Petrological Examination of Stonework at Bourne Abbey Church, Bourne, Lincolnshire

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The west end of the abbey church at Bourne is a 13th century structure which appears to have been the starting point for a rebuilding of the whole church. However, that rebuilding never took place and the nave piers are clearly the originals of c.1138. The only later medieval featured noted by the author in a quick inspection were niches, added by doors on the west and south sides of the church, presumably once holding statues. By the early 19th century, the church was in a poor condition and several etchings show the west end in a partly ruinous state. During that century, however, the church was renovated and parts of the 13th-century work shown as ruinous are now restored.

APS was commissioned by the church to undertake a stone-by-stone survey of one wall of the church which the church architects claim was rebuilt in the 19th century. They further claim that within this wall is a blocked doorway. As part of an upgrade of a 19th-century toilet and boiler block attached to the northwest corner of the church, the architects have suggested unblocking this doorway.

However, the evidence for the existence of this doorway is weak and the stone-by-stone drawing in fact suggests that the lower 12' or so of the wall is essentially original 13th-century work, with rebuilding and repair work only present, in the main above this point.

The author was asked to undertake a quick survey of the wall to see if there was any difference in the source or character of parts of the wall which it is claimed are 19th-century infill and original 13th-century work.

The survey involved the collection of 11 samples of stone, chosen to represent the various blocks of stonework in the wall. These were all examined in Lincoln and six were chosen for thin section.

Results

Stone Lithology

Only stone from the wall being recorded by APS was sampled. However, visual comparison makes it clear that the 12th-century nave pillars have a similar or finer-texture than the 13th-century wall work whereas the 14th century statue niches are made from a coarser, more shelly, peloidal limestone whilst the 19th century work is made from a fine-textured oolitic limestone with few shells or iron-rich pellets.

The Alan Vince Archaeology Consultancy, 25 West Parade, Lincoln, LN1 1NW http://www.postex.demon.co.uk/index.html A copy of this report is archived online at http://www.avac.uklinux.net/potcat/pdfs/avac2008125.pdf

Rock 1: Samples 1-2, 4-8 and 10-11 are all very similar in appearance. They are all peloidal limestone with rare punctate brachiopod shells, sparse bivalve shells and sparse oolitic brown iron-rich pellets. Thin-sections were made of four examples (samples 1, 2, 8 and 10).



Figure 1

The following inclusions were visible in thin section:

- Pellets.
- Coral.
- Bivalve shell.
- Punctate brachiopod shell.
- Echinoid shell.
- The pellets and shell fragments are coated with micrite.
- The groundmass consists of sparry calcite, some ferroan and some non-ferroan.

Rock 2: Sample 3 is much finer in texture than any of the other samples. It is suggested here that it comes from an earlier phase and was reused alongside roughly finished infill. None of the other stonework in the wall has such a fine texture, even the *in situ* carved stones (which all appear to be Rock 1).



Figure 2

The following inclusions were visible in thin section:

- Bivalve shell.
- Ostracod shell.
- Coral.
- The groundmass consists of sparry ferroan calcite.

Rock 3: Sample 9 is if similar texture to the major group (Rock 1) but lacks the shell and ironrich oolitic grains. It is more similar visually to material used in definite 19th century work.



Figure 3

- Ooliths. Up to four layers of oolite built up over various cores, mostly biological in origin (e.g. shell). All grains less than 0.5mm across.
- Shell (completely altered to micrite), up to 0.5mm long.
- The groundmass consists of sparry non-ferroan calcite.

Stone Source

The most likely source of Rock 1 is the upper part of the Lincolnshire Limestone (Kent 1980, 48-9). Rock 3 probably comes from a similar source, and is similar in the low amount of visible sparry calcite cement to stone from Ketton). Rock 2 is much finer-textured although still oolitic. Assuming the pre-13th century date assigned here is correct, the stone is likely to be either of local origin or perhaps brought to the site via water transport either from somewhere else on the fen edge or possibly further afield.

As far as the interpretation of the stratigraphic sequence in concerned, the important point is that rock 3 is limited to an area which forms a clear patch, different in block size and regularity from the remainder.

Appendix One

List of samples

The precise location of each sample is marked on a photocopy of the APS stone-by-stone drawing. They were chosen to cover the various structural elements of the wall, and to test of any difference between the supposed original work and backfilling of a doorway.

1. Taken from the right hand (i.e. more easterly) block of stonework below a chamfer course and block of coarse work running across wall.



Figure 4 (sent for TS, sample V5154). Field of view for this and other macrophotos = c.3.4mm wide.

2. Taken from the left hand block of stonework below the chamfer course and block of coarse work.



Figure 5 (sent for TS, sample V5155)

3. Taken from a block of stonework interpreted as the faced stonework forming the left hand side of a blocked doorway.



Figure 6 (sent for TS, sample V5156)

4. Taken from coarse work above samples 1 to 3 and below chamfer.



Figure 7



Figure 8

6. Taken from the block of masonry above the right hand part of the chamfer course and within the area of the supposed blocked doorway.



Figure 9 (sent for TS, sample V5157)

7. Taken from the upper part of the masonry block to the left, i.e. above sample 5 and below sample 9.



Figure 10

8. Taken from the upper part of the masonry block to the right, i.e. above sample 6 and below sample 11. Again, within the supposed area of door blocking.



Figure 11

9. Taken from a patch of more regular-shaped stonework below the more westerly window and gallery opening. This appears to be a repair patch inserted into the wall, and cutting areas 8, 10 and 11.



Figure 12 (sent for TS, sample V5158)

10. Taken from a patch of stonework to the left of the patch from which sample 9 was taken.



Figure 13

11. Taken from a patch of stonework to the right of the patch from which sample 9 was taken. This should be above any blocking.





Bibliography

Kent, Peter (1980) *Eastern England from the Tees to the Wash*. British Regional Geology London, HMSO