THE BUILDING STONES OF ROCHESTER CATHEDRAL CRYPT

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The crypt of Rochester Cathedral (see plan, Fig. 1) consists of two parts, differing in date, in architectural style, and in type of building stone. Its westernmost two bays, probably of 1080s date and early Norman in style, comprise a central chamber and two side-aisles, with, between them, massive square piers faced with calcareous tufa blocks, thinly plastered. The plastered groin-vaulted roof of the central chamber is supported midway on two columns, and against the piers and the western wall of the crypt on half-columns, all with cushion capitals. The monolithic shafts, capitals and bases of the two free-standing columns, and the capitals and bases of the half-columns, are of a hard, whitish coarse oolite from Marquise, near Boulogne (Tatton-Brown 1990, 73). The shafts of the half-columns are built up of drums of tufa, with thick mortar joints; their bases are of Reigate stone.

The northern aisle of this early part of the crypt was opened up in 1999 after housing an organ-blower (Strong 2000). Flat tufa pilasters with plain chamfered impostos of Reigate stone support its groin-vaulted roof. In its northern, originally exterior, ragstone-rubble wall are two round-headed openings with tufa jambs, each partially blocked and now containing a narrow window-embrasure faced with Reigate stone. The southern aisle is now an entrance-passage to the crypt, but two tufa pilasters with Reigate stone impostos, and a round-headed former window opening with tufa jambs, are partly visible.

The construction of the eastern, and principal, part of the crypt must have taken place as the first phase of reconstruction of the whole eastern arm of the cathedral, undertaken after a fire of 1179. Tatton-Brown (1989; 1997) and McAleer (1999) consider that reconstruction began immediately after the fire, the new eastern arm being built within the period c. 1180-1200, rather than delayed until 1200-1215, as suggested by Hope (1898) and others, e.g. Newman
The crypt vestibule, looking north, with column C2 in the foreground

(1976). Tatton-Brown points out (pers. comm.) that proof of the fire is provided by burnt Caen stone in the rubble stonework of a pier between the earlier and later parts of the crypt, and that fragments of onyx marble in the same pier must have come from the demolished mid-twelfth century eastern arm of the cathedral.

Hope (1898, 234), quoting notes made of an unpublished talk given by Professor Willis in 1863, described the eastern crypt as consisting of four parts: firstly a large rectangular cross-hall or vestibule beneath the eastern or choir transept of the cathedral and vaulted by means of two rows of columns (Plate I); eastward of this a chapel divided by columns into three aisles east and west; and to each side of it a small double chapel beneath the aisles of the transept. The east-west chapel, previously known as the Holy Trinity Chapel, was dedicated in 1964 to St Ithamar. It is enclosed at its west end by a transparent screen consisting of panels and a door of plate glass, backed by massive wrought-iron palings with outward-curved finials. The screen was designed by the late Martin Caroe when Cathedral Surveyor, in collaboration with Charles Normandale, blacksmith, and erected in 1990 (Caroe 1991).
Walls throughout most of the crypt vestibule are of rubble stonework, plastered in places, with ashlar quoins in part Reigate, in part of Caen stone. The four piers between the vestibule and the earlier part of the crypt are built around earlier (c. 1080s) columns - two Marquise stone capitals are still partly visible. The two inner piers are faced with a random mixture of Reigate and Caen stone ashlar, while two at the entrance to St Ithamar’s Chapel have an entirely Caen stone facing. Throughout the later crypt is a half-round string-course at the springing-line of the roof-vaults, matched by the abacus of free-standing columns. It consists of Large-‘Paludina’ limestone (Bethersden Marble) in the west, giving way to Purbeck Marble farther east, roughly in line with the entrance to St Ithamar’s Chapel (see Table 1). The roof-vaults have hollow-chamfered ribs, mainly of Reigate stone, with perhaps some Caen.

Supporting the roof-vaults are twenty free-standing columns and (against the walls) forty-eight responds, of which twenty-eight are half-columns, four are half-columns flanked by cylindrical shafts, and an additional ten single and six paired attached shafts, or corner-columns, occupy corners of the crypt. All shafts except those of five of the half-columns, and excluding six missing corner-column shafts, are monoliths. The original design would have called for no fewer than 82 monolithic shafts. The columns are of two designs (Fig. 2), although it happens that the bases of the two half-columns illustrated are slightly unusual in having a chamfered fillet surmounting a roll-moulding. These bases have perhaps been recut, and like all or nearly all other column-bases (many of them are damaged) they probably originally had a double-roll moulding. To aid description of the columns, a scheme is now introduced (Fig. 1) in which north-south rows are lettered A to J and east-west rows numbered 1 to 10; the western two bays of the crypt are excluded. The cathedral is in fact aligned to the south-east rather than due east, but it is the liturgical south and east, etc., which are here used.

Hope (1898) noted that in the vestibule the half-columns throughout are semi-circular, while the free-standing columns of the western row are circular, and in the eastern row the first, third, fourth and sixth columns are octagonal, the second and fifth (C3 and C8) round. In St Ithamar’s Chapel the responds and columns are alternately round and octagonal from west to east. This may have been designed to emphasise the direction of liturgical processions (Hoey 1986). The whole eastern crypt shows increasing elaboration eastwards, in that single columns occupy the four corners of the vestibule and the western corners of the three chapels, and paired columns the eastern corners of the chapels; while the central respond on the east side of
Plinth course of shelly oolitic limestone, showing the weathered ribs or ‘bars’ typical of Taynton stone, below the southernmost (4-5) of three windows at the eastern end of the crypt

each double chapel and the two responds at the east end of St Ithamar’s Chapel, that would have stood between the seven altars of the crypt, are each a semi-octagonal half-column flanked by two corner-columns.

The Oolite of the Crypt Columns

The stone of most of the crypt columns is a shelly, pale yellow to brownish-yellow oolite, between 10YR 8/2-3 and 10YR 8/4-6 on the Munsell scale. Ooliths ranging in size from 0.3 to 0.6mm diameter, together with a few 1mm ovoid pellets, are set in a crystalline calcite matrix. On weathered surfaces, ooliths become loosened from the matrix, and their vacated sockets give the stone a honeycombed or ‘Aero chocolate’ appearance under the hand-lens. Some columns, for instance A3, B3, C3 and H7, show shelly streaks aligned vertically along their shafts, the monoliths thus being end-bedded.

The writer now regards as doubtful his former view (Worssam
Eroded column-base of shelly oolite of Taynton stone type, recessed into the north-east corner of the buttress at A10, Fig. 1

1995) that the oolite is a variety of Bath stone, partly because the stone of the crypt columns is more shelly than is typical of Bath stone, and lacks the calcite veinlets commonly seen in the latter. Two other possible sources are Lincolnshire, and Taynton in Oxfordshire. Lincolnshire oolites in general are of a paler colour than both Bath stone and the stone used in the crypt; Taynton stone, however, typically weathers to a brownish-yellow colour, and includes shelly streaks.

A common feature of Taynton stone is that its shelly layers weather out to form ribs or ‘bars’. These are not obvious in the stone within the crypt, but can be seen in some otherwise similar oolite in the crypt’s external walls. The most noticeable ‘bars’ are shown by brownish-yellow, cross-beded shelly oolite that forms a chamfered plinth course just below sill level of the crypt’s three east windows. Part of this plinth course is shown in Plate II. In the photograph the wall and the window-surround above the plinth are of Chilmark stone, from Sir George Gilbert Scott’s 1872-78 restoration of the eastern arm of the cathedral, the Chilmark stone soot-blackened except for the window sill, which is rainwashed and eroded. A few
blocks of the shelly oolite occur in the plinth around the north-eastern tower buttress of the presbytery. In the north face of the crypt one large block forms the sill of the crypt window at I-J, and three others, carved as column bases, occur at the foot of re-entrant angles at the corners of buttresses (see Plate III). The re-entranst were evidently meant to hold corner-columns that in the event were never fitted (string courses run into and out of the re-entranst higher up the buttresses). These scattered blocks of oolite in the buttresses and the north face of the crypt are surrounded by Gilbert Scott’s Chilmark ashlar rather as if judged re-usable, and so left in place. Some others, evidently not so re-usable, are built into a low, mainly Kentish Rag retaining wall set back 1m or so from the base of the north-eastern tower buttress. More certainly medieval are blocks of weathered oolite showing Taynton-like ‘bars’, in the basal courses of the large, Caen-stone faced polygonal buttress on the south side of the crypt at H 2-3. This buttress, sheltered by the fourteenth-century Chapter Room, has never needed restoration.

Stone of other types than this oolite is used in some of the columns, as detailed in Table I. With three exceptions, however, all columns have bases of oolite. The exceptions, G5, G6 and I5, are entirely, including the abacus, of Kentish Rag, and have the appearance of being late-medieval replacements (see below). The existence of oolite bases to the rest is a strong indication that all the columns were originally of oolite.

It has been mentioned above that the most elaborate column-arrangements are shown by the central respond of each side-chapel and by those at the eastern end of St Ithamar’s Chapel. The importance of the former central altar at the eastern end of the chapel is emphasised in that while the responds in the side-chapels, and the corner-columns J4 and J7 of St Ithamar’s Chapel, are backed by Reigate stone ashlar walling, the abutments against which the responds J5 and J6 are set are faced with the more valuable oolite.

Reddened Stone and Late-Medieval Repairs in St Ithamar’s Chapel

Column I6 and many responds in St Ithamar’s Chapel show patches of red staining. All that are so affected are of oolite, and it is mostly capitals and the upper parts of shafts that are red-coloured. The shaft and capital of I6 are light reddish-brown (2.5YR 6/6 on the Munsell scale), while corner-columns J7 are light red (10R 6/6) in their upper parts. With little doubt the reddening results from burning.

An unusual effect is provided by the capital of the half-column of respond J5. The stone has been reddened, but the calcite infill of
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**KEY** Ab Abacus; Cap Capital; Sh Shaft; Bs Base (the term includes both base proper, which is moulded, and plinth-block).
- Shaft missing (also missing are one corner-column from each of the responds F3 and F9, and two from F2). *Half-shaft built up of separate drums. Betersden Marble (=Large-'Paludina' limestone); Caen stone; Granite; Kentish Rag; Marquise Oolite; Oolite (Taynton stone); Onyx Marble (travertine); Purbeck Marble; Portland stone; York stone.
some fossil bivalve shells, of 10mm diameter, shows up white in contrast. This could be because the infill, crystallising at a late (geological) stage in the consolidation of the stone, lacks the pyrite (iron sulphide) that is disseminated in the body of the stone and by oxidation to hematite (red iron oxide) gives a red colour when burning occurs.

Fig. 2 shows a typical pattern of reddening, affecting octagonal half-column F4. The shaft, unusually, is fashioned from two drums, and the red colour spreads across the mortar joint between them. Where the surface has spalled off to a depth of 2mm at this joint, fresh

Fig. 2. Red staining of two columns in St Ithamar's chapel.
yellow oolite can be seen. The capital is broken where most reddened, and there is a long split down the north face of the shaft. Similar fissuring would have seriously weakened a free-standing column.

Corner-column E7 (Fig. 2) is reddened in a similar fashion to F4. That the reddening is only skin-deep is again shown by fresh yellow stone, revealed where part of a collar-moulding at the base of the capital has broken away. The Reigate stone walling against which the column is set is not affected by reddening, nor is the Purbeck Marble abacus or string course, here or elsewhere in the chapel, though the abacus does seem commonly to be in a shattered or broken condition above reddened responds, notably above F4.

A suggestion (Worssam 1995) that the burnt stone resulted from fires being lit against the crypt’s walls and columns during the seventeenth or eighteenth century, when the crypt was derelict, now seems less likely than that the burning was caused by a major late-medieval fire, or a series of small fires. Such fires must have post-dated, though not by a long period, the piers (or short parallel walls) that until their removal in 1963 encased columns H5 and H6. The piers were erected, probably in 1344, to support a new high altar and shrines in the cathedral presbytery (Tatton-Brown 1997). Careful observations during their removal by the architect Emil Godfrey (Holbrooke 1994; Rochester upon Medway Studies Centre, Strood, DRc/DE/209/IV) showed that the plaster that covered rubble stonework of the piers displayed ‘quite deep pinkening’ due to burning, covered by a later setting coat (but still of early date for it retained traces of ‘masonry’), whereas the buried stonework of the columns H5 and H6 was in mint condition, only their capitals (not completely covered by the piers) being fractured as a result of fire damage.

That the three Kentish Rag columns, G5, G6 and I5, already mentioned, were late-medieval replacements after fire damage, is a conclusion that Godfrey came to, citing their ‘quaint caps and bases’. They differ from original oolite columns, and also from a number of columns replaced in 1833 (see below), in that each has a relatively inflated abacus, of 8.5cm thickness compared with the standard 6.5cm, while their bell capitals, correspondingly reduced in height, are more widely splayed. Late-medieval replacement may also account for four half-column shafts, G4, G7, H4 and I4, being built up of separate drums, of a stone hard to identify beneath an only lightly cleaned, thin surface incrustation, but probably Caen stone. The bases of the half-columns are of oolite, presumably original. The capitals also appear to be of oolite, which may or may not be re-used, but their abaci have certainly been replaced, three of them being of Caen stone and the fourth (H4) partly of Caen stone, partly of oolite. Along
the middle part of the south wall of the chapel the Purbeck Marble string course is in a badly fractured condition, while between G4 and H4 it has largely been replaced by Bath stone. This oolite, recognisable because of containing thin calcite veins, would represent a nineteenth or twentieth-century repair.

**Nineteenth-Century Restoration of the Crypt Columns**

The architect Lewis Nockalls Cottingham undertook, in two campaigns lasting from 1825 to 1830 and from 1839 to 1841, to rescue Rochester Cathedral from the neglect it had suffered during the seventeenth and eighteenth centuries. The crypt cannot have been one of his main concerns: Mrs Mary Covert (1992) in her account of his activities thought it worth mentioning of the crypt only that, all of its windows having been blocked off, two of the east windows were opened for light and air, while the earth of the floors was dug away to the level of the column bases, and many of the columns were renewed.

Diana Holbrook’s summary (1994) of post-Reformation building work at the Cathedral, from documents in the Cathedral archives held by Kent County Council at the Rochester upon Medway Studies Centre, Strood, gives much more detail. She listed items of work carried out in 1833 and 1840, in various parts of the Cathedral, by a Mr William Brisley. His 1833 invoice (DRc/FTv/188) was for a total sum of £66 9s. 11d., that of 1840 (DRc/FTv/195) for the much larger amount of £535 5s. 3d. The latter includes only two items, both quite minor, clearly relating to the crypt, but the 1833 invoice specifies much work in the crypt, including the following (the dates are all Saturdays):

- July 20th, washing off, cleaning, and examining the Old Bases of Pillars, etc....
- Aug. 17th, removing Old Column and fixing new one....
- Aug. 24th, fixing Granite column; repairing tracery of old window and making rubble work, 1ft cube Bath stone, sawing, mortar, ..... underpinning Old Column Bases....
- Aug. 31st, making Ashler for Piers and Columns in Crypt....
- Sept. 7th, removing Caps of Pillars fixing new ones, running with Lead....
- Sept. 14th, repairing door jambs externally of North entrance to Crypt....
- fixing new Caps....
- Sept. 21st, repairing Jambs, south side of Crypt....
- Oct. 5th, underpinning Piers and columns.....
- Oct. 12th, 2 days fixing new Granite pillars and Caps.....
- Oct. 26th, running Caps and refixing old Pillars.

The invoice finally itemises the cost of stone supplied:

- 4 fine grit blue Stone Granite in Columns or pillars worked complete 29s each £5.16s; 8 Portland Stone caps 3 circular and 5 octagonal 25s each - £10.00; 8 Yorkshire Stone torus moulded upper members worked from very hard strong stone, each 10s - £4.00.
The invoice is of particular interest in showing that it was Brisley who introduced the crypt's most unusual type of stone, the granite used for four of the column shafts. It consists of interlocking equigranular (1 to 3mm) crystals of clear quartz, opaque white feldspar (some of them slightly pink-stained) and flaky mica. In Mr R. W. Sanderson's opinion (pers. comm., 1996) the stone is a Devon or Cornwall granite, but cannot be given a precise location of origin.

Brisley's three circular Portland stone 'caps' prove to be the capitals of columns B8, B9 and C8, but there are six rather than five octagonal capitals, to columns C2 (which is alone in having a Portland stone abacus), C5, C6, C9, F5 and F6. Portland stone shafts were not specifically mentioned by him, but columns B8 and C2 have them. The stone is a white oolite. As is typical of Portland stone, when viewed under a lens its ooliths can be seen to be in contact, except for minute interstitial voids, rather than held in a crystalline matrix. The west face of capital C5 and that of shaft C2 each show in cross-section a large fossil bivalve shell, of about 4cm diameter. The eight 'Yorkshire stone torus moulded upper members' can be recognised as the fine-grained yellow-brown sandstone abaci of eight of the columns. The stone is composed of quartz grains of 0.1 to 0.2mm diameter, is non-calcareous, and is abrasive to the touch, like fine sandpaper.

Granite, Portland stone and York stone were commonly used for churchyard monuments in the 1830s, so it is not altogether surprising that Williams's *Directory of Rochester etc.* (1849) lists, under Rochester, 'Brisley, William, statuary and mason, High Street', and under Chatham 'Brisley, Wm., stone mason, Old Foundry Wharf, High St'. In the 1851 Census for Rochester, William Brisley, aged 58, was living with his wife and two sons at 10 High Street, a 'Town Councillor, Master Mason & 4 men'.

From a present-day point of view it seems remarkable that in replacing defective columns in 1833 no attempt was made to match the oolite of those allowed to survive. In 1826-28 Lewis Cottingham had used large quantities of Bath stone (which would have provided a reasonable match for the columns) for his new south wall of the south choir transept as well as for a rebuilt tower (Covert 1992, 10) - the stonework bills for the two works together came to over £1,370 (the stone suppliers were F. and W. Freeman and the masons J. Hooper and W. Maggs, Rochester upon Medway Studies Centre, Strood, DRC/FTw/180-82). One can only suppose that Brisley, working directly for the Dean and Chapter in the absence, between 1830 and 1839, of a supervising architect, chose types of stone that he could supply from stock.
Brisley’s was not a complete restoration of the crypt columns, for some attached shafts without a structural function are still missing, these being the shaft of the attached column on the north side of respond F9, the shaft of E4 in St Ithamar’s Chapel, and, in the southern double chapel, the shaft of E3, as well as one shaft of the formerly double corner-column F3, and both shafts flanking respond F2. The shaft of respond E2 is quite anomalous, being three-quarters round and having a smooth black polished surface. At one point near its top Tim Tatton-Brown (pers. comm.) has noted the wavy lamin-ation characteristic of onyx marble. It must therefore have been stained and re-used, and is perhaps one of the ‘stalagmitic’ shafts, originally mid-twelfth century, that were found around and above the west doorway of the cathedral during renovation in 1894, one of them being ‘in-situ in the jamb of the great window’ (Holbrook 1994, 122).

Column B2 is the one crypt column that is difficult to account for. Its capital and base are of the yellow shelly oolite used elsewhere in the crypt, but its shaft, though of oolite, differs in that its ooliths (of 0.3-0.5mm diameter) are closely packed together rather than em-bedded in a crystalline calcite matrix. The ooliths are moreover hard and micritic (i.e. structureless) internally, rather than composed of concentric shells. Except for the evenness of grain size, these are features typical of Marquise oolite. Identification of the stone as from Marquise could imply that the shaft is of late eleventh-century date, and re-used from work by Bishop Gundulf. The tooling of the shaft surface is of thirteenth-century comb-chisel type (Tatton-Brown, pers. comm.). One possibility therefore is that the shaft was re-used in the thirteenth century.

Windows, Doorways and other Crypt Stonework

The following account treats of various parts of the crypt in order from east to west, starting with the three lancet-window embrasures at the east end of St Ithamar’s Chapel. The side walls of these embrasures above their Purbeck Marble string course are of Reigate stone ashlar; below the string course the walls are rendered. The piscina in the north wall of the northern embrasure and that in the south wall of the southern are of much-weathered Reigate stone. The oak window frames are each set in a slight recess with quoins of Chilmark stone, evidently Gilbert Scott’s restoration work. Each window internally has a sill, provided in 1955, of polished Purbeck Marble - the stone contains both Viviparus and the bivalve Unio.

Each window-embrasure along the north and south sides of St Ithamar’s Chapel is framed by a hollow-chamfered pointed arch of
Reigate stone; within each is a splayed window-recess with quoins of the same stone. The east jamb of the window recess at F-G on the north side of the chapel contains one block of Taynton stone, while there are Chilmark stone repairs, some quite fresh, in particular in the embrasures on the south side of the chapel. Externally, the windows on the east and north sides of the chapel have surrounds of Chilmark stone, part of the extensive re-facing carried out by Gilbert Scott. The Taynton stone sill to one window has been mentioned.

Possibly the most important clues to the original exterior appearance of the crypt are to be found on the south side of the chapel, where the lancet windows at F-G and G-H look onto a small courtyard bounded by the south-east transept, the north wall of the Chapter Room, and the polygonal buttress already mentioned. Externally, each window has a surround of two chamfered orders. The outer order of the more easterly window extends down to a chamfer stop halfway down each jamb, and is wholly of rather decayed Reigate stone, which must surely be original late twelfth-century work. The inner order is of Reigate stone at its apex but of a fresh-looking greyish-yellow fine-grained stone, probably a Caen stone repair, lower down. The sill of the window is a single slab of much-weathered oolite, with little doubt Taynton stone. The window has a hood-moulding of yellowish-grey, fine-grained, probably original Caen stone, linked by a string course to a similar hood-moulding over the window to the west. The surround of the latter has been wholly remodelled in Bath stone. The stretch of wall between the two windows, unaffected by Cottingham’s or Gilbert Scott’s refacing, is of rubble of Kentish Rag (from Maidstone quarries), including much chert, with a few scattered blocks of tufa.

The courtyard east of the polygonal buttress is now a boiler room and the windows at H-I and I-J are blocked. However, their external surrounds can still be seen, and are largely of decayed Reigate stone, like that of the window at G-H.

Inside St Ithamar’s Chapel, the present-day altar consists of a single slab of Portland stone, 2.14 x 0.9 x 0.1m, supported on a block of the same stone, 0.85m in height. It was originally in the chapel of Brasted Place, near Westerham, from 1952 to 1977 the Diocesan College for the pre-theological training of ordinands.

The northern of the crypt’s double chapels (at E-F 8-10) has side walls of Reigate stone ashlar, one block in its southern wall being fashioned as a piscina. The chapel’s two three-light east windows have tracery in a Decorated (fourteenth-century) style. The southern one is in an original Caen stone ashlar recess. Its tracery internally is partly in Caen stone, which may be original, with Mullions repaired.
with Chilmark stone; externally the tracery is extensively repaired with Bath and some Chilmark stone. The northern window, in a Chilmark-faced recess, is wholly of Chilmark stone.

The embrasure of the lancet window on the north side of this chapel, and those of the two windows and the doorway in the north wall of the crypt vestibule, have quoins partly of Caen, partly Reigate stone, to rubble-stonework walls. Externally the window-surrounds are of Chilmark stone, the doorway surround partly Chilmark, partly of Bath stone.

In the southern double chapel, the northern of the two former altar-recesses is built up with mainly Kentish Rag coursed-rubble stonework, and the southern is blocked by the lower storey of the fourteenth-century Chapter Room. A former archway at D-E 1-2 has also been blocked by stonework, probably in the eighteenth century to help to support the fabric of the choir transept, above (Hope 1898, 234).

The easternmost of the three windows in the south wall of the vestibule (at C-D) was originally a doorway to the cloister. Internally the window is flanked by half-columns with shafts and bell capitals of Bethersden Marble, on bases of yellow oolite, and is bridged by a flat lintel of Purbeck Marble, these being all that remains of a former multi-columned door-surround facing the cloister (Fig. 3). An iron hinge-bracket for a door inside the columns remains in situ. The shafts of the columns have the same diameter (19cm) as the Bethersden Marble columns forming the jambs of the doorway at the foot of the steps leading into the crypt from the south choir aisle of the cathedral.

The window-embrasures A-B and B-C on the south wall of the vestibule have original medieval quoins and rere-arches of Reigate stone. The lancet window-openings are however of a much later date, the best evidence for which is on their exterior, where they are set into the south face of the choir transept, which was refaced largely in Bath stone by Cottingham in 1826-28 (Plate IV). The immediate surrounds of all the crypt windows can there be seen to be of an oolite of a grey-brown colour, unlike the yellow-brown of Bath stone, while, examined with a lens, its ooliths are seen to be in contact rather than held in a crystalline calcite matrix. Also, closely-set tube-like ironstained cavities of about 2mm diameter, probably fossil worm-burrows, give some of the stone a streaky appearance. Although previously tentatively identified as Ketton stone (Worssam 1995, 28, 32) the oolite may be another variety of Lincolnshire Limestone, namely Weldon stone. Martin Caroe (1993, 3) found, during cleaning of the west front of the cathedral, that much of the Weldon stone used
by the architect J. L. Pearson in 1889-95 to replace decayed medieval Caen stone in his restoration of the west front contained fossil worm tubes that, when the stone was improperly bedded, actually led water into the core of the wall (Caroe 1993, 3).

At the foot of Cottingham's restored south face of the transept, Bath stone attached columns of a blind arcade that contains the crypt windows rest on plinths comprising a top layer of pale brown sandstone (York stone), on a Portland stone basal course. In Plate IV the bases of the columns appear whitish, but this is because the Bath stone is there rainwashed. As already mentioned, York and Portland stones were in common use in south-east England in Cottingham's time; the oolite of the window-surrounds seems, however, an unlikely
stone to have been used by him. This supposition tends to be confirmed by a statement by Hope (1900, 32) who, writing of the former doorway at C-D, remarked that 'during recent alterations by the late Mr. J. L. Pearson, Mr. Cottingham's copy of the doorway was converted into a window', while Palmer (1897, 4), in describing the exterior face of the south transept stated that 'in the basement on this side some windows have quite recently been inserted, to light the new vestries in the crypt'. The vestries mentioned by Palmer were built on the south side of the crypt in about 1895, J. L. Pearson being the architect (Holbrook 1994). They have since been removed, but an MS draft proposal for their erection (Rochester upon Medway Studies Centre, Drc/Emf/138) refers to 'opening of blocked windows of the crypt towards the south'.

From all this it is hard to escape the conclusion that Cottingham in 1826-28 gave the crypt no windows, except, possibly, at E-F, where there is a two-light window in a shallow segment-headed recess and the window-embrasure internally is ashlar-faced with what appears to be Bath stone. Cottingham's blind arcade seems therefore really to have been blind.

Lastly, it is worth mentioning that until as late as the 1890s the crypt
had an unpaved earth floor, as shown in a photograph in Palmer (1897, 113), having presumably been robbed of any medieval floor tiles when derelict during the seventeenth century. Proposals for paving were put forward in 1894 and again in 1896, and one for concreting the floor in 1897 (Holbrook 1994). The last-mentioned proposal was acted on, and the concrete floor 10cm thick, then laid, still exists in the crypt vestibule except in its southermost part, where there is wood-block flooring on the site of the former vestries. In 1996 St Ithamar's Chapel was furnished with a floor of reddish-brown tiles, hand-made in Kent, over re-laid rainwater drains (Hebron 1997).

Summary and Conclusions

A knowledge of the types of stone of which it is constructed adds an extra dimension to the appreciation of a major work such as the crypt of Rochester Cathedral, beyond what is conveyed solely by its architectural detail. By directing attention to the earliest surviving stonework it can bring to light the builders' original intentions as to the appearance of the work. Further, in the Rochester crypt it is evident that some of the best available types of stone were made use of, and deliberately placed not only to secure strength where needed, but also by a sort of hierarchy of stone quality to emphasise the relative importance of different parts of the design.

In the early Norman crypt, the columns of Marquise Oolite represent the only known use of this stone outside the easternmost part of Kent. Marquise stone is in evidence in east Kent in Roman and (probably re-used) in Anglo-Saxon buildings, while it was also imported during the early Norman period, for St Augustine's Abbey and the dortitory of Christ Church Priory (Tatton-Brown 1990). The Rochester columns (unless retrieved from some Roman building in Rochester) could be but one indication of the close dependence of the diocese of Rochester on that of Canterbury in the late eleventh and twelfth centuries (see Smith 1943).

Reigate stone (used for capitals and bases of columns in the early Norman crypt), being easily carved, was much in favour for Norman work, though its poor resistance to weathering led to it being used only internally in the later Middle Ages.

By the late twelfth century, deposits of the calcareous tufa freely used as a walling-stone in the early Norman crypt had evidently been worked out, and internal surfaces of walls of the eastern crypt, where ashlar was not called for, would have been of random or coursed rubble mainly of Kentish Rag, in all likelihood covered with rendering. Apart from this, only five types of stone seem originally to have
been employed: Reigate stone, for most dressings; Caen stone, used as a supplement to Reigate or by itself for a richer effect in facing the two piers at the entrance to St Ithamar’s Chapel; dark, polished Betersden and Purbeck marbles for a string course and the abacus of columns; and the oolitic limestone used for the columns and half-columns that are the crypt’s principal architectural feature. Almost certainly, in the writer’s opinion, this is Taynton stone (though only documentary evidence can give complete certainty as to the source of an oolite). A few remnant stones in the crypt exterior suggest that the same oolite was used for a plinth course at ground level; for sills to the crypt’s lancet windows; and for the bases of buttress-corner columns, for which shafts and capitals were never provided.

Quarries at Taynton are mentioned in the Domesday Book. The village is on the River Windrush, a tributary of the Thames, and transport of the stone would have been perhaps overland for a first stage to Eynsham on the Thames above Oxford (Arkell 1947, 61), thence by river to Rochester. Although documentary evidence is lacking, the oolite used in the Tower of London for the massive capitals and bases of columns in the late-eleventh century Chapel of St John in the White Tower (the column shafts there are of small-block Caen and Quarr stone) is probably Taynton stone (Worssam 1998), while the shelly oolite used together with Caen stone in the crypt of St Mary-le-Bow, Cheapside, may also be Taynton stone (Tim Tatton-Brown, pers. comm.). Both the White Tower and St Mary-le-Bow’s crypt are possibly the work of Gundulf, Bishop of Rochester from 1077 to 1108 (see discussion in Smith 1943). Further, in Rochester, early twelfth-century (c. 1120) attached columns of shelly oolite beside the upper window-openings of the ruined Chapter House of the cathedral (Tatton-Brown 1994) can now be regarded fairly definitely as of Taynton stone. Arkell (1947), in his history of Taynton stone quarrying, could find no recorded use of the stone earlier than in the rolls of Merton College, Oxford, of 1310, though in his opinion the Norman tower of Burford church and, almost certainly, the top stage of the tower and the spire of Oxford Cathedral (early thirteenth century) are built of Taynton stone. It is probably true to say, therefore, that the Rochester crypt ranks among the foremost medieval examples of the use of Taynton stone; perhaps it is mainly the distance from its source that explains why the stone was never thereafter used at Rochester.

The change from Betersden Marble in the west to Purbeck in the east, in the string course and the abacus of the crypt columns, is described by Tatton-Brown (1997) as a constructional change in a continuous sequence of building from west to east. Betersden
Marble is but one variety of Large-'Paludina' limestone, others being Petworth Marble and Sussex Marble, but the term is used in this paper for the stone at Rochester since Bethersden, in the Weald of Kent, would have been the nearest source. The stone was commonly used architecturally in south-east England in the late twelfth century, for instance in the late 1180s as floor slabs in the ambulatory of the Trinity Chapel of Canterbury Cathedral, and for the plinth of the Bell Tower (c. 1190) of the Tower of London (Tatton-Brown 1991). Only in the thirteenth century did Purbeck Marble come to supplant Bethersden or other varieties of Large-'Paludina' Marble.

In the centuries following the completion of the crypt, new types of stone were introduced during the course of repairs. These were notably:

1. Kentish Rag ashlar, replacing columns G5, G6 and I5 after a fire in St Ithamar's Chapel. The fashioning of these large monoliths, of 30cm diameter, in a hard stone, difficult to work, the beds of which in the quarry rarely exceed 30cm, would have required a high degree of masonry skill, but this is likely to have existed at the late-medieval date deduced by the architect Emil Godfrey for the emplacement of the columns.

2. The Bath stone used in large quantities by Lewis Cottingham in 1826-28 for rebuilding the south face of the cathedral's south choir transept came from Combe Down, south of Bath (Holbrook 1994), and with railways to the west of England not yet in existence must have been transported by the Kennet and Avon Canal. All this Bath stone of Cottingham's is in good condition.

3. Portland stone, York stone and granite were used by William Brisley in 1833 for replacing columns in the crypt. Whatever may be thought of his choice of stone, his shafts and capitals faithfully reproduce the outline of the originals and are difficult to distinguish from them at a distance.

4. Chilmark stone, from the Vale of Wardour in Wiltshire, was introduced by Sir George Gilbert Scott for exterior dressings of the choir transepts and the presbytery. The stone is a slightly glauconitic calcareous sandstone or sandy limestone, pale grey with a faintly greenish tinge. The closely similar Tisbury stone was largely used for building Salisbury Cathedral (Tatton-Brown 1998), but both stones were restricted to south Wiltshire and northern Dorset until the coming of railways. Chilmark (like Tisbury stone) provides a
reasonable match for Reigate stone, which may be why it was used by Scott. Though much harder than Reigate stone, some of the stone at Rochester (e.g. in plates II and III) shows signs of spalling as a result of weathering.

5. And finally there is the Lincolnshire Limestone oolite, presumed to be Weldon stone, used by J. L. Pearson for window-surrounds on the south side of the crypt vestibule. It was also used by him farther east along the north side of the cloister, for the tracery in Decorated style of a tall window, originally an entrance archway to the Chapter Room undercroft (Hope 1900, 33) - the window is just visible at the right-hand edge of Plate IV.

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