^2). The third piece is grozed on all sides bar for a larger piece broken from one corner (22cm^2). Each is painted with curving thick and thin edgework, the conjoining pieces having a trellis overlap at the apex. All are painted with finely-executed oak leaves in thin outline, on a plain ground, with the central stem continued by thin tapering lines up the centre of the leaf and as veins within the leaf. One is sprouting straight from the trellis; one is sprouting straight from a concave-curved grozed edge, but with a curling tendril on the left-hand side; the conjoining pieces have the oak leaf sprouting from a stem and with a curling tendril on the right-hand side. There are no curves emphasizing the leaf indents on any of these pieces. There is some yellowing on the glass but this is exclusively associated with corrosion and not applied yellow stain. There may be some fine wash over the trellis edgework as this appears duller than the other surfaces. All consistently-painted late 13th-early-mid-14th-century naturalistic grisaille. [In second Museum display photograph]

Discussion

There were at least a further 34cm^2 of naturalistic leaf grisaille on plain ground with trellis edgework from contexts G29 and G36, making a total of at least 136cm^2. Almost all of this was much cruder in the quality of painting than the pieces on display in the Museum, except for catalogue number 74 (GLSGA G31 1988/1348). The finer quality painting is, therefore, represented by 149cm^2. See discussion beneath Quarry edges and strapwork.

Quarry edges and strapwork

83. One large fragment (area: 57cm^2; thickness: 3.37-2.29mm) of semi-translucent white glass, with

widespread opaque corrosion product on the inner face. The outer surface has almost completely chipped away, but a small rectangular piece of white glass is fused to the outer surface. So much of the exterior has been chipped off that it is not possible to discern if there was any yellow stain. Two, possibly three grozed edges. One long edge respects the painted design, but the second cuts right across it, and may be a regrozing. Painted with a wide and a thin line at the quarry edge, and with a similarly spaced set of wide and thin lines slightly over one third of the way down the right hand side, crossing trellis lines within the shape of the grozed quarry. No internal design can be recognised from what remains. Probably early-mid-14th-century. [GLSGA G27 1989/1344]. Illustrated.

84. One fragment (area: 6cm^2: thickness: 3.01-2.71mm) turquoise green-tinted white metal, heat-distorted, edges fire-smoothed rather than rounded, with stress lines along one edge, opaque white surface, opalescent where fresher breaks visible. The former paintwork only visible as slightly upstanding lines against the rest of the surface. Painted with quarry edgework. Probably early-mid-14th-century. [GLSGA G20 1988/1232]

85. One fragment (area: 7.5cm^2; thickness: 3.19-2.03mm) of partially opaque white glass, with toe grozed edges at right angles to each other. Painted with quarry edgework. Probably early-mid-14th-century. [GLSGA G31 1988/1348]

Discussion

There were at least a further 15.5cm^2 of this distinctively painted quarry edge in contexts G31 and G318. Naturalistic foliage featuring vine leaves, oak leaves, ivy and maple leaves were illustrated in English manuscript illumination by c.1270; and featured in architectural sculpture in the late 13th-/early 14th-century. The use of naturalistic foliage in English stained glass seems to have occurred slightly later, but the windows of the Chapter House vestibule at Wells Cathedral featuring ivy leaves may have been amongst the earliest manifestations, dating to c.1286 (Marks 1993, 145; Ayers 2004, 458). It is possible that some grisaille at Exeter dates to the 1280s, but amongst the most cited examples are the windows of the Chapter House at York Minster, c.1285-90 (O'Connor and Haselock 1977, 334-41, pl.98); Merton College Chapel, Oxford, c.1294 (Marks 1993, 145-147; Newton 1979, 23). The Glastonbury examples are rather fragmented, and it is not really possible to establish an affiliation to 'schools' of artistic production at this time, but the glass is certainly of this date bracket. There is one now partially obscured example of an ivy leaf and certain other fragments, together with well-preserved examples in the Museum Display (catalogue number 78) which may have been from similar ivy leaves with very long, pointed lobes, closer to the simplicity and elongation of the Merton College, Oxford glass than to the ivy leaves surviving in the windows of the Chapter House Stairs at Wells Cathedral, except for the curling tendril which is found at Glastonbury and in the simplest leaves at Wells (Ayres 2004, 457, Fig.V.5 and 459, Fig.V.7, 464, CHS I A1). There are also examples of oak leaves, and probable oak leaves. All this material has painted strapwork or bands.

The grisaille is unlikely to have been used on its own, but to have featured in so-called band windows, in which the glazing formed alternating horizontal bands of grisaille and figured glass. This form of glazing was probably introduced from France, appearing at Tours Cathedral in the 1260s (Marks 1993, 148). Naturalistic grisaille was certainly used in England, in conjunction with figured panels, usually

depicted in panels featuring under micro-architectural canopies, in York Minster, Merton College Chapel, and this type of window became widespread in the early 14th century. The implication is, therefore, that the grisaille was part of a suite of contemporary painted designs that would have been used in any single glazing programme of the time. The Glastonbury assemblage has, consequently, been searched for examples of late 13th- and early to mid-14th-century micro-architecture, background patterns, figural and animal detail, and border patterns, that may have complemented the grisaille settings (see below).

Pieces from the edges of grisaille of this period, and of early to mid-14th-century diamond quarries with naturalistic foliage, are not necessarily diagnostic in themselves as without accompanying floral or foliate designs they cannot be identified and dated for certain. The glass does tend to be of a consistent thickness, and much reacts within the soil to produce the opaque, corroded products typical of much 13th- to 14th-centiry glass. However, many do tend to occur, perhaps telling us more about the processes whereby glass was extracted from lead cames for reclamation and recycling of the lead. In other words, this glass may not have been valued highly, and in extracting the glass from the lead in order to recycle the lead, no great care was taken as to the integrity of the panes, consequently, the edges, painted with straps or bands, are more highly represented than the central foliate elements of the designs.

Quarries

86. One fragment (area: 11cm^2; thickness: 3.78-3.50mm where not broken) of mostly transparent white glass, but which is corroding very badly and has lost a great deal of both the inner painted face and the external face. The corrosion on the outer face has a golden iridescence, which makes it appear yellow stained, but it is not in these areas. Where the inner face is still intact some paintwork is discernible in the form of one thin curved line, a small cluster of hemispheres or curves near the centre, probably representing a tendril trail, and some more small curves to one side. This looks like a Somerset/Wells quarry design of the 15th century. 14th to 15th- century. [GLSGA G31 1988/1348]. Illustrated.

Discussion

It has been recognized since Woodforde (1946) that there are variations on quarry designs specific to, or at least indicative of, Somerset glass. Some of these patterns appear within the Wells Cathedral windows, with an extended typological range identified by Ayers (2004, xl-xli). There may be one fragment of such a quarry, catalogue number 86 [GLSGA G31 1988/1348]. The tendril trail is the most recognizable motif, and can be compared with, although not exactly the same as, those excavated from Winchester Castle and St Mary's Abbey, Winchester (Kerr and Biddle 1990, 396, cat. entry 832, Fig.92). On the other hand, the thin curved line which has survived may suggest that this was part of an ivy leaf or oak leaf motif, which may also have had tendril trails. This would be more consistent with the thickness and quality of the glass.

Floral and foliate patterns

87-88. Two conjoining fragments (area: 21.5cm^2; thickness: 2.22-1.80mm) of partially translucent mid-blue pot metal, the outer face of which has survived very well, but the inner, painted face is badly chipped, and has a calcareous accretion. One long grozed edge which respects the painted design, one short length of grozing on the smaller fragment, parallel to the other grozed edge; all other edges broken. There is a thin painted cut-line along the long grozed edge, and two parallel lines at right angles to this, defining the edge of a quarry or strapwork. A great many tapering and waving lines have been picked out a wash of paint, and there are at least two stickwork lines where the surface is chipped. There appears to be a broad area of yellow stain on the outer face, which would have highlighted the tapering lines. Late 14th-15th-century. [GLSGA G14 1988/1226 (smaller portion) and G24 1988/1341]. Illustrated.

89. One fragment (25cm^2; thickness: 3.48-3.56mm) of almost opaque white glass (visible where the edges are chipped and laminated). Probably grozed originally along the curved edge, as this is also painted with an edge border. Rather buckled. Painted with a large-scale leaf pattern in reserve, with large indents, and veins in tapering lines. 13th-14th-century, probably 14th-century. [GLSGA G25 1988/9/1342]. Illustrated.

90. One fragment (area: 7cm^2; thickness: 5.06-3.54mm) of now completely opaque glass. No definitely grozed edges. Painted with a floral design in fine outline, at one edge, consisting of a small multi-lobed flower, on a stem, with a long, tear-drop shaped leaf, and another multi-lobed flower at the bottom. Many tapering lines between. [GLSGA G224 1991/65/6]. Illustrated.

91-92. Two conjoining fragments (area: 6cm^2; thickness: 3.65-3.43mm) of now completely opaque glass, but where the glass is broken the section of the glass retains a band of ruby sandwiched between bright verdigris corrosion. This appears to have been flashed ruby. No grozed edges. There may be some discernible paintwork, with a leaf or lobe in reserve from a painted ground, and with one thin curved scratched line. [GLSGA G20 1988/1232]

93. One fragment (area: 7cm^2; thickness: 2.33-01mm) of fine, partly opaque blue pot metal, slightly curved, chipped, but with three grozed edges, none of which may be original, but evidence of regrozing instead. Painted with two large side curling lobes and the beginnings of higher lobes in reserve, with a tapering line for the stem. [GLSGA G20 1988/1232]. Illustrated.

94. One fragment (area: 11cm^2; thickness: 3.53-2.81mm) of now almost completely opaque white glass (visible where the glass is chipped). Slightly beveled. Two grozed edges respect the painted design, but one cuts across the top and may represent a regrozing. Painted with a design of simple round-headed flowers on slightly curving stems picked by stickwork in reserve from the painted ground. The stems and leaves interspersed with similar lines in thinner paint. Further stickwork lines in reserve to the left. Probably 13th- or 14th-century. [GLSGA G23]. Illustrated.

95. One fragment (area: 26cm^2; thickness: 2.87-1.74mm) of almost completely opaque deep blue pot metal. The colour is visible where the inner, painted surface has chipped. Three grozed edges,

two at right angles. Painted partly in outline, partly in reserve, to create indented edges which may indicate a large leaf pattern, but not a certain identification. [GLSGA G24 1988/1341]

96. One fragment (area: 6cm^2; thickness: 2.56-1.62mm) of almost opaque white glass, slightly beveled, with mortary accretions on the outer face. One grozed edge with lead ghosting which does not respect the painted design, therefore possibly regrozing. Painted with a line at one edge, and a curled, indented leaf in reserve. Could be a crocket, but not definite. 13th-early 14th-century. [GLSGA G31 1988/1348]. Illustrated.

97. One fragment (area: 9cm^2; thickness: 3.27-3.24mm) of almost completely opaque white glass, One grozed edge that respects the painted design, and one that cuts across it, possibly indicating regrozing. Painted with a thick band of paint from which a spade-like leaf and one possibly indented leaf, with two tapering lines, have been left in reserve. A small bead has been picked out between these two areas. [GLSGA G31 1988/1348]. Illustrated.

98. One fragment (area: 6cm^2; thickness: 3.57-3.25mm) of now completely opaque glass, with two grozed edges, one of which respects the painted design, the other of which cuts through it and is probably a regrozing. Painted with a thin line at the edge, then two partial flower or leaf lobes in reserve, both of which are decorated with curled, tapering lines for stamens or veins. [GLSGA G31 1988/1348]

99. One fragment (area: 16cm^2; thickness: 4.60-4.32mm where not broken) of translucent white glass, laminating very badly such that only one relatively small area of outer surface and a slightly larger but vulnerable area of inner painted surface survive as nearly opaque patches. Painted with curving lines, two filled with a light wash. Possibly a stalk or curling foliage stems. Looks late medieval but the glass is very thick. [GLSGA G31 1988/1348]

100. One fragment (area: 4cm^2; thickness: 2.96-2.33mm) of now opaque glass, slightly beveled with accretions. One short length of grozing. Painted with partial foliage in reserve, with indented leaves and tapering veins, possibly hawthorn, and similar to 14th-century diaper. [GLSGA G318 1991/175]. Illustrated.

Discussion

Foliage designs were used from the late 11th century onwards in English glass. Certain conventions of design are characteristic of different periods, however, as has been seen with the Romanesque glass, and the stylized foliage of the 13th century. In the early 14th century, in particular, certain foliage patterns were used as backgrounds against which figures were placed, usually under architectural canopies. These are discussed under *Rinceaux and diaper patterns* (see below). Some details which may be part of diaper patterns are so isolated that they have been classed here, however, such as the example from GLSGA G31 1988/1348, which resembles a commonly-used rinceau of the 1320s-40s in Yorkshire. The Glastonbury fragment, however, has been reserved from a far thicker area of matt paint than is usual for rinceaux.

Foliate designs were used particularly from the early 14th century to fill the backgrounds of

architectural canopies and figural glass. GLSGA G25 1988/9/1342 is of this form of foliage, though its use was fairly widespread in England.

The long tear-drop/loop leaf of catalogue number 90, (GLSGA G224) resembles shapes frequently used in the 'Somerset' type of quarry, and resembles a small scale version of flower heads and long tear-drop/loop of quarries in the Old Deanery porch at Wells Cathedral (sI 1a), dated to c.1472-98 (Ayers 2004, 586).

Beaded and other border patterns

101. One fragment (area: 2.5cm^2; thickness: 2.35-2.24mm) of translucent mid-blue pot metal, with iridescent corrosion product. Slightly beveled possibly due to heat distortion. One grozed edge which respects the painted decoration, the other edges broken. The paint is now extremely faint, but there are several parallel lines, and a small bead from which a circle has been scratched. [GLSGA G14 1988/1226]

102. One fragment (area: 5cm^2; thickness: 3.80-2.67mm) of almost completely opaque, deep brown/amber pot metal, visible at the broken edge. Grozed on two long edges. Painted with one large and one broken bead in reserve from a matt ground. [GLSGA G20 1988/1232]

103. One fragment (area: 7cm^2; thickness: 3.94-3.71mm) of now almost completely opaque white glass, with one slightly curved grozed edge, which respects the painted design. Painted with a band of paint at the curved edge from which a design of large beads has been left in reserve, interspersed with two small stickwork circles. Beyond this there is another thick line, tapering towards the bottom of the piece. Within the space thus defined, there are two tapered curved lines resembling the inner lines of trefoil grisaille stems, but there is too little left to be diagnostic. There is possibly some backpainting or even yellow stain on the outer face. Possibly 13th-century, but if silver stained, then 14th-century or later [GLSGA G23]. Illustrated.

104. One fragment (area: 9.5cm^2; thickness: 1.94-1.24mm) of only just translucent white glass, grozed long two roughly parallel edges. Both surfaces subject to corrosion. Painted with two curving lines with a lighter wash between, from which beads appear to have been picked out and highlighted in yellow stain. However, the painted surface is very disrupted. Late medieval. [GLSGA G25 1988/9/1342]

105. One fragment (area: 7cm^2; thickness: 5.06-4.55mm) of now completely opaque glass, with one grozed edge. There is a wide border of unpainted glass, then two lines defining the extent of the pattern, which is a stickwork pattern of circles interspersed with spandrels, top and bottom. Within the circles, six small beads surround a central seventh bead, all of equal size picked from the paint. The spandrel shapes may be divided into pointed trefoil shapes, but it is difficult to distinguish given the chipping to the paintwork. [GLSGA G27 1989/1344]. Illustrated.

106. One fragment (area: 25cm^2; thickness: 4.20-3.06mm) of now completely opaque glass, slightly

beveled. Soil accretions. Grozed on three sides to a curve, all edges respecting the painted design. Painted with a broad band of paint from which a pattern of alternating circles set in a diamond pattern, and beads set in a quincunx pattern have been made by stickwork. [GLSGA G44 1991/418/1]. Illustrated.

107. One fragment (area:10.5cm^2; thickness: 3.11-2.29mm) of partially translucent white glass, badly pitted and chipped on the inner, painted face. Two edges grozed at right angles to each other, respecting the painted design. Painted with wash from which a splayed cup stem and part of a cup has been left in reserve. Possible yellow staining, but unclear. 14th-/15th-century. [GLSGA G31 1988/1348]. Illustrated.

108. One fragment (area: 24cm^2; thickness: 4.60-3.24mm) of now completely opaque glass, with the painted surface very friable and subject to lamination. Both opaque and iridescent corrosion products. Two edges grozed at right angles to each other, and as far as may be discerned, seem to respect the original paint design. The slightly curved, long edge has been painted with three thin concentric lines; the other edge of the piece has an unpainted band defined by two thin lines, and a border of alternating ovals and two small circles in outline on a plain ground. The space in between appears to be covered with fairly large-scale cross-hatching, but the surface is too damaged to be certain. Could be a form of dress hem or jeweled edge, possibly from a bishop's mitre. [GLSGA G27 1989/1344]. Illustrated.

109. One fragment (area: 23cm^2; thickness: 3.26-2.63mm) of semi-translucent white glass, much of the opaque outer surfaces no chipped away and laminating. Grozed on two curved edges to produce a strip, slightly wider in the centre than at either ends (37.40mm to 28.50mm and 30.75mm). Some design discernible where the paint has created a differential surface: at least one curved line and a band of small saltire quatrefoils with pointed lobes. The shape suggests that the piece was placed inside a cusped stone embrasure. [GLSGA G27 1989/1344]. Illustrated.

110. One fragment (area: 22cm^2; thickness: unattainable as fragment is set in a glass frame) of almost completely opaque white glass, pitted on both faces. Grozed with a concave curve at one end, then two straight sides, and expanding into a broken roundel at the opposite end. Painted with a stick work border pattern in the rectangular portion, picked out of a band of matt paint. The design consists of a running lozenge pattern with stickwork circles picked from each triangle and from each lozenge. In the circular portion a four-petalled flower in reserve from a matt ground, with a teardrop in the spandrels, also in reserve. Judging by the grozing, there was possibly originally another roundel leaded against the concave side. 12th- to 14th-century, but more probably 13th-/early 14th-century. [GLSGA ?1991 G40 38]

There were a further 4.5cm^2 from context G31.

Discussion

A range of beaded and stickwork border patterns are represented, some of which were used throughout the middle ages and were not particular to any one period. Nonetheless, the examples described here can be compared with patterns in extant windows. The most extensive sample from Glastonbury has

been preserved in the framed glass, namely the running lozenge and circle pattern. This combination could have formed a decorative border of alternating roundels and strips. It may even have been used within a grisaille design of the 13th century. It is noticeable that many of these stickwork patterns are relatively crude in execution, whereas stickwork could be immensely detailed and fine (contrast, for example, the stickwork patterns on blue pot metal identified as Romanesque in this assemblage).

Rinceaux and diaper patterns

111. One fragment (area: 13cm^2; thickness: 2.74-2.01mm) of almost completely opaque flashed ruby glass. The inner, painted surface has been obscured over half of its surface by a calcareous concretion. The rest retains a fairly glossy surface. Three grozed edges and a fourth broken edge. Grozed to a curve of width of c.36mm, with one edge grozed to an angle of about 45 degrees. Painted with two thin lines reflecting the curve of the outer edge, and with what appears to be a pattern of stickwork leaves and curling stems picked out from a wash. Diaper pattern, probably 14th-century. [GLSGA G18 1988/1280]

112. One fragment (area: 5.5cm^2; thickness: 2.18-1.84mm) of semi-translucent white glass, transparent where the surface has chipped. One possible grozed edge that cuts across the design, and so possibly a regrozing. All other edges broken. Painted with a wash of paint from which a design of scallop edged figures (probably originally square or lozenge-shaped) has been scratched, decorated with tiny scratched circles within each shape. A diaper or repeated pattern, possibly a textile design. Probably late medieval, 14th- or 15th-century. [GLSGA G25 1988/9/ 1342]. Photographed.

113. One fragment (area: 9.5cm^2; thickness: 4.26-3.45mm) of slightly green-tinted white glass, semi-translucent with opaque corrosion on the painted face and pitting beginning on the outer face. Some white accretions on the outer face. One grozed edge that cuts across the design, so probably regrozed in the middle ages. Painted with strapwork lines meeting at an obtuse angle, and a design of vesica shapes meeting at a central point either side of a thin line. Design in solid paint against open ground. Probably stylized floral or quatrefoil design. 13th-/14th-century. [GLSGA G30 1988/1347]. Illustrated.

114-15. Two conjoining fragments (area: 17.5cm^2; thickness: 2.28-2.16, 2.10-1.74mm) of translucent mid-dark green pot metal, beginning to go opaque on the outer face. Two grozed edges, one a long outer curve; the other including an ogee curve. This latter grozing respects one part of the painted design and looks to be original. Painted with a cut-line, and two fine concentric lines bordering the design. This consists of a series of circles containing multiple lobed flowers in outline, with concave-sided lozenges between. The execution is not very neat. Probably a 14th-century design, forming the background to an arch or canopy. The grozed shape may have been made to accommodate the ring of a foliate pinnacle rising over this plane [GLSGA G30 1988/1347]. Illustrated.

116. One fragment (area: 3cm^2; thickness: 3.37-3.34mm) of now completely opaque glass, all edges

broken. Painted with a wash from which a pattern of curves and cusps has been picked in stickwork. [GLSGA G31 1988/1348]

117. One fragment (area: 12cm^2; thickness: 3.32-3.22mm) of translucent mid-deep blue pot metal. The outer face is very shiny. Two grozed edges at right angles to each other, with lead ghosting, and a possible third which is not parallel to the first and is almost certainly a regrozing, and cuts across part of the painted design. Painted with a wash of paint from which a curving band has been left in reserve (the third grozed edge cuts through this), and a design of concave-sided lozenges interspersed in with small beads in an overall lozenge arrangement. A repeated diaper pattern, but possibly used for a textile pattern for drapery. Late 14th-/15th-century. [GLSGA G220 1991/73/14]. Illustrated.

Discussion

Whilst some of the diaper patterns here were most probably used as grounds for figural glass and in the grounds of architectural canopies in particular, one might have expected a greater range of types of diaper and rinceaux. In particular, the more common forms used in the West Country might have been expected. The hawthorn-type leaf (catalogue number 77) may in fact be a fragment of background leaf diaper, similar to that seen amongst fragments from the Chapter House at Wells Cathedral (Ayres 2004, 480, Fig. V.18). The pattern in catalogue numbers 114-15 resembles one used as a background in the early 15th century, for example a form of wall-painting or tapestry in an architectural setting in 1g of the Great East Window of York Minster (French 1995, Pl.22 1g).

Micro-architecture

118. One fragment (area: 2.5cm^2; thickness: 3.82-2.73mm) of now almost completely opaque but possibly yellow pot metal glass (fragmented edge appears yellow). Painted with a set of converging lines and two sets of thin converging lines on each side of these to form a gable. Tiny leaf crockets are formed in reserve from a painted ground on the right-hand side. 15th-century. [GLSGA G20 1988/1232]. Illustrated.

119. One fragment (area: 7.5cm^2; thickness: 3.27-2.45mm) of now opaque white glass (visible in broken section). One short length of grozed edge, all others broken. Painted with graded wash, lines and parallel scratched highlights on the left hand side; a highlighted and shaded architectural cusp on the top right hand side. Possible yellow stain on external face, but not conclusive. Cusp from a micro-architectural canopy gable arch. 14th-/15th century. [GLSGA G20 1988/1232]. Illustrated.

120. One fragment (area: 12cm^2; thickness: 2.28-1.60mm) of very fine, semi-translucent pot metal, rich mid-blue. Finely grozed to a rounded shape on one side, with a straight line on the other. One broken edge. Painted with a lateral curved line where the grozed curve gets narrow, as if to depict a curved column base or capital, but not very clear. Late medieval. [GLSGA G22]

121. One fragment (area: 18cm^2; thickness: 1.54-1.43mm) very fine, semi-translucent pot metal, rich

mid-blue. Appears both finely grozed and possibly cut to a curved shape at one side. Painted with line to divide the surface into two parts and with curving highlights and shading suggestive of a curved, possibly spiral column, with a rounded base. Late medieval. [GLSGA G22]

122. One fragment (area: 18cm^2; thickness: 2.33-2.09mm) of translucent grey-blue pot metal, grozed on three sides with lead ghosting on the same. Relatively free of corrosion but with mortary accretions. Painted with smear shading and highlights picked out in scratchwork, to emphasise concentric bands where the grozing steps the shape inwards, combining to present a cylindrical base with quarter hollow-chamfered top, and roll mouldings. Late medieval, probably late 14th-century/early 15th-century [GLSGA G24 1988/1341]. Illustrated & in Photograph of Range of Blue 1.

123. One fragment (area: 26cm^2; thickness: 2.86-2.53mm) of translucent white glass, grozed to follow the design of the paintwork on the left hand side; broken on the right hand side. The lowest grozing slightly cuts across the design and may be a regrozing. Painted in outline, shading and highlighted stickwork lines, with yellow stained highlights, to represent a rectangular sectioned column or jamb base, in perspective, with chamfered top, and mouldings below, and detail of sunken rectangular moulding in the plinth. Late medieval, late 14th-/15th-century. [GLSGA G29 1988/1346]. Illustrated.

124. One fragment (area: 18cm^2; thickness: 3.34-3.07mm) of translucent white glass beginning to go opaque from corrosion on the outer surface near the grozed edges. Three grozed edges including a series outlining the mouldings depicted. Painted in a mixture of stipple and smear shading, with line and highlights, including a series of concave and convex curves, used to depict a column or jamb base with a rectangular plinth, concave quarter hollow, and a roll with a square column above. Some of the shaded portion to the left-hand side is highlighted with yellow stain. Relatively thick for this later period of painting. [In Museum display]

125. One fragment (area: 16cm^2; thickness: 3.14-2.93mm) of semi-translucent white glass. Grozed on two sides to a right angle, and a third side has been cut, forming a broken rectangle. Heavy accretions on the inner painted side. Painted with a curved arch with multiple cusping beneath in outline, the outer portion of the arch highlighted in yellow stain. Appears to be the left side of an architectural canopy. Second quarter 14th century or later. [GLSGA G218 1991 97/5]. Illustrated.

126. One fragment (area: 5cm^2; thickness: 2.60-3.01mm) of now completely opaque glass, two grozed edges at right angles to each other, but neither of which respects the original painted design, therefore possibly regrozings. Painted with a number of slightly concave-sided rectangles in outline, stipple shading and highlights, to convey recessed panelling, in three-dimensions. There may be a little yellow stain on the outer face, but not definite. Late medieval, late 14th-15th-century. [GLSGA G318 1991/175]. Illustrated.

127. One fragment (area: 10cm^2; thickness 2.32-1.59mm) of now opaque glass, laminating and friable. All edges broken. Painted with concentric curved lines, decorated in two places with small projecting indented features in outline. Probably an architectural arch decorated with foliate

cusps. 15th-century. [GLSGA G318 1991/175]. Illustrated.

128. One fragment (area: 17cm^2; thickness: 2.20-1.91mm) of partially opaque, white glass. The top edge straight, grozed. Painted with linear areas of wash and stipple shading, from which areas have been left in reserve and from which a round-headed arch has been drawn in highlighted lines. The reverse of the arch may have been highlighted in yellow stain, now corroded. 14th-/15th-century. [GLSGA G25 1988/9/1342]. Illustrated.

129. One fragment (area: 14cm^2; thickness: 2.01-1.80mm) of partially opaque white glass. One long edge grozed, although this cuts across the painted design and perhaps indicates regrozing. Two concave curves apparently carefully grozed and cut, but these too, seem to cut through the painted design. The design consists of two linear bands of paint and shading at the top of the piece, the thinner of which may be decorated with a row of circles, and a round-headed arch drawn in highlighted lines picked out of a wash, with depth implied by a recessed inner edge also drawn in highlight. Double and triple-arched openings feature in architecture and in border designs. The concave grozing may be related to cusping or the accommodation of another arched architectural feature? 14th-/15th-century. [GLSGA G31 1988/1348]. Illustrated.

Shaded fragments, probably architectural

130. One fragment (area: 16cm^2; thickness: 2.36-2.23mm) of translucent grey-blue pot metal. Both surfaces quite glossy, but the inner face has some accretions. Three grozed edges with lead ghosting, which respect the painted design, the others broken. Painted with outlines with parallel stickwork highlighted lines, projecting at an angle from an upright painted line. Smear shading used to highlight the corner and depth. A buttress or other architectural base depicted at an angle and in three-dimensions. No yellow stain discernible. Late medieval, probably 15th-century. [GLSGA G24 1988/1341]. In photograph of Range of Blue 2.

131. One fragment (area: 16cm^2; thickness: 2.24-2.00mm) of mostly translucent grey-blue pot metal, with accretions from another piece of glass adhering to the painted inner surface. One straight grozed edge with lead ghosting. Painted with three lines at an angle of approximately 45 degrees to a highlighted edge parallel to the grozed edge. Each of these is echoed by a highlighted line and further shading. The whole may be architectural, but certainly seems to be a rendering of three dimensions or receding features. Late medieval. [GLSGA G24 1988/1341]

132. One fragment (area: 9.5cm^2; thickness: 2.78-2.21mm) of translucent white glass, very badly corroded on the inner, painted face. A laminating yellow corrosion product is chipping away, taking the painting with it. One grozed edge respects what remains of the design, but two cut across it and may represent regrozing. Painted with a curved line and accompanying highlights scratched out of a stippled wash. Possibly a curved base of column or jamb. Late medieval. [GLSGA G25 1988/9 1342]. Illustrated.

133. One fragment (area: 9cm^2; thickness: 1.85-1.70mm) of fine translucent white glass, one grozed

edge, possibly another, finer, parallel to this. Painted surface very chipped. Painted with a thick band of matt paint, a narrower band left in reserve and highlighted in yellow stain, and the rest filled with fine smear shading and scratched highlights. Possibly a curved line in reserve at one end. Late medieval. [GLSGA G25 1988/9/1342]

134. One fragment (area: 13.5cm^2; thickness: 2.66-2.02mm) of now almost completely opaque white glass (visible at the broken edges). One fine grozed edge. Painted on the internal face with a broad band of paint, possibly of varying thickness but this is unclear, with a smear-shaded area beneath, highlighted along its top edge and painted with lines suggesting blocks in perspective. Above the broad wash there is a partial lozenge in outline. On the outer face a broad band of either yellow stain or back-painting. This appears to represent part of a wall in perspective, with perhaps floor tiles or a trellis beyond. Probably 15th-/early 16th-century. [GLSGA G21 1988/1233]. Illustrated.

135. One fragment (area: 7cm^2: thickness: 2.06-1.97mm) of transparent white glass, with one large air bubble or seed, relatively free of corrosion, with some white accretions on the painted surface. One small length of grozed edge. Painted with parallel areas of solid paint, smear shading from which highlights have been picked out, and stipple shading. One small area appears to be highlighted in yellow stain. The arrangement resembles the shading used to depict architectural buttresses in perspective in late medieval contexts. [GLSGA G25 1988/9 1342]

136. One fragment (area: 10cm^2; thickness: 3.57-1.83mm) of almost completely opaque white glass (visible at the broken edges). One grozed edge, which respects the painted design. Painted with a series of rectangles in solid paint and lines, with a wash of smear shading, with lines picked out as highlights. A broad wash of yellow stain at the edge and over the highlighted lines on the outer face. The geometric pattern and shading probably represents receding depths in an architectural base, panelling or other narrative setting. 15th- or early 16th-century. [GLSGA G31 1988/1348]. Illustrated.

Possible Architecture

137. One fragment (area: 13cm^2; thickness 4.05-3.30mm) of now completely opaque glass, with slight pitting on inner face obscuring the painted design. Carefully grozed along one edge in a series of three scallops or convex curves. Painted with a broad wash from which a pattern has been picked in stickwork of a possible circle or curling stem, with small leaves (?) in reserve. The grozing alone might suggest the outline of a head with curling hair, but the design is certainly not anthropomorphic. Consequently, this may be shaped to represent a multiple cusped arch opening, with stickwork background design. 14th- or 15th-century. [GLSGA G20 1988/1237]

Discussion

A number of these pieces are painted with parts of design, too fragmentary in themselves to be accurately diagnostic, but they are of forms recognizable in surviving window glass. The representation of canopies in window glass was at first very two-dimensional. Three-dimensional

depiction was used in the choir clerestory glass of Wells Cathedral in the early 1340s (Marks 1993, 157; Ayers 2004). More sophisticated renderings of depth, recession and perspective were conveyed by use of shading, highlighting and angle of line. Different periods used different forms of crocket decoration for canopy gables, pinnacles, cusped openings and arches, and of off-sets and niches on the side-shafts or buttresses supporting the canopies. Furthermore, different 'schools' often developed distinct traits in depicting these elements. By far the largest category of micro-architectural depiction represented at Glastonbury is the side-shaft. From the 1340s onwards, architectural canopies and their side-shaft supports in Wells Cathedral and more generally in Somerset, as elsewhere in England, were depicted on white glass with yellow stain highlights. Often, particularly in the late 14th and 15th centuries when depth and three-dimensional depiction is prominent, fragments of these design elements are only recognizable as having angled lines and graded shading, with an increased use of scratchwork highlighting. The cylindrical column and base (catalogue number 122) is perhaps typical of early 15th-century, as seen in, for example, the Great East Window of York Minster.

The use of shading and highlighting to depict recession is represented in catalogue numbers 123 (GLSGA G29), 126 (GLSGA G318 1991/175) and 136 (GLSGA G31 1988/1348). These could be portions of the bases of the supports of architectural canopies, or they could be solid balustrades with recessed rectangular panels or mouldings.

It is also interesting to note what appears to missing from, or under-represented in, the Glastonbury assemblage compared with many other excavated assemblages. This includes castellated features, like merlons and towers, cusping and offsets of the early to mid-14th century or later, especially since castellated features occur in the superstructure of canopies of the Choir clerestory windows in Wells Cathedral (Ayers 2004, 321-325); tiled floors (although there may be at least one example); cross-hatched window recesses of the late 14th-15th centuries; pinnacles and pinnacle neck-rings, of either the early 14th or late 14th/15th centuries (except by implication, for example GLSGA G30 1988/1347); the characteristic 'scumbled' shading of the undersides of canopy vaults of the 15th and early 16th centuries.

Architecture is the single biggest category that allows an indirect inference of the presence of figural representation to be made. In conjunction with drapery fragments, the picture overall is of a (proportionately) large presence of late 14th/15th-century windows.

Heraldry

138. One fragment (area: 27cm^2; thickness: 5.07-3.31mm) of now completely opaque glass, all edges broken. Painted with the partial forelegs, hind legs, torso, tail and very small portion of head of a heraldic lion, probably *passant gardant*, in reserve from plain ground. No obvious yellow stain on outer surface. The legs and tail have hair depicted as part of the entire outline rather than additional detail. One thin scratched whisker is visible beside the head. [GLSGA G27 1989/1344]. Illustrated & Photographed.

Discussion

Heraldic borders began to feature in English stained glass windows towards the end of the 13th century

at Merton College Chapel, Oxford, and in York Minster Chapter House in the first half of the 14th century (Marks 1993, 154). Lions or leopards *passant gardant* were extremely popular as border motifs, and the scale of the Glastonbury fragment is consonant with a border location. Wells Cathedral, in particular, used the lion *passant gardant* border motif in alternation with crowns, and both could be seen as indications of loyalty to the reigning house. The Wells type of lion has noticeably projecting ears and whiskers, and the Glastonbury example has one scratched whisker, but has been broken off before the ear. Examples can be found in windows EI 6-7d and SIII 2-3a, (Ayers 2004, volume 2, Pls 25 and 30).

Ayers (2004, 58) notes that lions have a hierarchical significance at Wells, and possibly an iconographical one as well. In borders, they may play an equivalent part to beasts in the marginalia of manuscripts, but in windows they may also evoke royalty, both in the specific allusion to the heraldry of the kings of England and since bestiaries refer to the lion as the king of beasts. He argues that at Wells, in the Lady Chapel glass of the early to mid-14th century, the lions evoke the royalty of Christ, and reference the lions of the Throne of Solomon. The latter imagery informed the iconography of the thrones and seals of Henry III and Edward I. At Glastonbury Abbey, Leland reported that lions supported the monument to King Arthur, who had been interred in 1278 in the presence of Edward I (Ayers 2004, 57-8), and thus the use of lions in windows here may have had an additional resonance.

Inscription

139. One fragment (area: 9cm^2; thickness: 2.09-1.56mm) of partially translucent white glass, the inner face has the opaque corroded surface remaining in part, and it is only on this surface that the paintwork survives. Some calcareous accretions to this surface. All edges are broken and friable. Beneath a straight line, remains of at least two, and part of a third, letters drawn in solid paint against a plain ground in Gothic Black Letter script (*textualis quadrata*). No yellow stain apparent. Late 14th-/15th-century. [GLSGA G31 1988/1348]. Illustrated.

140. Several fragments (area: at least 39cm^2; 1.87-1.53mm) of semi-transparent glass, of a consistently fine thickness of metal, with one glossy surface. At least seven fragments conjoin, and two are from the same or a similarly produced glass and executed inscription. One corner piece has two grozed edges at right angles, and associated lead ghosting. Between two sets of parallel thin lines, a series of letters drawn in solid paint against a plain ground in Gothic Black Letter script (*textualis quadrata*) with elaborate serifs and decorative terminals, in at least two registers. 15th-century, possibly mid-to late 15th-century. [GLSGA G319 1991/176]. Photographed.

Discussion

In later medieval stained glass, Black Letter text accompanied depictions of saints, recorded donors, and often, through the (often abbreviated) referencing of parts of the liturgy, evoked particular feasts and fasts. In certain contexts, contemporary poems were written out as sub-text to figural or narrative glass. The ornate serifs, decorative terminals and stops or word spacers here suggest a date in the mid to late 15th century (cf. Kerr and Biddle 1990, 406-7, Fig.97).

Shaped fragments

141. One fragment (area: 22cm^2; thickness: 1.35-0.95mm) of translucent pot metal green, some residual iridescent corrosion product remaining, suggesting that this is the remains of a heavily laminated piece of originally thicker glass. Very obvious elongated air bubbles or seeds suggesting cylinder glass manufacture. The curved outer edge is grozed. Such pieces may have formed parts of small roundels or fitted into the curve of a cusped window embrasure. [GLSGA G17 1988/1229]

142. One fragment (area: 17cm^2; thickness: 2.16-0.98mm) of translucent mid-dark green pot metal, with one tiny area of opaque outer surface indicating that this is the remains of a heavily corroded and laminated piece of originally thicker glass. One edge grozed to a bow or humped-back bridge shape and a corresponding edge shaped to an ogee curve. The way in which the glass has corroded on the outer surface has left a slight ridge inside the grozed edges. [GLSGA G17 1988/1229]

143. One fragment (area: 21cm^2; thickness: 3.27-2.14mm) of translucent mid/olive-green pot metal with slight iridescent corrosion product forming concentric lines on inner face and slight pitting on outer face: this does not appear to reflect former paintwork. Two grozed edges, one forming a gentle curve with a small projecting 'hook' in careful, deliberate grozing, and the other opposite it forming a gentle curve reflecting the main curve of the first. [GLSGA G17 1988/1229]. In photograph of Range of Green.

144. One fragment (area: 8cm^2; thickness: 1.61-1.20mm) of translucent mid-green pot metal which has probably lost some part of its thickness to corrosion. Grozed on two sides to a leaf-shape. No discernible traces of paint remaining. [GLSGA G17 1988/1229]. In photograph of Range of Green.

145. One fragment (area: 9cm^2; thickness: 4.44-2.95mm) of almost completely opaque white glass (visible at the pointed end and on the outer face where the corroded surface has chipped away). Slightly beveled. Grozed to a tear-drop shape, but no discernible paintwork. Possibly from 13th-century grisaille. [GLSGA G20 1988/1232]

146. One fragment (area: 12cm^2; thickness: 4.87-3.99mm) of semi-opaque white glass grozed to a curve tapering towards one end, with all other edges broken. Could be a geometric shape from 13th-century grisaille. [GLSGA G20 1988/1232]

147. One fragment (area: 22cm^2; thickness: 2.43-2.36mm) of almost translucent deep blue pot metal. Grozed to the shape of a cup or bowl base on the left hand side; the other edges all broken. Painted with a wash of matt paint from which areas of highlighting have been smeared and scratched, emphasising the curves suggested by the grozing. A cup or bowl, or, inverted, a hat? Late medieval. [GLSGA G24 1988/1341]. Illustrated & in photograph of Range of Blue 1.

Discussion

Grozed shapes can often indicate something of the sort of space which they filled, for example, tightly curved glass fitting into the multi-cusped (usually cinquefoliated) heads of late 14th-15th-century lights. This may explain catalogue number 141 from GLSGA G17 1988/1229. The grisaille of the early to mid-13th-century often used geometrically-shaped panes to complement the painted designs, and such may the origin of the tear-shaped piece from GLSGA G20 1988/1232. At least two examples had been carefully grozed to have a protruding hump or hook (catalogue numbers 142 and 143 from GLSGA G17 1988/1229), and these may have echoed or accommodated some aspect of architecture, for example the shapes surrounding the neck ring at the base of a micro-architectural finial (see the very useful photograph of the reverse of a panel from Wells Cathedral Lady Chapel sII, now nIII 5d; Ayers 2004, 47 Fig. I.39).

As an excavated assemblage the Glastonbury material is notable for its relative under-representation of what are often called glaziers' side strips, frequently recurring rectangular, or rhomboidal strips of unpainted white glass that were (and are) used as a frame of white glass between the main panels and the stone or wooden embrasure into which the panels were sunk or affixed. Curved pieces of the same width and equivalent length would continue this plain frame around the curves and cusps of the heads of windows. Whilst the exact width of such strips might vary from period to period or campaign to campaign, they tended to be very consistent, at least in terms of width, within each window. In many assemblages from monastic contexts there is a fair representation of this type of glass, suggesting that the margins of windows have been left to enter the archaeological record, whereas the pictorial centres of the windows were either broken up and removed, or separated form their surroundings for sale or reuse elsewhere. The point may be made with an example: at Clarendon Palace, Wiltshire, one season's assemblage of window glass amounted to only four pieces, but of these one was a plain, rectangular side strip. The relative paucity of side strips at Glastonbury may indicate a very thorough stripping of the windows in the first instance at the Dissolution.

Figural details

148. One fragment (area: 10cm^2; thickness: 1.86-1.78mm) of translucent, transparent white glass, of fairly consistent metal, with two large elliptical air bubbles or seeds, and very glossy external face. One curved edge possibly cut, but all other edges broken. Painted with a combination of fine stipple and smear shading, using stickwork to highlight the moulding. A human eye and brow are discernible as a combination of outline and scratched highlights, as is part of the ear. The hair is largely shaded, highlighted, and coloured in yellow stain on the outer face. If the curved edge is a genuine cut, it may have been made to accommodate a halo in a separate piece of glass. 15th-/early 16th-century. [GLSGA G25 1988/9/1342]. Photographed.

149. One fragment (area: 16cm^2; thickness: 2.10-1.79mm) of almost opaque white glass, fairly consistent fine metal, but with accretions on the inner painted face. Finely grozed around all except two broken edges. Painted with either a human foot or an animal claw in reserve and moulded with shading. There are accretions over the toes, which makes definite identification difficult. Late medieval, late 14th-15th-century. [GLSGA G220 1991/73/14]. Illustrated.

Drapery

150. One fragment (area: 10.5cm^2; thickness: 4.11-3.27mm) of almost completely opaque white glass, extremely chipped and laminated on the outer face, with some gold iridescent corrosion product. Remains of a small-scale zig-zag grozed edge which reflects the painted design. Painted with detailed combined stickwork and outline design of circles formed into trilobed figures, framed by lines of differing width to either side, and with a zig-zag band of miniature beading, with large beads interspersed with two smaller beads picked from a line of paint, as if the hem to a garment. Possible textile or drapery from a figure? [GLSGA G31 1988/1348]. Photographed.

151. One fragment (area: 5.5cm^2; thickness: 2.03-1.80mm) of almost opaque, grey-blue pot metal. Two finely grozed edges may be original as they border the painted design. Painted with vermicular drapery folds in small scale in outline, shading and scratched highlights, both linear and in the form of small parallel diagonal scratches. Possibly some yellow stain on the outer face, but not definite. The hems of the folds are decorated with minute scalloped edges. Late medieval [GLSGA G319 1991/176]

Possible Drapery

152. One fragment (area: 8.5cm^2; thickness: 2.68-2.62mm) of transparent white glass, laminated into two thicknesses at one edge, very consistent metal. All edges broken. Painted with a combination of smear and stipple shading, with highlights suggesting drapery folds. 15th- or early 16th-century. [GLSGA G25 1988/9 1342]

A quantity of glass was painted with smear shading, stipple shading and highlights picked from such shading. In figures of any substantial scale, the fall of the cloth in folds with contrasting depth and highlights would be rendered by means of shading and highlighting. Smear shading was used from the second quarter of the 14th century at least to render plasticity in both drapery and depictions of the human head. Newton (1961) observed that from the second quarter of the 14th century onwards, lead was used to emphasize the folds of drapery, and that there were clear attempts to hide some leads within heavily shaded areas. Consequently, it is unsurprising that many fragments of what may have been textile or drapery only depict shading.

Other designs and attributes related to figural representation

153. One fragment (area: 13.5cm^2; thickness: 3.71-3.44mm) of semi-opaque, white glass. Grozed all round except for one short, broken edge which is, in fact, partially grozed. Painted with tapering lines at the top left hand side, and three eyes, one at the top, two beneath, and tapering lines beneath. Part of a wing (see *Discussion*) [GLSGA G22 1989/1339]. Illustrated.

154. One fragment (area: 8.5cm^2; thickness: 1.70-1.39mm) of semi-translucent fine, grey-blue pot metal, one curved, finely grozed edge, the others broken. Painted with a series of angled chevrons with shading and highlights picked out. Conceivably the laminated plates of armour. Late medieval. [GLSGA G23]

155. One fragment (area: 10.5cm^2; thickness: 2.41-2.02mm) of translucent fine, grey-blue pot metal. Three grozed edges, one curving outward. Painted with a line of joined curves and thinner wash at right angles from the deepest pointes of the curves. Smear shading and scratched highlighting emphasizes curvature longitudinally. Conceivably the laminated plates of armour or of a gauntlet. Late medieval. [GLSGA G24 1988/1341]

156-57. Two non-joining fragments (area: 27cm^2; thickness: 2.78-2.48mm) of partially translucent ruby-flashed glass, the ruby layer partially chipped away from the inner, painted face. Painted with a slightly curved border consisting of scratched scallops on both sides with central beads removed by stickwork. The inner design consists of curves, interspersed with concave-sided diamonds, and tapering, radiating lines, scratched from a solid ground of paint. These tapering lines may be rays of light emanating from something. The curving of the border suggests that this was a diaper background set within an architectural canopy arch, but the rays may suggest a halo. Late 14th-15th century. [GLSGA G40/41 1991/38]. Illustrated.

Discussion

There are few identifiable examples in this category. The unusually-shaped piece decorated with three eyes was tentatively identified by Lewis (1991, 10) as the wing of a seraph or Beast of the Apocalypse. There are references in the Bible and the Apocalypse of the Virgin to many-eyed cherubim, and six-winged seraphim, and in many places the attributes of many eyes are given to the seraphim as well. Seraphim are depicted with eyes scattered across their wings in the vault mosaic of the Cathedral of Cefalu, Sicily, dated c.1150, and both seraphim and the Beasts of the Apocalypse/Four Gospel writers have eyes on their wings in the Bury Bible, c.1135 (e.g. the Prophet Ezekiel with Christ and the Gospel Beasts, Cambridge, Corpus Christi College, MS 2, Petzold 1995, 12, Fig.6) and the illuminated initial of the vision of the Prophet Ezekiel in the Winchester Bible (Oakeshott 1945, Plxxxiv). In a scene from the Winchester Psalter of c.1050, Christ is shown being tempted by the Devil who has a wing with exactly three eyes on the upper wing, and tapering long wing feathers below (Kauffmann in Zarnecki, Holt and Holland1984, 85-86, Cat. entry 1). Lucifer was, of course, a fallen angel. The wing must have been depicted with longer lower wing feathers originally, either in a separate piece of glass, or on this piece when it was a longer shape. Since this lower edge has grozing it may reflect a breakage and releading at some point. Presumably, there would have been six wings in the original design from which this fragment came, unless, it was a more or less faithful copy of the Winchester Psalter Devil, who only has one many-eyed wing.

Since the piece came from G22 1989/1339, Lewis (1991, 10) felt that it was a piece of the mid-12th-century glazing, along with the early blue material. This fragment is definitely white, and is of the thickness and weathering condition akin to potash glass from the late 12th through to the early 14th century, so that the condition of the glass does not help in dating it. There are fragments of a range of

dates in this context. However, the iconographical interest in the many-eyed seraphim/cherubim in many media from the mid 11th to mid-12th centuries is persuasive.

There is at least one is portion of a book in the assemblage, represented by GSGA G220, encased in the glazed frame. This depicts a book in three dimensions, with the leaves conveyed by scratchwork through a wash of paint. The cover is depicted a thicker wash, and part of a cover decoration has been picked out in stickwork and highlighted in yellow stain. Books, representing sacred texts are a common attribute of saints, clerics and scholars.

Discussion of figural and related glass

Figural glass, other than drapery, tends to be under-represented in excavated medieval window glass assemblages relative to its former dominance of the glazing schemes of most periods and institutions. The reasons for this may be to do with iconoclasm, but the pattern is so widespread that there may be other reasons (considered below). The most detailed figural fragment is from GSGA G25 1988/9/1342. This depicts the top left hand side of a face, and although the surface is suffering from post-depositional abrasion the curvature of the face, has been depicted in a combination of smear and stipple shading, and highlighting. In particular, most of the eye has been conveyed using scratched highlighting, and dates to the mid to late 15th century. This represents a relatively small scale of figure, however. The glass appears to have been cut, rather than grozed, an indication of mastery of technique, but it also perhaps implies that the figure had a halo surrounding it. This, however, is speculation.

The possible foot or claw is of an entirely different technique of painting, having been formed in reserve from a matt ground, on thick glass, which is largely opaque from the progress of corrosion. It has not proved possible to specify whether this is a human or animal foot as there are neither toe nails or claws depicted. This is a much earlier depiction than is represented by the head. Again, this is a relatively small scale of depiction.

The largest category of anthropomorphic representation is undoubtedly drapery/textile. Whereas details of different kinds of drapery fold can be seen in GLSGA G31 1988/1348 and GLSGA G319 1991/176, and these have come from very small-scale figures, the greatest proportion of drapery fragments must come from figures of a larger scale. By the later middle ages a great deal of drapery was conveyed by combinations of shading and highlighting to depict the three-dimensional moulding of the fabrics around figures and as they fell towards the ground. In a large scale figure, this means that large expanses of fabric have no other details than just this shading and moulding. When this has been broken up, the fragments may not look very convincing by themselves. Certain repeated painted patterns, like a simple rose or flower, were often used to convey fabrics, especially highlighted in yellow stain, but it has not been possible to identify any of this amongst the excavated fragments (as distinct from the releaded glass elsewhere in Glastonbury).

Painted fragments with unidentified designs

158. One fragment (area: 16.5cm^2; thickness: 1.57-1.48mm) of translucent, nearly transparent white

glass, of consistent thickness and quality of metal. Some pitting beginning on the inner painted face. Some accretions on the inner face too. Three finely grozed edges. With a fine wash, smear-shaded, and stipple-shaded in part, and with fine radiating highlights picked out. The radiating lines, perhaps, suggest shading of drapery. Late medieval, late 14th-early 16th-century. [GLSGA G25 1988/9/1342]

159. One fragment (area: 14.5cm^2; thickness: 3.44-3.33mm) of semi-translucent deep blue pot metal, both surfaces glossy. Two grozed edges, one of which has an apparently cut edge at right angles to it. The second grozed edge is at an angle and may have cut across the original painted design, suggesting a regrozing. The paint survives as a very faint wash, and combines a geometric shape with an apparently foliate design, from which a pattern of highlights has been picked in stickwork. [GLSGA G24 1988/1341]. Photographed.

160. One fragment (area: 6cm^2; thickness: 3.86-3.68mm) of semi-translucent mid-light blue pot metal, all edges broken and friable, with a very chipped and laminated inner painted surface. Painted with a wash of paint from which a closely-set series of lines have been scratched as highlights. No obvious yellow staining on the outer face. [GLSGA G24 1988/1341]

167. One fragment (area: 11cm^2; thickness: 2.00-1.22mm) of almost opaque white glass, with accretions on the inner, painted face. Painted with smear shading, stickwork highlights, and some outline detail. Possible drapery folds. Late medieval, late 14th-15th-century. [GLSGA G31 1988/1348]

168. One fragment (area: 10.5cm^2; thickness: 2.66-2.45mm) of semi-opaque white glass, badly corroding on both faces, chipped and laminating. Painted with solid paint, from which tiny knots or repeated circles have been scratched, and with shading and stickwork highlights. Could conceivably be buttons from a costume detail. Late medieval, 14th-15th-century. [GLSGA G31 1988/1348]

169. One fragment (area: 2cm^2; thickness: 1.46-1.36mm) of partially translucent white glass, finely grozed to a small curve. Painted with a round end or terminal in reserve, highlighted with yellow stain, as if the end of a lion's tail or something similar. Late medieval, late 14th-early 16th-century. [GLSGA G224 1991 65/6].

170. One fragment (area: 5.5cm^2; thickness: 3.69-3.52mm) of now completely opaque glass, with accretions on both surfaces. Grozed to a rounded shape similar to a ‘finger-tip’. Painted with twisted lines, on a plain ground, possibly overlapping fingers (but no fingernails visible), or possibly a twisted rope. The linear emphasis may be an indication of the long wing feathers of an angel. Late medieval. [GLSGA G318 1991/175]. Illustrated.

171. One fragment (area: 16cm^2; thickness: 3.14-3.04mm where not broken) of semi-opaque white glass, friable and laminating. Painted with very fragmented design, two rounded lobes [GLSGA G21 1988/1233]

Miscellaneous colour, painted and unpainted

Blue

172-75. Four fragments (area: 60cm^2; 3.31-3.09mm), each of slightly varying shades of rich dark to mid-blue pot metal, includes a very translucent, fine piece, finely grozed into an irregular shape, with very little of the interior surface remaining, but meaning that the seeds on the surface have been exposed, perhaps burst when the glass was flattened, i.e. cylinder glass manufacture. The remainder painted, one (area: 16cm^2; thickness: 3.31-3.08mm) within reserve, executed as large-scale stickwork, effectively. A series of quarter curves picked out from a wash, and framed with a large curve. Could be architectural, or a large-scale diaper background of the later middle ages, but not certain. Of the remainder, one painted with curving lines, one with shading. [GLSGA G22]

176. One fragment (area: 12cm^2; thickness: 2.14-1.93mm) of partially translucent, fine grey-blue pot metal. At least two, possibly three grozed edges. Painted with stipple shading, from which a curved line of highlighting has been picked, with many subsidiary scratched lines on either side. Could possibly represent the curved base of a column or jamb. Late medieval, probably late 14th/15th-century. [GLSGA G23]

177. One fragment (area: 10cm^2; thickness: 4.38-2.45mm) of translucent mid-blue pot metal, grozed on three sides to a deliberate shape, with some lead ghosting. Painted with a series of long, tapering lines, although the paint is hardly visible now at all. Could well be the same as the Romanesque glass, although the identification of the design is inconclusive. [In Museum display]

Summary quantifications:
Total pot metal blue: >682cm^2
Dark blue without paint: 41cm^2
Dark blue with paint: 299cm^2
Mid-blue without paint: at least 38.5cm^2
Mid-blue with paint: 76cm^2
Pale blue: 13.5cm^2
Grey-blue without paint: at least 43.5cm^2
Grey-blue with paint: at least 44.5cm^2
Streaky or reamy blue: 28cm^2

There were at least 672cm^2 of blue pot metal in total (not including the 'early' blues), representing a range of shades. Whilst some deep blues can be attributed to the later middle ages due to their painted detail, a particular shade of grey-blue was popular in the later middle ages and is also represented here, for example, the column base from GLSGA G24 1988/1341, probably dating to the late 14th century. Range of blue pot metal shades shown in photographs of Range of Blue 1 & 2.

Turquoise

178. One fragment (area: 5.5cm^2; thickness: 2.95-2.54mm) of translucent turquoise pot metal with many small bubbles and elliptical seeds in the metal. Extremely shiny surface. Grozed on two sides to a deliberate shape. Several parallel lines of yellow staining appear to have been applied, without any other paintwork. [In Museum display]

179. One fragment (area: 2cm^2; thickness: 2.57-2.03mm) of translucent turquoise pot metal, with one large seed or air bubble which has been burst at the surface. One carefully grozed edge. [GLSGA G17 1988/1229]

This turquoise pot metal is extremely similar in colour and metal to the Anglo-Saxon turquoise examples from Glastonbury. However, the example from the Museum display clearly has applied yellow stain, and this indicates a date after c.1320.

Green

180. One fragment (area: 15.5cm^2; thickness: 2.55-1.52mm) of translucent mid-green pot metal with swirling iridescent corrosion product on both faces, but with tiny lentoid air bubbles or seeds within the metal. Two edges grozed to a right angle; with a third grozed edge parallel to one of these, hence the piece may have been a rectangle originally. [GLSGA G17 1988/1229]

181-82. Two fragments (area: 12cm^2; thickness: 3.93-3.28mm) of almost completely opaque green-tinted pot metal, extremely friable and laminating, but revealing verdigris corrosion where the edges are broken. [GLSGA G26? 1988/1343]

183. One fragment (area: 17cm^2; thickness: 2.87-2.36mm) of translucent dark rich green pot metal. Deep iridescent corrosion product on both surfaces. Complete grozed shape, accommodating a right angle and two quarter hollow curves. No paintwork. Very unusual. [In Museum display]

184-96. Thirteen fragments (area: 110cm^2; thickness ranges from 3.29-2.80mm to 1.89-1.31mm) of varying translucency and condition, and of varying hues of pot metal green: 51m^2 dark green; 4cm^2 mid-green, 9.5cm^2 of a dark blue-green; 40cm^2 of a corroded and laminated paler green. The dark green is finer in thickness, bar one piece, and at least one (area: 14cm^2) is painted with identifiably late medieval smear shading and highlighting. This and the thicker piece of dark green pot metal are grozed to irregular shapes using curves. [GLSGA G26? 1988/1343]

Summary quantifications:
Total green pot metal:
Dark green without paint: 70cm^2

Dark green with paint: 22cm^2
Mid-green without paint: 36cm^2
Mid-green with paint: 6cm^2
Light green without paint: 85cm^2
Blue-green: 10cm^2

There were at least 212cm^2 of green pot metal, and a range of shades and conditions of glass, was present. Range of green pot metal shades shown in photograph of Range of Green.

Flashed Ruby

197-214. Seventeen fragments of different thicknesses of ruby flashed glass, in which the flashed layers themselves vary greatly in thickness (area: 180cm^2; thickness ranges between 3.36-3.03 to 1.29-1.82mm. This includes 7cm^2 (thickness: 2.14-2.08mm) of abraded ruby which gives the appearance of being streaky, but the differential surface can be felt by touch; and 11cm^2 (thickness: 2.71-2.45mm), which does appear to be genuinely streaky within the metal itself. About 60cm^2 of this is painted, at least 11cm^2 of which is shaded late medieval, but the majority of the thin flashing is probably later medieval. From a technical point of view, one piece is interesting because it has laminated so badly, revealing the layers, but also because these layers have turned completely opaque creamy white, and the ruby flashing has gone opaque red. [GLSGA G18 1988/1230]

215-25. Eleven fragments of different thicknesses of ruby flashed glass, in which the flashed layers themselves vary in thickness and condition (area: 86.5cm^2; thickness ranges between 2.89-0.85 to 1.77-1.62mm). This includes 14.5cm^2 (thickness: 2.89-0.85mm) of abraded ruby which gives the appearance of being streaky, but the differential surface can be felt and seen. At least 54cm2 has paintwork of some sort, mostly shading and scratched highlights. [GLSGA G28 1988/1345]

226. One fragment (area: 13cm^2; thickness: 2.55-2.46mm) of fine, translucent flashed ruby, with one grozed edge and lead ghosting. No paintwork. [In Museum display]

227. One fragment (area: 18cm^2; thickness: 2.17-2.02mm) of fine, translucent streaky or reamy flashed ruby, two finely grozed edges, making a horn shape. Several elliptical seeds or air bubbles, including one enormous one, containing two others. No paintwork. Could have been used for a devil's horn. [In Museum display]

Summary quantifications:
Total flashed ruby: 406cm^2
Painted flashed ruby: 66cm^2

The colour achieved by flashing red glass over white metal is dependent on both the colourants used, the action of light through both layers, and the depth of the respective layers. It is known that a form of multi-layering, sandwiching ruby and white layers of glass through half the section of the glass was

used in the 12th and early 13th-century but this can rarely be detected without microscopic examination (see Cox 2000). A great deal of the Glastonbury ruby glass has a fine layer visible through the chipping of the edges. Glass that appears to be 'red streaky' occurs at least three times in the Glastonbury assemblage (GLSGA G18 1988/1230, GLSGA G28 1988/1345 and one unknown context in the glass frame. On close inspection, however, the Glastonbury streaky appears to be flashed ruby that has had the ruby layer abraded to produce a variety of reds, pinks, and white glass. The differential thickness of the surfaces can be felt with the human hand on the loose fragments. Consequently, it is likely that the red streaky glass encased in the glazed frame is also a product of controlled abrasion techniques. However, there is at least one fragment that does appear to be genuinely streaky or reamy red, from GLSGA G18 1988/1230. Glass described as 'red streaky' occurs at Wells, for example, in the eyelet sII A4b, beside the St Wulfstan trefoil, dated to c.1325-30, and elsewhere (Ayers 2004, 116).

Murrey

228. One fragment (area: 18cm^2; thickness: 1.83-1.39mm) of translucent, fine dark murrey. Grozed to an irregular shape, but very fine, precise grozing. Painted with a wash from which linear highlights have been picked. Late medieval. [GLSGA G23]

229. One large fragment (area: 59cm^2; thickness: 2.82-2.41mm) of translucent, fine, dark murrey. Two grozed edges, outer surface shiny, inner surface matt, possibly due to a wash of paint, but not clear. [GLSGA G24 1988/1341]

230. One fragment (area: 15cm^2; thickness: 2.51-2.23mm) of translucent, fine, dark murrey. The exterior face is badly pitted and the lead ghosting is visible as a differential height in the surface of the glass. Complete grozed shape, long and narrow. No painting visible. [In Museum display].

231-32. Two fragments (area: 73cm^2; thickness: 3.21-2.28; 2.59-1.97mm) of translucent mid-coloured murrey. One with one grozed edge, one with two, at right angles. Very iridescent weathering. One with a laminated wash on the inner surface. [GLSGA G24 1988/1341]

233. One fragment (area: 12cm^2; thickness: 2.02-1.80mm) of partially translucent light murrey pot metal, with iridescent and opaque surface corrosion, and pitting on the outer face. Three finely grozed edges forming a rectangle, 41mm wide. Some paintwork discernible, mainly fine lines/shading. Late medieval. [GLSGA G221 1991/73/15]

234. One fragment (area: 5cm^2; thickness: 2.27-1.76mm) of translucent light murrey pot metal, with iridescent surface corrosion, particularly on the outer face. Two finely grozed edges. [GLSGA G19 1988/1237]

Summary quantifications:
Total murrey: 342cm^2

Dark murrey: 222cm^2
Dark blue-murrey: 8cm^2
Mid-murrey: 73cm^2
Light murrey: 14cm^2
Pink murrey: 25cm^2

Murrey occurs in variations from pink, to lilac-light murrey, to a mid tone, and to deep, dark purple in the Glastonbury assemblage. The pale murreys (pinks, lilac-pink) are often badly corroded, and this may be due to the deterioration of the specific colourants within the metal in conjunction with the soil conditions. The condition may, however, also be indicative of relative age. Some of the deepest purple occurs in large fragments of fairly consistent thickness, and can be judged to be late medieval. Context GLSGA G24 1988/1341 contains some very large fragments, of at least two variations on murrey, dark and lighter. These pieces have lengthy pieces of grozed straight edge, and at least one has a wash of paint. A piece from GLSGA G221 1991/73/15 has combinations of shading, highlights and some linear paintwork indicative of the three-dimensional moulding of large-scale drapery folds. Broad pieces of deep murrey were used for garments in much late medieval glass composition, and this seems to have been the case with some of the Glastonbury examples.

Pot Metal Yellow

235-36. Two fragments (area: 27cm^2; thickness: 2.51-0.37mm) of a translucent tobacco-yellow pot metal, both fragments of which have lost their outer and inner surfaces through corrosion. One piece has slight iridescence. The surface of the larger piece, in particular, is covered in concentric grooves possibly the result of the corrosion of a piece of crown or spun manufactured glass. At each edge corrosion cones have progressed into the body of the metal enhancing this appearance of concentric lines. [GLSGA G26 1988 1343]

237. One fragment (area: 13.5cm^2; thickness: could not be measured as glass in glass frame) of translucent tobacco-yellow pot metal, grozed to a curve. Possible architectural pinnacle finial. [GLSGA G26 1988 1343]

238. One fragment (area: 3cm^2; thickness: 1.75-1.79mm) of very fine translucent tobacco-yellow pot metal, finely grozed. [GLSGA G15 1988/1227]

239. One fragment (area: 7cm^2; thickness: 1.71-1.13mm) of a translucent olive-green-yellow pot metal. The glass has lost both its outer and inner surfaces, but one grozed edge is discernible, with a slight ledge in the profile of the glass where the lead came overlapped the edge. Similarly, the former paintwork is discernible where there is a difference in heights of the thickness of the glass. There were two roughly parallel lines and a square or rectangle. [GLSGA Possibly G26 1988/1343]

Summary quantifications:
Total yellow pot metal: 55.5cm^2

Deep brown/amber: 5cm^2
Deep amber or tobacco yellow: 43.5cm^2
Olive-green-yellow: 7cm^2

Pot metal yellow does occur, but is not a significant proportion of the overall colour representation. In particular, a deep amber or tobacco yellow is noticeable (43.5cm^2 in total). Where pot metal yellow might be expected, for example, as the base glass for the heraldic lion, the glass is so corroded that it is no longer possible to tell if this was so. One fragment (2.5cm^2) of micro-architectural detail from GLSGA G20 1988/1232 may be painted on pot metal yellow glass, but this cannot be verified due to the corrosion of the metal (see above).

Miscellaneous Yellow Stained Fragments

A relatively high proportion of yellow stain was present in the overall assemblage (at least 450cm^2; 183cm^2 of which was painted with characteristic designs motifs or elements; 267cm^2 of which had design elements which could not be identified), most of it occurring on relatively thin glass, and mostly in combination with either or both smear shading and stipple shading. As yellow stain is known to have been deployed in English glass from at least 1307-1312 when it appears in the Heraldic window of York Minster nave (nXXIII) (Marks 1993, 38; 154; Brown and O'Connor 1991, 61-2), this probably means that all the yellow stained fragments postdate this point in time (although there is no reason why innovations could not have been introduced at Glastonbury, prior to our documented examples). In reality, most of the yellow stained fragments can be dated by their painting and shading to the later middle ages, i.e. the late 14th, 15th and possibly early 16th century. Much of the staining seems to have been used to highlight architectural detail. There are at least two examples of yellow stain having been used on blue pot metal [GLSGA G14 1988/1226 and G24 1988/1341].

Summary quantifications:
Total yellow stain: >450cm^2
Painted with identifiable motifs: 183cm^2
Other painted yellow stain: 267cm^2
Yellow stain on blue pot metal:

Discussion of colour
In the summation and characterization of particular periods and 'schools' of glass-painting the combinations and balance of colour used can be distinguishing features. The problem with excavated material is that many periods and sources of window glass are likely to have been mixed together at the point at which glass was swept up in Dissolution-period activity. Therefore, more often than not, proportions of colour present have no statistical significance or relevance. Having said that, if the nature of the coloured metals present can be sorted into identifiable consistencies, and if associated paintwork can be dated, and indeed if archaeological spatial and stratigraphic patterning can contribute data, then perhaps *something* may be hypothesized, however tentatively, rather than nothing. It is for this reason that the analysis of the coloured glass has been undertaken.

The relative quantities of pot metal coloured glass are interesting. It might be expected that yellow staining would have the highest representation, but blue is by far the greatest murrey glass are interesting

Aspects of glass manufacture and other technical notes

There are examples of both crown and cylinder glass manufacture.

240. One fragment (area: 7cm^2; thickness: 4.99-3.00mm) of opaque glass, some paintwork along the fire-rounded edge, and on both sides. [GLSGA G11 1988/1063]

241. One fragment (area: 23cm^2; thickness: 3.16-1.50mm) of translucent green-tinted white potash glass, with one small area of opaque outer surface remaining. Two grozed edges. Linear seeds or air bubbles visible in the exposed metal. Cylinder manufacture. [GLSGA G12 1988/1064]

242. One fragment (area: 8.5cm^2; thickness: 4.45-3.50mm) of party opaque but originally white glass, badly chipped and laminated at one end. Fire-rounded edge with lines which may be connected with the flattening of cylinder glass. [GLSGA G20 1988/1232]

243. One fragment (area: 3cm^2; thickness: 3.11-1.96mm) of partially opaque, but very friable flashed ruby fire-rounded edge. [GLSGA G21 1988/1233]

The thickest single fragment of any colour in the Glastonbury assemblage was a piece of white glass, (area: 10.5cm^2; thickness: 6.18-4.08mm) from GLSGA G20 1988/1232. This was only partly practically opaque due to corrosion typical of potash glass, with just enough still visible to ascertain that this was originally white glass with a strong green tint to the metal. The tints of white glass could change markedly from place to place, batch to batch as well as through time, so that the tint of white glass alone is no indication of time or place. Similarly, because of the manufacturing techniques used in the middle ages, some variation in thickness may have occurred within the same sheet or table of 'flat' glass. Having said that both tint and thickness may give a relative indication of similarity, and for this reason attention has been paid to these two factors throughout this report. If the same tint of white glass, or hue of a pot metal colour recurs, and is of similar thickness or treatment (with regards to say, grozing or painting) then it is worth looking for possibly contemporary batches of glass manufacture used in any single glazing scheme.

On a technical note as regards colour, where medieval potash glass has corroded to the point of being completely opaque, it can be almost impossible to determine the original colour of the glass from visual inspection alone. Materials analysis can be used to determine the presence and relative quantities of metal oxides and trace elements. In the course of visually examining the Glastonbury material, it was noticed that a distinctive verdigris corrosion product occurred on glass of two distinct colours. It is visible in two conjoining fragments from GLSGA G20 1988/1232 in which the broken section revealed a substantial layer of ruby flashing. The verdigris corrosion had taken place in both the white and the ruby layers. In another sample, verdigris corrosion was observed on pot metal green glass. Copper

oxide was commonly the colourant used to produce red, and iron oxide was commonly used to produce greens. A sample from GLSGA G20 1988/1232 (area: 6.5cm^2; thickness: 3.76-3.25mm) also displays verdigris corrosion on what is still plainly visible as green-tinted white glass. Verdigris corrosion may result from the presence of iron in the constituent elements of white glass. Observing verdigris coloured corrosion, therefore, on its own is no failsafe means of identifying original colour by eye.

Glass connected with Glastonbury Abbey, located elsewhere

A different methodology had to be applied to the comparative glass as most of it was releaded in extant windows and could not be accessed at close quarters; the exception was that in St Patrick's Chapel, in the grounds of the abbey. The latter has therefore been described in detail, including condition and area covered. The other glass had to be examined using binoculars, and areas could not be assessed.

St Patrick's Chapel, Glastonbury.

Southern window (**sI**) of four lights, all the glass releaded.

sI light 1a. **Fragments**, in the main light, in three assembled groups. The lowest is an arrangement of a small roundel of white glass with a figure in yellow stain with very little outline paint remaining, surrounded by a border of scrolls and slightly egg and dart intertwining bands in outline and reserve on white glass and highlighted in yellow stain. With a partial semi-circle of blue pot metal above and a piece of flashed ruby beneath (169cm^2).

The top of the ensemble is an inverted capital or possibly a finial on white glass outlined and in reserve, and highlighted in yellow stain, 15th-century (c.13cm^2).

Three pieces of architectural detailing on white glass, with obvious pitting. Angled, crenellated wall tops with trefoil decoration and cross-hatching, highlighted in rather orangey yellow stain, with a part of a pinnacle with simple rounded crockets. A form of brattishing or cornice along the top in reserve from a matt ground, 15th-century. The second piece has smear shading on the crenellations, but is obviously conjoining. The third piece has part of the crenellations, the trefoil design, and beneath that an ornate pinnacle finial, foliate, highlighted with scratchwork in the thin wash, and yellow-stained. It is also decorated with cross-hatched circles on a white ground, highlighted in yellow stain, 15th-century (c.155cm^2 in total).

There are two pieces of similar glass, one with a yellow-highlighted cross-hatched circle turned into a comma shape, ad another smaller piece (5cm^2 and 1cm^2 respectively). One piece of white glass depicting a human hand against a ground of circles with inner circles, and holding something comprising two circular objects, half in yellow stain (11.5cm^2). Two pieces of modern-looking murrey

(3cm^2 each). Three pieces of ruby flashed glass, each with curved edge painting making leaf indents (6, 6.5 and 5.5cm^2 respectively).

sI 1b **Fragments**, in the main light. An ensemble surmounted by a round-headed or plume-type pinnacle finial on top of a bell capital, with neck ring, shaded and highlighted in yellow stain, 15th-century (c.11cm^2).

A rectangle (15 x 23cm, or 345cm^2) composed of twelve pieces all painted on white glass and highlighted with and yellow stain. Features centrally a helm, frontal, with silver/grey mantle, dagged and billowing to either side. A lion or bear paw on either side. Three small pieces of ruby flashed glass beneath, each c. 1cm^2.

Two small fragments of architectural detail on white glass, painted in outline, 15th-century (3.5cm^2 each). Pieces of ruby flashed glass, yellow stain and a modern-looking orange pot metal (37.5cm^2).

sI 1c **Fragments**, in the main light. An assemblage of fourteen pieces. Three ruby flashed with some painting in the form of smear shading (3, 3, and 3.5cm^2 respectively). Two fragments of bright green pot metal (1.5cm^2 each); and one of mid-blue pot metal (<1cm^2). Two pieces of white glass highlighted with very orange yellow stain, with highlighted tapering lines scratched from a very fine wash (1.5cm^2 and 4.5cm^2 respectively). Part of a back letter inscription on white glass, within a yellow-stained border (45cm^2). Two pieces of white glass painted with angled architecture, with the mouldings highlighted in yellow stain, one with a window opening above (49cm^2 and 45.5cm^2 respectively).

The central pane depicts two prisoners looking out through a grilled window opening, with one in profile, and one in three-quarters view. The hair of the latter is in yellow stain, and both wear neck irons, in yellow stain. One set of hands depicted outside the window may be from another image, but shares the same highlighted cill beam as the window scene (85cm^2 in total). This is a fragment of 'Visiting Prisoners' from the Seven Corporal Acts of Mercy identified by Woodforde (1946, 169; 45-46).

sI 1d **Fragments**, in the main light. The lowest element mirrors the roundel and ornamented frame in 1a, except that the central roundel is unpainted.

Above this three pieces of white glass, painted with two windows, each with cross-hatching depicting a diamond lattice of glass quarries. The windows have round heads externally, cusped, with cross-hatched circles in the head, highlighted in yellow stain, 15th-century (60cm^2). Above this a canopy gable in white glass, but heavily weathered with pitting on the exterior. Painted with with crockets in white, and yellow stain highlights to the concave inner moulding of the gable, 15th-century (25cm^2). Two pieces of flashed ruby painted with solid beading on either side of line of chevrons (7.5cm^2).

A triple pinnacle from a canopy, one small pinnacle with crockets in white and central gable in yellow

stain, another the same size on the other side with yellow stain crockets and white central gable, the third pinnacle rising behind, all in yellow stain apart from the finial ring. Trilobed finial, 15th-century (95cm^2). Three small pieces of yellow stain highlight on white (3.5, 3 and 2cm^2 respectively). The assemblage has a central image of a helmeted head in profile, painted on white glass in Renaissance style of the early 16th century. This is rather crude in outline, and flaking badly, but the glass does contain very small air bubbles. The moustache, beard and Renaissance details of the helmet are yellow stained. The piece is shield-shaped with yellow stain highlighting around the edges (129cm^2).

Discussion

According to Woodforde (1946, 111) the fragments include the arms of Stourton, a family documented by John Aubrey to have been benefactors of the abbey, and whose heraldry was to have been seen in the windows of the town and in the remaining parts of the monastery. The only armorial aspect is the helm and mantle with the animal paws on either side but this hardly seems enough evidence upon which to make an attribution of the heraldry. The painting style seems very late indeed for this to have originated at the Abbey, and appears to be possibly even 17th-century. The glass did not originate in this chapel, but may have come from a building in the vicinity.

The Abbot's Kitchen, Glastonbury

West window (**wI**) of two lights, all the glass releaded.

wI A1. **Fragments** in the quatrefoil tracery:

Grisaille: three pieces of trefoil grisaille on cross-hatched grounds, 13th-century.

Architectural detail: one large piece of canopy gable with cabbage leaf crockets highlighted in yellow stain, early –mid-14th-century.

Nine or ten pieces, including some substantial fragments, depicting elaborate architecture of a wall with an elaborate overhang, leaded glass windows with yellow stain, the wall recessed and paneled, with a trefoil corbel. Two of this style depict a window opening with golden bars. Two cusped window heads with lattice windows in yellow stain; two large pieces of angled side shafting; two pieces of canopy with simple curved crockets, all 15th-century. Two pieces of much simpler canopy arch decorated with rounded trefoil cusps, also 15th-century.

Eight pieces of white glass with finely painted architectural detail with much use of shading, with foliage decorating columns and yellow stained, late 15th- or early 16th-century.

Foliage:
Two pieces of broad leaf on white glass, painted in reserve and yellow stained with some shading emphasizing lateral curvature, cf. leaves found in e.g. the background to Wells Cathedral E1 2-3c and 2-3d, 14th century, (Ayers 2004, Pls 20 and 21). Two pieces of diaper with a hawthorn-type leaf in reserve and scratchwork detail from a fine matt ground, highlighted in yellow stain.

Four pieces of close-spaced circles, perhaps depicting berries or window glass, but common enough as a background feature in some 15th-century glass.

At the top of the assemblage, a highly naturalistic depiction of apples or pomegranates growing on a central branch, very finely drawn and shaded, probably early 16th-century.

Quarries: At least two fragments with separate Somerset quarry details.

Figural: a dominant, large fragment of blue pot metal, painted with shading to depict drapery folds, 15th-16th-century; one piece of blue pot metal, painted with possible chain mail pattern.

Other: A crown with an heraldic badge beneath – the sign for a rook – and what appears to be an ermine mantle beneath. A piece of flashed ruby with both white and yellow stain highlight on the same piece, must be abraded. One indistinct piece of white glass with some yellow staining, could be a Renaissance grotesque head in profile (16th-century) or a piece of foliage (14th-century).

St John's Church, Glastonbury

South and north chancel chapel windows (**sIII** and **nIII**),

sIII, of three lights, miscellaneous collection of fragments in all three lights and tracery;
1a **fragments**, two **male donors**, kneeling, in red gowns, each with a purse and tassel at their waist, a large Somerset quarry design and fragments of others, architecture and other features, on a mainly blue ground, including two small blue roundels.
1b **fragments**, made into a roundel framed mainly in blue pieces, an **angel** in blue swinging a censer by a chain, but not in usual position, and the censer looks more like a citern or stringed instrument. Fragments of foliage and what may be another censer amongst the background pieces. A lot of red in the background pieces.
1c **fragments**, including some blue stickwork diaper and a Somerset quarry and part of a large cup, upside down, a red and a blue roundel. A partial angel with red vestments, but no head, holding a **shield**: Argent, gutté d'eau argent, a cross raguly vert between two covered beer jugs or. The latter is probably the canting arms of Abbot Richard Beere of Glastonbury, d.1524 also attributed to St Joseph of Arimathea.
2a and 3a **fragments**, including part of a prison window drawn on white glass, and an **angel** whose head does not seem to fit the rest of the upper body and wings holding a shield, whilst the vestments beneath the shield are made up of fragments. The **shield** with the Virgin's monogram: Gules, the monogram M or. Fragments make up the background with bits of architectural detail, a crocketed arch with round-headed window, a piece of jeweled hem.
2b and 3b **fragments**, including an **angel** whose head does not appear to fit any other part here, drawn on white glass with yellow stained hair. A **shield** blazoned with the Sacred Wounds: Azure, on a rustic cross vert, a heart proper, and between hands and feet proper. Amongst the border fragments on the west side there is an inscription in black letter set vertically, with part of what may be a window, and

paneling consisting of circles. Part of a canopy side shaft with round-headed latticed window, other parts of canopy. Background largely ruby. Above this, several fragments from the multi-pinnacled top of a canopy.
2c and 3c **fragments**, including an angel whose head does not appear to fit the rest of the upper body and wings holding a shield, whilst the vestments beneath are made up of fragments. **Shield** blazoned with the sacred monogram: Azure, the monogram ihc or. A miscellany of fragments including architectural detail.
4a **fragments**, a hem of a white robe, highlighted with yellow stain. A **shield** whose central blazoning is illegible, but within a bordure gules. To the west, a small **shield** on a ruby roundel: parted per pale, the dexter side azure, a stork argent, within a bordure argent, impaling the sinister side argent, an eagle displayed with wings displayed and inverted, sable, beak and claws or. Identified as Storke impaling Bryn or Trestwood.
4b, 5b and 6b **fragments**, a **bishop** in full vestments and mitre drawn in outline, shading and yellow stain on white glass, holding a cross staff, the chasuble decorated with flowers highlighted in yellow stain, on a red ground and framed by a very elaborate architectural canopy depicted in three dimensions. Multi-pinnacled canopy with vaulted underside, against blue ground. Miscellaneous fragments in foreground.
4c **fragments**, the bare feet and robes to the knees of a throned figure facing to the figure's right. Probably Christ from a Coronation of the Virgin (see below). Part of a shield, argent, an eagle rising, wings displayed and inverted or. To the west a shield parted per pale, the dexter side azure, three horses' heads argent impaling [not at all sure of this blazoning] the sinister side on a fess gules, two ? or, the lower half per pale, argent and argent semé lozenges, counterchanged per fess. Identified as Horsey impaling Rogers of Dorset, but unconfirmed.
5a **fragments**, in a quatrefoil made up of white glas three-quarter roundels with ivy leaves highlighted in yellow stain, a **shield**: Azure, a chevron or, between three crosses fitched or, within a bordure engrailed or. Identified as Turges.
5c **fragments**, including an eagle, Tudor roses, a sun-in-splendour, vesica shapes made up of jeweled borders and leaves - these may have been eyelet fillings originally.
6c and 6c **canopies**, multi-pinnacled, each with a taller central pinnacle, painted on white glass, on a ruby ground.
A1-4, eyelets filled with fragments including some grisaille with ruby centres, elaborate grisaille and wound foliage of the late 15th/16th century.

nIII, of four lights, miscellaneous collection of fragments in all four lights and tracery;
1a **fragments**, forming a border, including architectural latticed windows, bits of canopy, and quatrefoils with trefoil cusps and latticed centres, yellow stained, all on white glass. A **male clerical donor**, kneeling, in clerical dress, a red robe under a white chasuble, on a blue ground, kneeling on yellow cushions. A scroll in white bearing black letter script: '*Salvator mundi salva me*'.
1b **fragments**, forming a border, including architectural latticed windows, bits of canopy, and quatrefoils with trefoil cusps and latticed centres, yellow stained, all on white glass. A **male donor** figure, kneeling, in a blue gown, with a purse at his waist and a long tassel or chain. At a prie-dieu, on a red ground. A scroll in white bearing black letter script: '*Salvator mundi salva me*'.
1c **fragments**, forming a border, including architectural latticed windows, bits of canopy, and quatrefoils with trefoil cusps and latticed centres, yellow stained, all on white glass. A **female donor**

figure, kneeling, with a rosary at her belt, in a blue gown with white winple and veil, at a prie-dieu on a red ground. A scroll in white bearing black letter script: '*Salvator mundi salva me*'.
1d **fragments**, forming a border, including architectural latticed windows, bits of canopy, and quatrefoils with trefoil cusps and latticed centres, yellow stained, all on white glass. Part of a **male donor** and a smaller **female donor**, both kneeling, the male with a purse and tassel at his waist, she with a rosary, a white wimple and veil. Both on a mainly red ground. A partial scroll in white, with letter no longer legible.
2a **fragments**, forming a border, including architectural latticed windows, bits of canopy, and quatrefoils with trefoil cusps and latticed centres, yellow stained, all on white glass. A **crowned Virgin** in prayer, turned towards the figure's left, a robe decorated with lozenges in yellow stain, a cloak in yellow stain and white, the ground decorated with seaweed diaper, an ogee arch, and diamond and circle pattern on cross-hatched ground.
2b **fragments**, an **angel** in a roundel, in alb and amice, holding a cup or ciborium. The angel's wings are made up partly of architectural detail.
2c **fragments**, an **angel** in a roundel, in alb and amice, holding a cross. Again, the angel's wings made up partly of architectural detail.
2d **fragments**, forming a border, including architectural latticed windows, bits of canopy, and quatrefoils with trefoil cusps and latticed centres, yellow stained, all on white glass. A **crowned Virgin** in prayer, turning towards the figure's left, depicted almost entirely in grisaille, that is paint on white glass, with only her hair and crown highlighted in yellow stain.
3a **fragments**, forming a border, including architectural latticed windows, bits of canopy, and quatrefoils with trefoil cusps and latticed centres, yellow stained, all on white glass. A **female saint** with gown patterned with detail similar to the Somerset quarry pattern, red/pink in colour on a blue background, holding a book in one hand and a scimitar-type sword in the other. Head decorated with a floral circlet and simple halo with trefoil cusps, set on a black and white tiled floor. Identified as **St Catherine**.
3b **fragments**, featuring a partial figure in a dress decorated with yellow stained flowers, with a blue cloak, the head is indistinct, but there is a scroll with black letter inscription: '…*ancillam*…*fiat mi*…'**: Virgin Annunciate**.
3c **fragments**, featuring a partial angel, very indistinct, in a pink robe, with wings hardly legible at all, but with remains of a scroll rising beside him with black letter script: '*ave maria gracia*…': **Archangel Gabriel**.
3d **fragments**, forming a border, including architectural latticed windows, bits of canopy, and quatrefoils with trefoil cusps and latticed centres, yellow stained, all on white glass. A **male saint** holding a chalice from which issues a demon. He wears a blue robe, with a white cloak over. He stands on a black and white tiled floor. Identified as **St John the Evangelist**, with his emblem the poisoned chalice.

Discussion

By far the majority of these fragments is of the 15th century. Some of the glass in sIII and nIII is said to have come from St Benignus's church, Glastonbury, in the 19th century (Woodforde 1946, 45). The glass is also said to have come from the east window, and been reassembled in the side windows by Westlake in 1879 (Boyd and Bonham n.d.17). Woodforde thought some of the kneeling figures were of Devonshire origin; as all the kneeling donors are executed in the same way, and clearly come from

either the same or a related set of windows, all the kneeling figures would seem to be of Devonshire origin. This, however, does not mean that they may not have come from the abbey itself, as it could have drawn from glass workshops across the south of England. Woodford assigned the other work to the Somerset School, and there are certainly identifiable Somerset quarry types in the backgrounds of many of the reassembled scenes (Woodforde 1946, 22, 45-46; 178; 188; 210). The fragment of window could be the 'Part of a panel related to the remainder in St Patrick's Chapel, Glastonbury, brought from a private collection, and possibly of Devonshire origin' (Woodforde 1946, 46), since a partial 'Feeding Prisoners' was depicted in St Patrick's. There are clearly two figures of the Virgin from two separate Coronation of the Virgin scenes, depicted in very different styles nIII 2a and 2d, but both dating to c.1450 (Woodforde 1946, 45). In the light of these, the figure enthroned but with bare feet facing in the opposite direction in sIII 4c is probably Christ from a Coronation of the Virgin scene. There are also parts of an Annunciation, detectable by the attitude of each figure to the other, body position and the residual inscriptions emanating from each figure. These figures, however, are very degraded. Censing angels are extremely common in stained glass, but they also appear on the seal of Glastonbury Abbey. Besides the sacred monograms of the Virgin Mary and of Christ, there are at least three heraldic shields of the late 15th- and early 16th-century, including those of Abbot Richard Beere, the families of Turges, Storke impaling Bryn or Trestwood and Horsey impaling Rogers of Dorset. John Horsey, who live in the reignof Edward III, married Elizabeth, daughter and heir of Richard Turges of Melcomb, Dorset (Woodforde 1946, 110). All except the arms of Richard Beere are said to have been painted for St John's church as they were noted before glass was brought from St Benignus's church; at this time there were also arms of Stawell of Cothelstone and Luttrell (Bod. Lib., Tanner MS. 89, 229; Woodforde 1946, 110-11). These may have been quarters of shields, but not necessarily relating to each other. Another shield was perhaps of Merton, Eleanor, daughter of Sir Richard Merton or Martyn, having married first Sir Matthew de Stawell, born c.1340, and died 1379, and second Sir Peter de Veel. Sir Matthew de Stawell of Cothelstone was buried in Glastonbury Abbey in 1439 (Woodforde 1946, 111). A priest by the name of John Stawell was mentioned several times in the churchwardens' accounts for St John's church between 1465 and 1500 (Stawell 1910, 35, 50-1). According to Woodforde (1946, 46) and Boyd and Bonham (n.d., 17) there is still some 15th-century glass in 'the lights below the transom' in the east window (I), bearing the initials T.M., thought to be those of the original donor, but I could not detect this.

Glass in the Tribunal Chapel, Glastonbury

Glass no longer extant, but stated by Collinson (1791, volume 2, 263) to be 'formerly filled with painted glass, consisting chiefly of coats of Abbots, Kings of England, and the different benefactors'. Woodforde (1946, 94) presumed that this would have been contemporary with the chapel, built by Abbot Beere (1493-1524.

Glass in Taunton Museum and Taunton Castle, Somerset

Woodforde (1946, 274) also recorded glass originating from Glastonbury Abbey in Taunton Museum and Taunton Castle, where there is part of a figure holding a book, canopy-work of two dates, and

some inscription (images kindly supplied by Vicky Dawson, Consultant Curator, Glastonbury).

Glass possibly related to, but not originating from, Glastonbury

Butleigh, Somerset.
In west window (**w**), window of six lights, fragments in tracery lights:
w A2 **shield**, the Arms of Glastonbury Abbey; A4 ruby flashed glass; A7-9 **fragments** of architecture, 15th-century.
B1 **fragments** of architecture, 15th-century;
B2 well drawn arm and side of **figure** holding staff, wearing a blue gown on a red ground;
B3 partial **figure** holding lance and book with a decorated cover drawn on white glass;
B4 fragments of architecture, drapery, a book in a hand, a partial **figure** holding an architectural fragment instead of a book, and a blue knife or sword;
B5 partial **figure** in blue on red ground, the head does not fit this figure, holds a sword;
B6 **fragments** of architecture, 15th-century.

Discussion
This glass was described as 'unlike anything else in the county' (Woodforde 1946, 22). The figures are thought to be: B2 St James with a pilgrim's staff; B3 St Thomas with a lance; B4 St Bartholomew with a large knife; B5 possibly St Paul with a shirt sword (Organ 1989).

Chilton Polden, Somerset
Miscellaneous fragments extant and glass, now lost, recorded in 1839, relating to abbots of Glastonbury (Woodforde 1946, 42-3). This glass was located in the eastern window of the refectory and consisted of a collection of cherubs, a bust of St James, the letters 'R W' for Richard Whiting, and 'B' for Richard Bere, both Abbots of Glastonbury, with the border round the lower compartments of the window composed of 'broken glass taken from Glastonbury Abbey' at its destruction, including shades of pink and ruby glass (Stradling 1839, 4).

High Ham church, Somerset
Fragments in east window central tracery (**I**), chancel south and north windows (**sIII**, **nIII**), nave south aisle east window (**sIV**).

I B6 and B7 **fragments**, figure of an Abbot, in vestments and mitre, traditionally identified as Abbot Selwood, and another figure.

nIII 1a and 1b **fragments**, two Somerset quarries.

sIII **figure** identified as Hezekiah laying his letter before the Lord.

sIV B2 symbol of the **Trinity**, triangular shape in white glass, with white circles at the apeces, on ruby ground.

Discussion
All by Woodforde's 15th-century 'Somerset School'; the abbot and convent of Glastonbury were involved in the rebuilding of High Ham in 1476 (Woodforde 1946, 47).

Other
The heraldic Arms of Glastonbury Abbey occur in Wells Cathedral's Vicars' Close Hall, dating to c.1498-1515 (VCH nII light a and VCH sII light d), perhaps a reflection of a particular devotion of Pomeroy, the donor; (Ayers 2002, 548 and 549, VCH nII and VCH nII 2a; 553-554, VCH sII and VCH sII 2d). They also appear in Butleigh (15th-century, above), Cheddar (probably mid to late 15th-century), Long Sutton Manor Farm (c.1485) and Mark (15th-century), all in Somerset (Woodforde 1946, 93, 98, 100, 116, 120, 137). Iconographical scenes relating to Glastonbury appeared in windows in other religious houses, for example, a window illustrating the transportation of St Dunstan by angels into a closed chapel at Glastonbury survives amongst the earliest glass at Canterbury Cathedral (north choir aisle 'triforium', Nt:X, c.1180) (Caviness 1977, 145, 154, fig. 110).

The Unpainted White Glass Assemblages

Very little of the medieval white glass was unpainted relative to the painted and pot metal material. Whilst medieval potash glass may display a number of weathering traits (e.g. pitting, opacity, friability, scaling or lamination), medieval glass working techniques are also indicative of date (e.g. grozed edges). It was obvious, however, that a great deal of the white unpainted glass did not have any of these traits and fitted the profile of post-medieval glass with a greater soda content, and modern glass. Much of this glass was consistently thin, and there was a preponderance of fire-rounded edges, indicative of broad and crown glass manufacture.

Indicative medieval potash white glass
One fragment (area: 29cm^2; thickness: 3.71mm thick over an air bubble, 1.41-0.56mm where laminated and broken) of translucent fine pale blue-green tinted white glass, grozed on three sides to a partial diamond quarry, but broken. Lead overhang is visible as a flatter, thinner portion of glass on each edge. Surface laminating with iridescent corrosion product. [GLSGA unknown]

Early Modern white glass
1) consistent blue tinted white
166cm^2 [GLSGA G1 1988/1053]
870cm^2 [GLSGA G3 1988/1055] 14 v deep aqua blue
121cm^2 [GLSGA G4 1988/1056]
96cm^2 [GLSGA G5 1988/1057]
23cm^2 [GLSGA G6 1988/1058]
3cm^2 [GLSGA G10 1988/1062]
Total = 1279cm^2

2) extremely colourless and transparent
34cm^2 [GLSGA G1]
88cm^2 [GLSGA G3 1988/1055]
Total = 122cm^2

3) relatively colourless, slightly green-tinted, thin, with iridescent corrosion
270cm^2 [GLSGA G1 1988/1053]
77cm^2 [GLSGA G3 1988/1055]
184cm^2 [GLSGA G4 1988/1056]
176cm^2 [GLSGA G5 1988/1057]
437cm^2 [GLSGA G6 1988/1053]
209cm^2 [GLSGA G8 1988/1060]
7cm^2 [GLSGA G10 1988/1062]
4cm^2 [GLSGA G11 1988/1063]
11cm^2 [GLSGA G15 1988/1227]
2cm^2 very potash looking [GLSGA G16 1988/1228]
20cm^2 [GLSGA G16 1988/1228]
4cm^2 [GLSGA G21 1988/1233]
36cm^2 [GLSGA G31/3 1988/1348]
Total = 1437cm^2

4a) fine olive-green tinted white with orange-buff corrosion but no grozing (possibly potash)
115cm^2 [GLSGA G1 1988/1053]
136cm^2 [GLSGA G2 1988/1054]
65cm^2 [GLLSGA G3 1988/1055]
5cm^2 [GLSGA G4 1988/1056]
526cm^2 [GLSGA G5 1988/1057]
507cm^2 [GLSGA G6 1988/1053]
104cm^2 [GLSGA G9 1988/1061]
11cm^2 [GLSGA G10 1988/1062]
21cm^2 [GLSGA G15 1988/1227]
78cm^2 very potash looking [GLSGA G16 1988/1228]
102cm^2 [GLSGA G16 1988/1228]
137cm^2 [GLSGA G31/2 1988/1348]
Total = 1807cm^2

4b) fine olive-green tinted white with orange-buff corrosion and grozed edges
One fragment (area: 18cm^2; thickness: 1.63-1.61mm) of fine olive-green tinted white glass with fine pitting and scratched appearance of orange-buff corrosion product. Grozed on three sides to a slightly rounded rectangle, with lead stains. [GLSGA unknown]
4cm^2 [GLSGA G31 1988/1348]
18cm^2 [GLSGA G31 1988/1348]
8cm^2 [GLSGA G31/2 1988/1348
Total = 48cm^2

Sub total type 4 = 1855cm2

Sub total types 1-4 = 4693cm^2

5) Other
360cm^2 [GLSGA G1 1988/1053]
191cm^2 [GLSGA G4 1988/1056]
495cm^2 [GLSGA G5 1988/1057]
12cm^2 [GLSGA G6 1988/1058]
11cm^2 [GLSGA G15 1988/1227]
39cm^2 green tinted white fire-rounded edge, iridescent corrosion [GLSGA G3 1988/1055]
Total = 1108cm^2

Overall total = 5801cm^2

Discussion
There were four distinct assemblages of white glass amongst the post-medieval/early modern material: (1) one that has a consistent blue tint, and tends to be transparent; (2) one that is extremely colourless and transparent; (3) one that is relatively colourless, thin, but has a consistent iridescent corrosion product, often with lead ghosting; (4) one that is olive-green in tint, and tends to be less transparent due to a fairly consistent orange-coloured corrosion product, generating pits that coalesce (i.e. more like potash glass pitting), and which also has signs of lead ghosting. Only the last of these assemblages has any signs of grozing (48cm^2), the rest all have cut or broken edges. The iridescent white (3) and the olive-green-with-orange-corrosion (4) were both used to form diamond-shaped quarries that were glazed into a leaded trellis of diamond or lozenge panes, suggesting late medieval/early modern use. The olive-green type (4) bears more resemblance to late medieval metals in its characteristic corrosion, and it may be that this material bridges the late medieval and early modern traditions. The picture is further complicated by the fact that some of the better-preserved identifiably late medieval painted glass is very colourless and free of inclusions. Some of the metals 1-4 have a great many inclusions (seeds or air bubbles, usually characteristic of hand-blown window glass manufacture). Furthermore, there are large quantities of fire-rounded edges in all four metals, characteristic of the hand-blown cylinder manufacture of flat glass. Quantities of fire-rounded edges in concentration are not unknown (Graves 1993), but they remain relatively uncommon, and they tend to indicate an episode of glass installation (i.e. these tend to be off-cuts from the glazing process).

There is a very limited amount of information to be deduced from visual inspection of early modern and later glass alone. Recent studies have demonstrated the value of chemical analysis applied to window glass in the post-medieval period (Dungworth 2005, 2006, 2011, 2012; Dungworth and Mortimer 2005). It is highly recommended that the Glastonbury material be presented for further analysis. Dungworth (2011) recognizes three phases of glass-making before 1835: Phase 1- forest glass before c.1567; Phase 2 - high-lime low-alkali (HLLA) (c.1567-c.1700); Phase 3 - kelp glass (c.1700-c.1835). The first is characterised by high levels of potassium and magnesium; the second by a high calcium content, and relatively low levels of potassium and magnesium; the third is mixed alkali, but derived from marine plants, predominantly seaweed or kelp, and used for the production of window

glass from at least the 18th century; the fourth dates from the introduction of the Leblanc method of producing sodium carbonate from common salt in c.1835, and window glass made from Leblanc soda has very few impurities, and rarely any colour (Dungworth 2011). In the 1820s, the Chance Brothers introduced an 'improved cylinder' technique of manufacture, and by 1844 a quarter of the glass in England was made by this technique. In visual terms, all pre-modern glass manufactured by broad and spun techniques will have variations in colour, thickness, surface and inclusions, however medieval potash glass will usually have some blue-green tint, usually with the green slightly more predominant; Dungworth observed that glass made with kelp generally has a blue-green tint, and that 'The HLLA glass of the late sixteenth and seventeenth centuries, however, had a much stronger blue-green colour' (Dungworth 2011, 44). Furthermore, the HLLA glass may be divided into two periods: 1567-1610 and 1610-1700, depending on chemical composition (Dungworth 2012, 17 Fig. 5).

Without chemical analysis, therefore, little more can be done to characterize the Glastonbury colourless and post-medieval window glass, but it is worth considering the evidence of the lead window cames in respect of this glass. At least 441.24g of lead came (maximim 605.01g) were deemed to have most probably been produced in an untoothed mill, dating them to according to Knight's 1986 typology (Type D) to the mid-late 16th-century. This category includes at least 290.79g with secondary cames soldered to create a triangle, i.e. perhaps from the edges of diamond-quarry lead lattices [GLSGA 1988/628 L19].

There were also examples of Knight's (1986) Type E, dating to the 16th-early 17th-century; came which lay between Types E and G, and therefore probably dating to between the 16th- to mid-17th-century; and Type G, dating to the late 17th-century.

General Discussion and archaeological considerations

There are several significant groups amongst the excavated window glass from Glastonbury Abbey. The first is, undoubtedly, the assemblage of largely still translucent blue pot metal, painted mostly with leaf designs, running beading, fragments of drapery and some swirling patterns which may be decorative grounds, comparable to those used in 12th century manuscripts. Some of this is on display in the Museum. Lewis identified this as mid-12th century and a 12th century date seems sustainable. Moreover, the fairly consistent condition of the blue (as opposed to the heavily pitted and opaque 13th and 14th century material, of potash composition) suggests that some of it is of the 'durable' soda-lime composition identified by scientific analysis (Cox *et al*. 1979; Cox and Gillies 1986; Gillies and Cox 1988); and at Winchester, where the date for this type of glass ranged from the late Anglo-Saxon to late 12th century and later (Biddle and Hunter 1990). Similar material has been excavated from York Minster, Old Sarum and Dover Castle (Biddle and Hunter 1990, 358, n.29-31). As it seems highly unlikely that blue was the only colour used the entire assemblage was scrutinized for any other candidates for 12th-century designs, but this has proved extremely limited. The major collections of 12th-century glass remaining in England are at Canterbury and York Minster, although there are examples in a few other churches and a little known from excavation. The stylistic affinities in this

period may also relate to French glass-painting in particular. Chemical analysis has demonstrated that blue glass from Chartres Cathedral and the abbey church of Saint-Denis (Ile-de-France), also share this durable soda-lime composition (Biddle and Hunter 1990, 358). The results of Scanning Electron Microscope (SEM) analysis on three Glastonbury examples confirms that the glass composition falls within the range of recognized durable blues, (Cox and Gillies 1986 group 1, mixed soda and potash composition, with both cobalt and possibly high levels of copper causing the distinctive blue colouring (see Caple and Barnett this volume)).

The predominance of blue in the surviving ambulatory chapel windows and relocated panels from Saint-Denis has been attributed to a deliberate evocation of "divine darkness" and the "inaccessible light in which God is said to dwell" that were referred to by the pseudo-Dionysius the Areopagite" (Lillich 1984; Caviness 1986, 262; see also Gage 1982). Whereas a patron such as Abbot Suger may have drawn on a number of theological sources for his choice of glass painting, and his schemes may are thought to have been variously narrative and anagogical in theme. Beyond the theological, however, iconographic and stylistic sources need not coincide, in other words a *composition* for a specific Biblical or hagiographical episode could be borrowed from an iconographic source, like a manuscript, or a reliquary, but the *style* in which that scene was conveyed might not be reproduced; the style might come from entirely different sources, only to be further subject to creative adaptation and invention (Caviness 1986, 262-265).

Much of the 'early' blue from Glastonbury has been subject to heat-distortion, which has rounded the edges, produced beveling, and often created a dull, frosted appearance. Most of this category of glass exhibits an iridescent weathering product. Lewis assigned fragments from GSGA G22 to the period of Henry of Blois, partly on the basis of art-historical comparison of the painted designs, partly on the basis of Bond's description of the 'azure-blue' glass he found in the area of Edgar's Chapel (1909, 109), and partly on the basis that, as it was burnt, it was probably the victim of the great fire of 1184. There seems to me to be a logical inconsistency here, for if the glass had been burnt in the 1184 fire why was it where it was, with both burnt and unburnt fragments? Did the pre-fire church extend this far east? Is it not more likely that the burning was connected with the destruction at the Dissolution, the glass having been used in the Edgar Chapel until that point? If the glass was deliberately reused in the later middle ages (G22 is not exclusively 'early' glass, but contains later medieval glazing, albeit a small relative quantity – less than 12% of the contents of this context), this would be particularly interesting in the light of Glastonbury's demonstrated deliberate evocation of the past in architectural and other matters (Draper 1995). It would not be the only major church to re-use old glass in later glazing schemes for ideological purposes (Caviness 1973). At Saint-Denis fragments of glass of about 1150 were reglazed in a scheme of the 13th century, after having been damaged by fire in 1184 (Caviness 1986, 267-268). Glass from Troyes dated to before 1188 was also repaired in the 13th century. The 12th-century glass at York Minster was used in glazing of the 14th century to emphasize the depth of history and the equally deep claims to primacy of the York See in comparison with its rival Canterbury. It is conceivable, then, that portions of the Romanesque glass at Glastonbury were deliberately redisplayed to emphasise the depth of history at the site, with one eye to its historic rivals as well. Furthermore, if some of the stickwork rinceau / trefoil foliate meander borders (numbers 22-26) are in fact 14th-century approximations of 12th-century designs, the Romanesque glass may have been reglazed along with later medieval glass deliberately intended to emulate or blend in with the

older revered material.

Many, if not most, monastic sites produce some grisaille of the 13th century (e.g. Bayham Abbey, Sussex, Kerr 1983), and some sites produce a great deal of this type of glazing (e.g. Rievaulx Abbey, North Yorkshire). By contrast, 13th-century grisaille is relatively under-represented at Glastonbury. One must be cautious in making judgments based on the overall paucity of window glass from the site (all the glass, of all periods put together, would not fill one large window). The choice of 13th-century grisaille at many sites may be partly in tune with the major building campaigns, and partly in tune with either aesthetic or ideological preferences on the part of the institution or the patron. Grisaille was, for example, used by some Cistercian houses perhaps as a deliberate ideological and doctrinal choice avoiding coloured, narrative, historiated windows. Other sites chose this method of glazing because it would have admitted more light than older, narrative windows typical of the mid to late 12th century, and thus perhaps have enhanced the elaborate contemporary architectural mouldings. Others again probably chose this type of glazing because it was, or could be, much cheaper than coloured glass, which was probably imported through most of the 13th century. This notwithstanding, the small representation of this type of glazing at Glastonbury may be worth considering a little further. Salisbury Cathedral, in particular, had set the example of grisaille glazing in the south-west of England, but here historiated glass was 'confined to the east end and to windows above altars' (Draper 1995, 125). Thus the juxtaposition of grisaille and narrative glass could be used to articulate the relative liturgical importance and sanctity of space within a building. Ayers (2004) suggests that the same was probably true of Wells Cathedral in the early to mid-14th-century work. Draper emphasizes the points of difference architecturally between Wells and Glastonbury in the late 12th and early 13th centuries in respect of window decoration, that at Wells being very simple, with simple hoods, and plain chamfered surrounds, 'whereas at Glastonbury the heads of the very similar form of windows are enriched with chevron ornament' (Draper 1995, 125). The argument goes that Glastonbury and Wells were great rivals at this time over their relative antiquity and their rights to the 'Seven churches', and to the see, and that this was, consequently borne out in their respective architectural and artistic directions. Glastonbury chose to emphasise depth of history and continuity, combining the latest developments with conscious artistic quotations of the past. Overall then, two hypotheses may be suggested with reference to the paucity of grisaille at Glastonbury. The first is that areas which might have used grisaille extensively have not been excavated (or the locations in which this glass was dumped have not been excavated). The second is that widespread use of 13th-century grisaille may have been eschewed as part of a more integrated architectural and ideological programme.

There were small indications of figural glass of this period (e.g. the foot or paw, and 1963 199/494 G47, possible bird breast or armour). In a house of the size and wealth of Glastonbury, figural or narrative glass would have been expected. The paucity may well be the result of the retention policy of earlier excavations or, as with the patterning of the grisaille, an artefact of the selection of areas excavated.

A small quantity of early to mid-14th-century grisaille was identified, as was some indication of contemporary diaper or decorated ground, possible architecture and drapery, but this is not extensive. Moreover, where comparisons can be made stylistically, there are no definite associations with the major glazing programmes in Wells Cathedral. The evidence for later medieval glass, particularly of

the late 14th to late 15th and possibly even early 16th centuries is far more extensive. This includes some pieces of Gothic Black Letter inscription, as well as a great deal of three-dimensional architectural detail, drapery, and figural detail including the finely delineated head fragment. Some of this material suggests a quite late glazing programme, some in the second quarter of the 15th century, some probably in the late 15th century. Even some of the colour ranges, for example the quantity and range of murreys, plums and purples, and the grey-blues, suggest later medieval glazing programmes. All this is congruent with the building activities of the later abbots. Indeed, as the evidence from St John's Glastonbury, Butleigh, Chilton Polden and elsewhere demonstrates, the later abbots introduced glazing bearing their own arms, or those of the abbey, in many churches throughout the region over which they had any influence. Although the use of heraldry in connection with patrons, benefactors and donors was widespread in this period, there may be something of the suggestion of a deliberate policy of imprinting a recognizable institutional connection far and wide as a sort of religious *imperium.*

Since this period witnessed a *floreat* of production in Somerset (Woodforde 1946), Devon, and in centres like Bristol and Gloucester (e.g. Kerr 1985), many workshops would have been available to the abbot and convent throughout the middle ages, a point emphasized by both Woodforde (1946) and Ayers (2004). Consequently, one of the aims of this report was to try to identify stylistic detail by which an attribution to regional 'schools' or glass-painters might be made. Archaeological assemblages, being so fragmentary, however, are notoriously difficult to link to recognized workshops. Nothing, for example, may be attributed definitely to 'Thomas Glasier' or 'Thomas of Oxford' whose work is recorded at Winchester College, and New College Oxford in the late 14th-early 15th century under the patronage of William of Wykeham, but whose work may also be credited amongst some fragments excavated in Winchester (Kerr and Biddle 1990, 398-400). The three-dimensional character, and exceptional quality of some of the architecture depicted amongst the Glastonbury assemblage is possibly of this date, but too fragmentary to be attributable.

Nonetheless, it can be tentatively suggested that there is no overwhelming affinity with the Wells glass in particular, with the exception of the characteristic heraldic lion. It may be that successive patrons of Glastonbury chose to avoid obvious similarities with its great rival Wells. On the other hand, glass supposedly initiated by abbots of Glastonbury in parish churches such as High Ham appear to have been of Woodforde's 'Somerset School' and one or two fragments of identifiable Somerset type quarries remain in the abbot's kitchen at Glastonbury, and St John's church in the town. Woodforde (1946, 46) also identified work of his 'Devonshire School' amongst the figures in St John's, and related work in St Patrick's Chapel. Consequently, it is probable that the patrons of Glastonbury glass used different sources for their glass painting, at different times, and probably for varying reasons, cost, workmanship, precedent, and distinctiveness amongst them.

Re-use of glass within the course of the Middle Ages

Quite apart from the possible re-use of early glass in later buildings for political and ideological reasons, one of the aims of this report was to recognize any post-installation alterations or damage, and post-depositional processes, for example, secondary lead-lines and grozing cutting through a design as evidence of medieval re-leading. Examination of the relationship between grozed edges and the

integrity of the painted design suggests that many fragments were regrozed, and therefore presumably releaded within the course of the Middle Ages. Lead deteriorates and it is sometimes estimated that the leads should be replaced every 100-150 years. However, it is also demonstrable that some leadwork survives from the Middle Ages in surviving glazing. The regrozing at Glastonbury may indicate releading of a window for occasional 'maintenance' purposes, when, by and large, the integrity of the original glazing scheme was maintained. In some instances, however, a window may have been dismantled in order to be replaced by a newer composition. In this instance fragments from older designs may have been redistributed to be used as space-savers or repairs in other designs to which they were not original. In some instances this may have been due to deliberate retention, perhaps the earlier glass was invested with significance in the on-going need to assert the antiquity of the abbey and its associations to distinguish it from its rivals, most notably Wells Cathedral (cf. Draper 1995). In some instances, older glass may have been used more haphazardly to fill in spaces in later releadings.

Regrozings were identified or suggested, for example, in GLSGA G23 (a 13th- or 14th-century piece of foliage, or a possible architectural canopy crocket), G24 1988/1341 (no certain identification of motif or date), G25 1988/9/1342 (a piece of probably late 14th- or 15th-century date), G27 1989/1344 9 (a large quarry, probably early-mid-14th-century), G29 1988/1346 (architecture of the late medieval period), G30 1988/1347 (a stylized floral design), G36 1988/1390 (a quarry edge), and several times in G31 1988/1348 (ivy leaf grisaille of the late 13th-, more probably early to mid-14th-century). Whilst some of this material dates to the late 13th- or 14th-centuries, and may, therefore have been subject to reuse, it is perhaps, more surprising that late medieval fragments have been regrozed.

Implications for the Dissolution process

Quite apart from what is represented in the Glastonbury stained glass assemblage in terms of the glazing schemes that it implies, it seems to be quite distinctive in terms of the archaeological pattern it represents with respect to the process of Dissolution. Many monastic assemblages produce quantities of 13th-century grisaille, 14th-15th-century background diaper and rinceaux, micro-architectural fragments, border motifs and glaziers' side strips, in other words characteristically peripheral motifs or older glass. This could be the result of the best glass having been reclaimed for sale or, even, the results of iconoclasm that targeted the figural representations. At Glastonbury, this pattern is less clear-cut, and indeed, there is a noticeable absence of the most peripheral glass: border motifs and plain side strips.

The much-cited Rievaulx Inventory states that the glass from the church was 'to be layd up under lok and key and out of danger of wastyng and stelyng.' It was 'to be sortyd into iij partes, One the fayrest to be sortyd. The second sort to be sold. The iij sort to be taken out of the lede and the lede molten,' (*Chartulary of Rievaulx*, Surtees Society **83**, 339). The lead, a valuable commodity, was to be kept for the king in order that the value might be realized for the Crown. The fairest, and much of the second sort may account for the glass which was sold and re-used in houses and churches, just discussed. However, much of the selection of the second category to be sold may have required discreet panels, like armorials, to be removed from a background of other glazing. The debris from such selection and stripping may have contributed to the archaeological deposits recovered. The treatment of the poorest

glass implies thorough stripping of the lead cames, with little or no consideration for the glass at all. From the perspective of someone in the 1530s-40s, what constituted 'the iij sort' of glass in the context of a house as wealthy and glorious as Glastonbury? Given that the glass of the late 15th and early 16th centuries could be exquisite in both colour and drawing, as demonstrated by the extant examples of this date found in St Patrick's Chapel, St John's Glastonbury and elsewhere, it may be that a lot of the older grisaille, for example, constituted 'pore glasse' (term used by the purchaser of former monastic houses in Lincolnshire, cited in Knowles 1976, 249). This, if it existed in quantity, may have been discarded altogether. The best glass may have been resold or appropriated, and even the second best glass at Glastonbury may have been worthy of retention for domestic purposes by those with the money and influence to acquire it.

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