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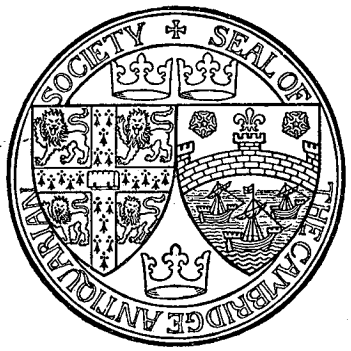

VOLUME LIV

JANUARY 1960 TO DECEMBER 1960

CAMBRIDGE
DEIGHTON BELL
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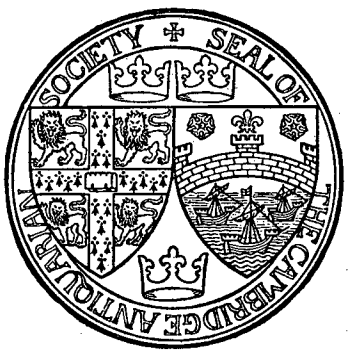

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CONTENTS

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A THIRTEENTH-CENTURY ARCHITECTURAL SKETCH FROM THE HOSPITAL OF ST JOHN THE EVANGELIST, CAMBRIDGE

MARTIN BIDDLE

INTRODUCTION

Medieval architectural drawings, whether detailed designs or merely sketches, are rare in this country. This rarity is certainly due rather to the absence of any contemporary feeling that such drawings should be preserved, than to the inability of medieval builders to make and use such drawings. Formal designs or 'show drawings' were sometimes produced here, but of these very few survive;[1] nor do models of the proposed buildings seem to have been made in this country.[2] Less formal drawings were however prepared, giving a general idea of the building,[3] and sometimes more detailed drawings of single features were produced.[4] With such, it seems, both mason and client were content at the first stages of the work.

On the site itself the actual laying out of the building on the ground will often have served in place of a drawn plan.[5] During construction, however, drawings of the various features, from windows[6] to single sets of mouldings,[7] were prepared. Frequent references in building accounts to 'tracing houses' confirm the extensive use of such drawings during construction.[8]

These designs and sketches were drawn on a variety of materials: in notebooks[9] and on sheets of paper,[10] or parchment,[11] on specially prepared boards[12] and on convenient stone surfaces in the masons' sheds.[13] Full-size drawings were worked out on

[1] For an English example cf. the drawing of King's College Chapel tower (see Appendix, p. 107, no. 17). Quite a number still survive on the Continent, see Harvey (1950), ch. II, *passim*. (For abbreviations see p. 106.)

[2] Salzman (1952), p. 17.

[3] None of these seems to exist of an earlier date than *c.* 1520; but for documentary references to such drawings see Harvey (1950), ch. II, and Salzman (1952), pp. 18–22.

[4] For example, the pinnacles of the central tower of Canterbury Cathedral (see Appendix, no. 18).

[5] Salzman (1952), p. 16.

[6] See Appendix, nos. 2, 4, 5, 7–9, 11–14, 22.

[7] Pepysian MS. sketch-book (see Appendix, no. 11), f. 20*b*, 21.

[8] Salzman (1952), p. 21.

[9] For example, the continental *Album de Villard de Honnecourt* (ed. H. R. Hahnloser, 1935). No notebooks survive in England, although they are occasionally mentioned in contemporary wills. Cf. Harvey (1954), pp. 46, 187.

[10] The drawing of King's College Chapel tower (see Appendix, no. 17).

[11] Pepysian MS. sketch-book (see Appendix, no. 11) has architectural drawings on sheets of parchment cut up to form a sketch-book at a later date.

[12] Glasgow Cathedral (see Appendix, no. 3).

[13] Byland Abbey (see Appendix, no. 2).

gypsum-plaster tracing-floors in the mason's office.[1] The individual mason kept his more important notes and designs, but after the completion of the building there will have seemed no reason to preserve the great mass of working drawings, and indeed those on wood and stone may already have become part of the building itself.[2] In a number of cases drawings for an additional feature of a structure were even made on walls and pillars already standing.[3]

It is worthwhile therefore, in view of the interest and rarity of such drawings, to call attention to a thirteenth-century example from the Hospital of St John the Evangelist, Cambridge.[4]

THE HOSPITAL OF ST JOHN THE EVANGELIST

The site, which is today occupied by the northern part of the First Court of St John's College, was occupied during the Middle Ages by the Hospital of St John the Evangelist. The Hospital was founded about 1200[5] and appears to have had a chapel or oratory by 1208.[6] This building is almost certainly that called the Infirmary, the character of which was revealed and recorded only during its destruction in 1863.[7]

About 1267 Bishop Hugh de Balsham granted additional property to the Hospital because of the depreciation of its property, a fire and the 'great confluence of the sick and poor' to the house.[8] In 1280 the same bishop took the momentous step of introducing into the Hospital 'studious scholars living after the rule of the scholars of Oxford called of Merton'.[9] Four years later, however, he moved the secular scholars to two hostels outside the Trumpington Gate, adjoining the church of St Peter.[10] It is probably the events of 1267 or 1280 which provide the context for the construction of a large separate chapel for the Hospital. The quire of this new chapel must always have been far larger than was required for the Master and five or six Regular brethren.[11] The reason behind the enlargement might therefore be either the 'great confluence' mentioned in 1267 or, perhaps more likely, the influx of 'studious scholars' in 1280, although they were soon to remove to St Peter's.

The chapel thus built consisted of a nave and quire, separated by a central area

[1] None of these is preserved, but see Harvey (1950), p. 30.

[2] Glasgow and Wells Cathedrals (see Appendix, nos. 3, 10).

[3] Castle Acre Priory, etc. (see Appendix, nos. 7–9, 21, 22).

[4] I am most grateful to the Master and Fellows of St John's College, Cambridge, for permission both to publish this sketch and to quote from Professor C. C. Babington's account of their college chapels; also to Dr G. H. S. Bushnell, Curator of the University Museum of Archaeology and Ethnology (where the stone is now kept, Cat. no. Z.15088), for his permission to illustrate it, and for his help during the preparation of this note. The stone has been illustrated (not very satisfactorily) in C. C. Babington, *History of the Infirmary and Chapel of the Hospital and College of St John the Evangelist at Cambridge* (1874), pl. 9, and in G. G. Coulton, *Art and the Reformation* (1928), at p. 178, where it is incorrectly dated *c.* 1475, owing to a printing error.

[5] *V.C.H. Cambridge*, vol. II, p. 304.

[6] Babington (1874), p. 7.

[7] C. C. Babington, 'On Some Remains of the Hospital of St John the Evangelist at Cambridge', *Camb. Antiq. Comms.* vol. II, no. 5 (1864).

[8] *V.C.H. Cambridge*, vol. II, pp. 304–5.

[9] *Ibid.* p. 305.

[10] *Ibid.*

[11] Babington (1874), p. 12.

below a tower.[1] There were seven windows in the quire, three on each side and a large one in the east wall. These windows, those in the nave, the quire arches and several other details were all of early Decorated form of about 1280; only the west window was slightly later in date. All the windows and other details were made of clunch and the walls were 3 ft. thick, except the west wall which was 2 ft. thick.[2] There is no evidence that the chapel was in any way altered until remodelled and converted to the use of the College in 1516–19.[3] At this time all the windows gave place to smaller Perpendicular ones inserted in the original openings.

The chapel as remodelled continued in use by the College until May 1869, by which time Sir George Gilbert Scott had completed the new chapel to the north of the old building. He deliberately chose for his design the Early Decorated style of the old chapel; this he had been careful to verify in the earliest stages of his work by a close examination of the existing remains. Demolition of the old chapel in 1869 revealed far more extensive traces of the thirteenth-century work than had been expected, in particular of the windows. During the demolition of the east wall a block of clunch was recovered bearing on one surface an incised sketch of a window. At the same time the clunch bases of the attached shafts of the east window were found *in situ*, showing that it had been '19½ ft. wide, and certainly not less than 30 ft. high'.[4]

The sketch shows a window of early Geometric type and there seems no reason to disagree with Professor Babington that it represents the east window of the thirteenth-century Chapel, in the east wall of which it was found.[5] This sketch is indeed the only surviving record of the original window, and must date from before 1516–19 when the windows were replaced. There seems to be no reason why the sketch should have been drawn merely as a record in the fourteenth, fifteenth or early sixteenth century; it can therefore be quite safely regarded as the mason's original design for the construction of the window.

THE SKETCH

(Fig. 1)

The window has been drawn on a block of fine clunch which has been cut down and squared off after the sketch had served its purpose. One edge of the block bears a small part of a moulding, the recesses of which show three layers of colouring: whitewash, black paint and whitewash. The part of the block bearing the left-hand half of the window (as seen in Pl. XVI) has been broken off and lost, possibly in the demolition of 1869. The lower and right-hand sides of the block have, however, been dressed, the latter only roughly; if the lower half of the window was ever drawn on

[1] A full description with plan, *ibid.* pp. 12–28; plan 1; pls. 1–12.
[2] *Ibid.*
[3] Willis and Clark, *Architectural History*, vol. II, p. 291.
[4] Babington (1874), p. 13.
[5] *Ibid.*

Fig. 1. The window design redrawn. The spots indicate those surface irregularities which appear to be compass turning-points. Cf. Pl. XVI.

the stone, this dressing has removed it. The back of the block bears traces of mortar, and similar traces can be detected on the face in the incised lines of the sketch. The moulding on the upper edge may be part of a window-jamb; it is, therefore, possible that the block was used in the east window and, if so, the moulding must have been set upright with the drawing thus turned on its side.

If the moulding can be considered as early Decorated, and this seems possible, although there is very little of it left, then the block was clearly incorporated in the *c.* 1280 chapel in such a way as to show that the drawing was already discarded. There is thus little doubt that this sketch dates from the time of the construction of the chapel and that it is a design for the east window. The six lights and three circles indicated by the sketch must have formed the east window, since the north and south windows had only three lights each, while the west window, of which very little remained, seems to have been rather later in style.

The surface used for drawing has been carefully prepared and, though not completely level, it is quite smooth. The sketch has been incised using a pair of mason's compasses; the straight lines were presumably laid off against a mason's square using the compass-point or an iron drawing-needle.

The sketch shows the right half of the head of a six-light window, the centre-line of which would fall just within the surviving area of the drawing. The lower part of the sketch extends just below a line drawn across the window at springing-level: this line is indicated on the drawing by a series of points (A, B, C, D, E, on Fig. 1). It is uncertain whether the lower half of the window was ever shown.

The basic element in the window is a pair of pointed arches carrying a quatrefoil, and covered by a third arch. This basic element is trebled to form the six lights of the window; the heads of the three larger arches thus formed support two circles, one at least, and probably both, containing pointed trefoils. These circles in turn support a circle containing a cinquefoil and the whole is enclosed within the window-arch itself. The spandrels have been left blank on the sketch, but may have been taken out in the finished window, although it is possible at this date (*c.* 1280) that the tracery was cut out of the solid (see p. 106). On the outer edge of the window-arch the mason has sketched in some large, out-of-scale crockets: four on the side and one finial on the point of the arch. These are merely doodles and can have no connexion with the window. The remainder of the surface of the block has on it only a trial for the head of one of the six lights.

A METHOD FOR SETTING OUT THIS DESIGN

Most of the points made by the compasses in setting out the sketch can still be seen and it is therefore possible to deduce a method which may have been used by the mason.

The base-line of the window head at springing-level was apparently laid down first and marked on the stone by points forming eight roughly equal divisions (four are preserved to the centre-line: (A)–B: B–C; C–D; D–(E) on Fig. 1). The arch standing on this base is an equilateral arch,

like all others in the window, and it was therefore described by the compasses from the extremities of the base-line. It is not clear why the base-line was divided into eight divisions; these were not needed to set out the main arch, and although they equal the bases of the arches covering the six lights, they in no way correspond to these in position. It might seem, however, that these divisions were for use when enlarging the sketch for the full-size setting-out of the work. This was sometimes done by proportional means,[1] but it would scarcely have been possible here, where so small a sketch represented such a large feature. They do not seem on the other hand to form a scale, for each division of 13/16ths of an inch would represent 2·44 ft.—scarcely a logical system. The scale of the drawing as a whole, however, when compared with the recorded width of 19½ ft. for the window,[2] works out at exactly 3 ft. to 1 in., a perfectly acceptable ratio.[3]

The next stage was to divide the base-line into three equal parts (e.g., A′—C′), each to form the base of one of the three equilateral arches covering the pairs of lights. After these had been struck off with the compasses the smaller arches of the light-heads were set out, two within each covering arch, and each on a base equal to one-eighth of the base of the whole window at springing-level. In the remaining space the centre-points of the circles below the intermediate arches were located. This may have been done by setting the mason's square on the centre-line of each arch, and by making the centre-point of each circle equidistant from the light-heads and from the inside of the covering arch. Thereafter the centre-points of the four circles forming the quatrefoils were marked off in positions roughly equidistant from the centre of the larger circles, on the vertical axis of each arch and at right angles to it.

The centre-points of the three large circles in the head of the arch form an equilateral triangle and the circles all have the same diameter. The centre-points of the two lower circles were probably set out from the centre-points of the circles within the intermediate arches. The triangles thus formed are both isosceles and this has the effect of placing the lower of the larger circles in correct relationship to the arches below them. A certain amount of trial and error was probably required to ascertain the correct size of the larger circles.

The lower circles probably both contained pointed trefoils, one of which is preserved. The inner—and incorrect—trefoil has been set out using arcs of the same radius as the inner circle. To construct the trefoil with one lobe vertically upwards, it was only necessary to draw the first arc with its centre at the lowest point of the circle. The outer trefoil was set out using the same radius but from points nearer the centre of the circle.

The cinquefoil in the uppermost circle completed the setting-out of the window. To draw this it was necessary to construct a regular pentagon within the circle, or at least to divide the circumference into five equal segments, which comes to the same thing. The five points on the circumference were then joined to the centre by the five radii marked on the sketch. No trace of the method used to divide the circle into five segments exists on the sketch and this may well have been done to one side on a similar circle using the method in Euclid, Bk IV, Prop. 11. The results thus obtained were transferred to the sketch in such a way that the division between the lowest lobes lay on the vertical axis of the window.

In the five segments points were then selected equidistant from the centre of the circle and lying on the (imaginary) bisector of each segment. From these five points equal arcs were struck off forming lobes in each segment. Finally, the ends of each arc were turned in to form the cusps of the cinquefoil.

Although this method does seem to form a logical sequence and is supported by measurements taken from the stone, it cannot claim to be more than *a* method for

[1] Harvey (1950), p. 32.
[2] Babington (1874), p. 13.
[3] Harvey (1953), p. 100, and see Appendix, no. 18.

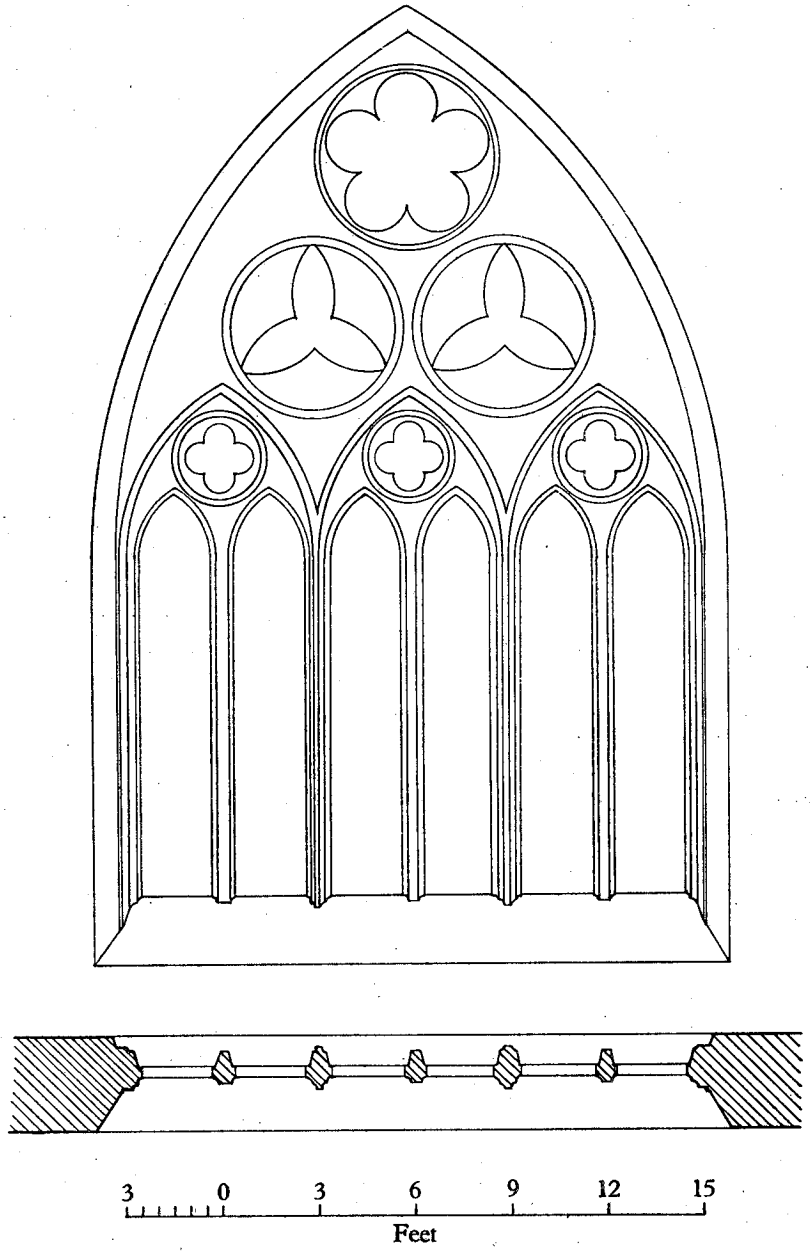


Fig. 2. Outline reconstruction of the east window of the chapel of the Hospital of St John the Evangelist, based on the thirteenth-century design and on measurements taken in 1869. There is no evidence for the treatment of the spandrels and cusps: these have therefore been left blank.

laying out this design. A good deal of trial and error doubtless entered into the mason's work, and, as can be seen from the sketch, he was not always very careful in what he did; in particular his compass did not always maintain the same arc.

OUTLINE RECONSTRUCTION OF THE EAST WINDOW

(Fig. 2)

As a result of this analysis, and because the sketch is the only surviving record of the east window of the chapel, an attempt has been made to reconstruct the whole window using the sketch and the measurements recorded by Professor Babington.[1] No indication of the treatment of the spandrels or cusps is provided by the mason's sketch; indeed at this date, *c.* 1280, the spandrels may not have been pierced or even sunk, though this would seem likely. The reconstruction drawing has not attempted to solve this dilemma and can therefore only be regarded as an outline of the window that once existed.

APPENDIX

A PROVISIONAL LIST OF MEDIEVAL ARCHITECTURAL DRAWINGS IN THIS COUNTRY

This list does not pretend to be exhaustive, in particular many more examples of designs on stone and wood could probably be found. The writer would be glad to hear of further examples so that a definitive list may be compiled. Only drawings that can fairly certainly be connected with the design stage of building works have been included; later views and post-construction plans and drawings have been omitted. An exception has been made in the case of the two water-supply plans (nos. 1; 15) which are probably more or less contemporary with the structures they record, but which should not even so be considered as designs. No examples of a later date than *c.* 1500 have been included; the rich archive of Tudor architectural drawings in the British Museum, Cottonian MSS. (Aug. I, i, ii, Supp.; Aug. II, no. 1; Aug. III), will be dealt with by the writer in detail at a later date. Full-scale drawings set out on the stone actually to be cut (e.g. R. Willis, 'On the Construction of the Vaults of the Middle Ages', *R.I.B.A. Trans.* vol. I, pt. ii (1842), figs. 6–8) have also been omitted. Two lead templates used for drawing full-scale mouldings, probably of fourteenth-century date, have been found at March, Cambridgeshire (*Proc. C.A.S.* vol. XL (1945), p. 45).

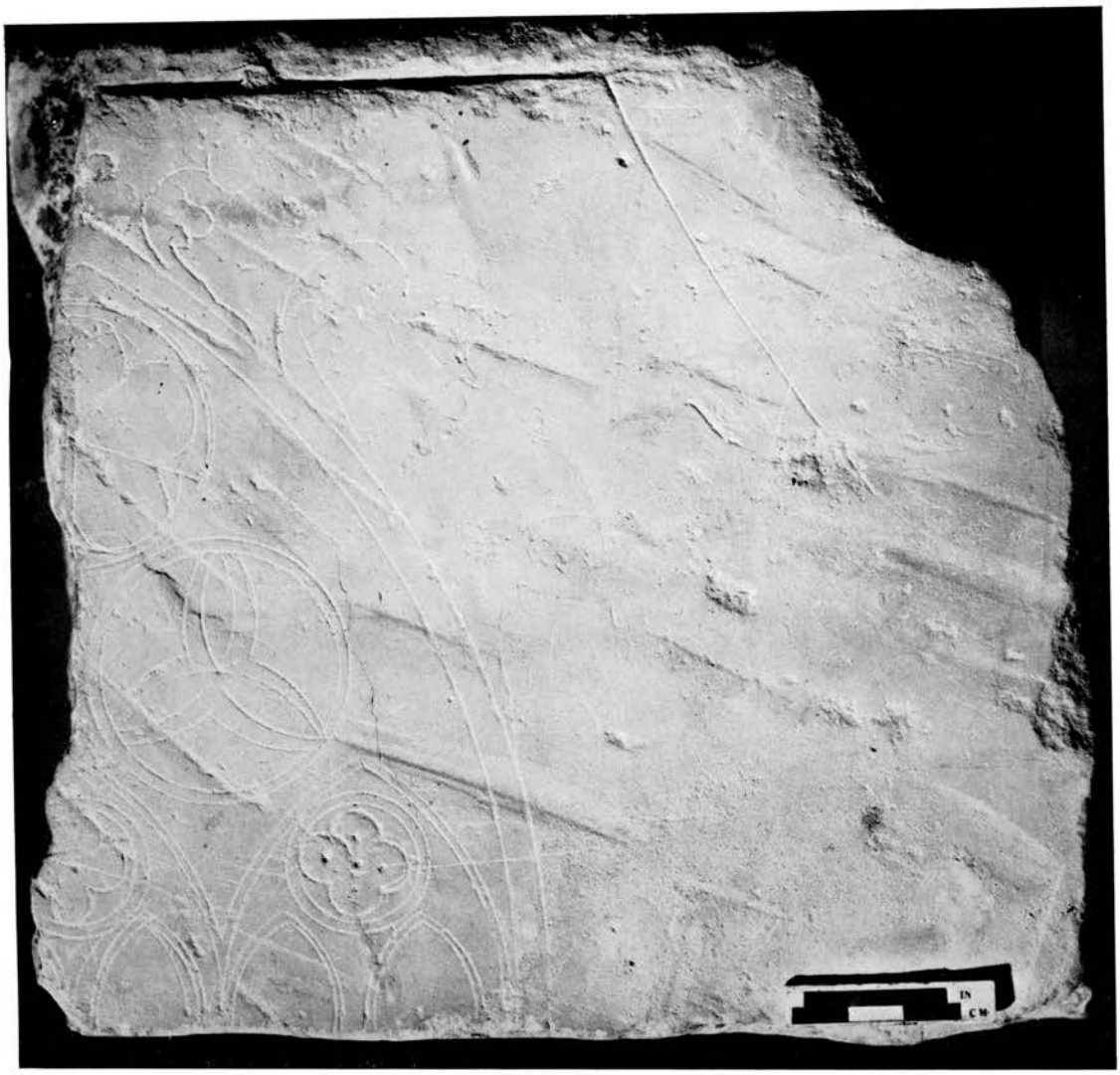
ABBREVIATIONS

Briggs (1927). M. S. Briggs, *The Architect in History* (1927).
Coulton (1915). G. G. Coulton, 'Medieval Graffiti, especially in the Eastern Counties', *Medieval Studies*, no. 12 (1915).
Coulton (1928). G. G. Coulton, *Art and the Reformation* (1928).
Harvey (1946). J. H. Harvey, *Henry Yevele* (2nd ed. 1946).
Harvey (1948). J. H. Harvey, *Gothic England* (2nd ed. 1948).
Harvey (1950). J. H. Harvey, *The Gothic World* (1950).
Harvey (1953). J. H. Harvey, 'Early Tudor Draughtsmen', *The Connoisseur Coronation Book* (1953), pp. 97–102.
Harvey (1954). J. H. Harvey, *English Medieval Architects* (1954).
Salzman (1952). L. F. Salzman, *Building in England down to 1540* (1952).

[1] Babington (1874), p. 13. These are given in a rather more definitive form in Willis and Clark, *Architectural History of the University of Cambridge*, vol. IV, no. 21 (fig. 15 of St John's College).

No.	Building	Date	Subject	Original ref.	Reproduced
1.	Canterbury Cathedral	*c.* 1165	Water-supply	Trinity College, Cambridge, MS. R 17. 1, ff. 284b–286	M. R. James, *The Canterbury Psalter* (1935), pp. 53–6; ff. 284b–286
2.	Byland Abbey	*c.* 1200	West rose window	Salzman (1952), p. 22, n. 7	—
3.	Glasgow Cathedral	Thirteenth century	Crypt vaulting	Briggs (1927), p. 88	—
4.	Hospital of St John, Cambridge	*c.* 1280	East window of chapel	Present paper, p. 100, n. 4	Present paper, and see p. 100, n. 4
5.	Leighton Buzzard Church	*c.* 1300	Window	Harvey (1950), p. 34	Harvey (1950), fig. 15
6.	St Augustine, Canterbury (MS. written at)	*c.* 1300	Panel with ogee tracery	Christ's College, Cambridge, MS. Dd. I. i. Harvey (1950), p. 31	—
7.	Castle Acre Priory, Norfolk	1300–50	Window	Coulton (1928), pp. 178–9	Destroyed before recorded
8.	Gamlingay, Cambs	1300–50	Window	Coulton (1915), pp. 61–2	Coulton (1915), pl. XVI
9.	Offley, Herts	1300–50	Window	Coulton (1915), pp. 61–2	Coulton (1915), pl. XVI
10.	Wells Cathedral	*c.* 1340	The 'St Andrew's Arches'	Harvey (1950), p. 31; Briggs (1927), p. 88	—
11.	Pepysian MS. sketch-book	1350–1400	Window; mouldings; an exterior	Magdalene College, Cambridge, Pepysian Library, no. 1916	*Walpole Society*, vol. XIII (1924–5), 1–17; Harvey (1946), figs. 7, 12–14
12.	Whittlesford, Cambs	1400–1500	Window	Coulton (1915), pp. 61–2	Coulton (1915), pl. XVI
13.	Barrington, Cambs	1400–1500	Window	Coulton (1915), pp. 61–2	Coulton (1915), pl. XVI
14.	Mount Grace Priory, Yorks	*c.* fifteenth century	Perpendicular window	Information from Mr R. Gilyard-Beer	—
15.	Charterhouse, London	*c.* 1430	Water-supply	MS. in custody of the Master	*Archaeologia*, vol. LVIII, pp. 293 ff.
16.	St Michael, Cornhill, London	1421	Tower	Overall, *Church Wardens' Accs. of St Michael, Cornhill*, pp. ix, 199	Overall, *op. cit.* pl. facing p. 199
17.	King's College, Chapel, Cambridge	Mid-fifteenth century	Tower	B.M. Cott. MS. Aug. I, i, 3	Harvey (1953), fig. iii; Harvey (1948), fig. 115
18.	Canterbury Cathedral	*c.* 1493	Pinnacles of tower	Cant. Cath. MS., Ch. Ch. Letters, no. 39[2]. Harvey (1953), p. 100	—

No.	Building	Date	Subject	Original ref.	Reproduced
19.	Westminster Abbey	*c.* 1500	Pinnacles and merlons of a parapet	Hatfield Maps, B.M. MSS. Facs. 372, vol. II, 13. Harvey (1954), p. 272	—
20.	Westminster Abbey	*c.* 1500	Tomb for Henry VI	B.M. Cott. MS. Aug. II, no. 1.	Harvey (1953), fig. iv; Harvey (1948), fig. 152
21.	Raunds Church, Northants	Unknown	Mouldings	Coulton (1928), p. 178	—
22.	Christchurch Priory, Hants	*c.* 1300	Geometric window, etc.	P. T. Jones, *The Priory Church of Christchurch*, p. 24	—



Thirteenth-century design for a window. From the Chapel of the Hospital of St John the Evangelist, Cambridge.

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