ST ANDREW'S CHURCH, WEST DEREHAM

St Andrew's Church, in south-west Norfolk, is Grade I listed, and has many incredible features such as medieval glass fragments in the east window (reputably taken from a nearby monastery), impressive C18 monuments within the chancel including one made in Florence, and of course its very impressive Norman round tower with Tudor belfry on top.

The other distinguishing feature of this church is the fact that it is built out of an extraordinary stone; not exactly carstone, but a hybrid conglomerate known as "ferricrete". Unfortunately, this porous stone is now suffering, not least because it has been repointed in cement, but also I came to realise the church had lost its traditional lime finishes over the years. Research from previous engravings showed very clearly that the church had been rendered, and remains of renders could be found on the chancel, and obviously the south porch. It all makes sense when you consider the church had a thatch roof, originally, with no rainwater goods. As a result of losing its original external lime finishes the fabric of the church has been put in a great deal of jeopardy and explains why the ironstone is shaling away and the soft clunch window masonry has been much replaced over the years. In fact, both of the nave north clunch windows have been entirely replaced in recent years having been blown out in gales, and we didn't realise we were to face the same problem when masonry started to fall from the east window.

We were very fortunate in that the Church Commissioners are the Lay Rector, and therefore have responsibility for the fabric of the chancel. They were very supportive to carry out repairs to the east window, and to reinstate a lime render to the chancel elevations.

Supporting documents were put together and Historic England and SPAB were consulted on the proposals to re-render the elevations. Fortunately they understood the technical merits, respected the evidence, and fully supported the proposals.

We obviously had to repair the east window first, and we thought initially that this would be a case of stone indent repairs, but once scaffolding was installed and a closer examination carried out, it was apparent that this C15 clunch window had been patched up many times before. It transpired that there was an awful lot of C19 brickwork and mortar repairs, and what remained of the clunch stonework was really very friable and rotten. We were then faced with the need to apply for an emergency faculty to take the stain glass window out, and to replace all of the tracery masonry. It is a great shame we can now no longer obtain local clunch, and after discussions with the DAC we reluctantly chose Hartham Park Bath stone. Our next challenge was to resolve the geometry of the window as it had twisted and bent out of shape over the centuries. This was no easy task as the stain glass had been made to fit the existing tacery and there was little scope to alter the glass. We were, however, able to make some small adjustments, and the masons did a brilliant job of setting it out and installing it, followed by the glaziers. We finished off the window masonry with a protective coat of limewash, bringing both new and old stone into a unified whole.

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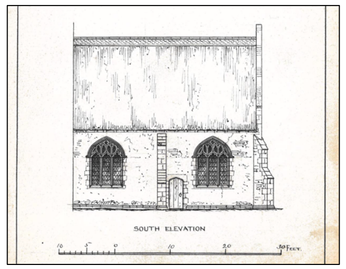
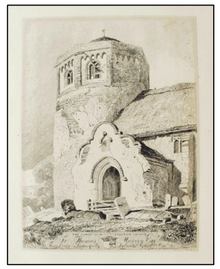
Chancel - south elevation, showing extensive cement pointing to the rubble walling

Chancel - east elevation, showing remnants of render and a lot of C19 brick replacement to the gable

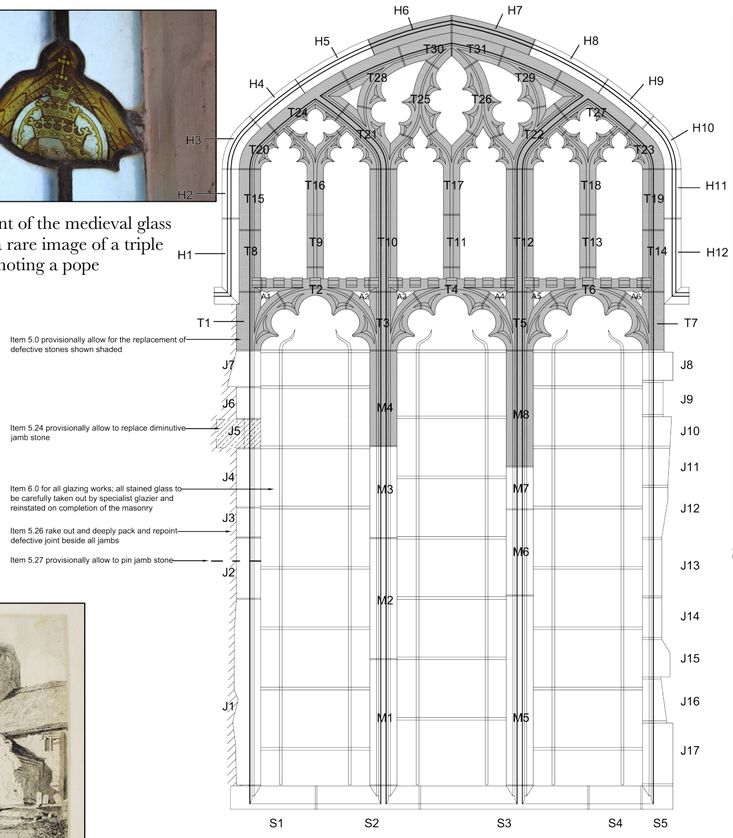
Investigations revealing the poor condition of the east window, and the stress it was putting on the medieval glass

A fragment of the medieval glass showing a rare image of a triple crown denoting a pope



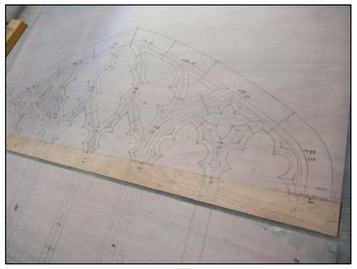


Church Commissioner's condition survey of 1892 showing render and thatch. A restoration was carried out in 1895 to install a new roof with tiles. To the right, an engraving by John Sell Cotman, dated 1818, clearly showing render to the church



Drawing of the east window showing it all square and true, and the extent of full stone replacement following our investigations

Stone mason looking a little too relaxed for my liking!



Full size drawing of the tracery by stone mason reflecting more accurately the distorted tracery

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Once the east window had been rebuilt we turned our attention to re-rendering the chancel. It was evident from a visual inspection of the remaining renders they were lime rich, with an even softer earth consolidated bedding mortar behind. It was clear to me that a hot lime render, made by slaking quicklime on site, was to be used as this traditional method of making mortars produced a lime rich mortar. Not only this, the pore structure of a hot lime mortar matches closely that of a water molecule and thereby creates a mortar of high capillarity. This in turn readily allows water to move to the evaporation face of the render and thus dries out the fabric more quickly. As recent research has shown, a render acts like a poultice drying out a rubble wall so much more effectively than one that is merely pointed.

A further reason to re-render the walls became evident when we removed the cement pointing as it revealed bedding mortars with many cavities (as is often the case), meaning water can easily penetrate through the fabric. Merely pointing the wall is very difficult at the best of times, and to try and point around such irregular and porous rubble as the ironstone we encountered here would have made it impossible to make the fabric weathertight.

The challenge was to find a contractor who was capable of producing and applying such a render. Fortunately the stone masons who had carried out the east window were up for a challenge and with the assistance of a septuagenarian master plasterer they learnt more about producing complex hot mixed mortars and how to apply them. The mortar for the render contained chalk and limestone sand, as well as hair to the base coats and extra grit before being laid down for a few days to fatten up and reduce shrinkage. A dubbing coat was applied with pinnings to bring the uneven walling more level before two coats of render were applied, conforming to be approved sample.

The rendered areas were then limewashed to match the colour of the porch.

We also had to remove all of the mirco-biological growth, not only from the rubble, but also the stone dressings of the buttresses and the remaining window masonry. This was done by applying an algaecide and then steam cleaning. It was very surprising to see how bad the state of the stonework was to both the buttresses and windows. The appearance was rather pink and we wondered if there had been a fire. The condition was such that stone piece repairs were required by the masons as well as general repointing. Furthermore, additional nano-lime consolidation, micro-filling of fractures, and mortar repairs were also necessary by a specialist conservator, who also restored the profiles to the window masonry so they could properly shed water once again.

The DAC preferred us not to limewash the window masonry or buttress dressings and that is a matter of contention.

The works have undoubtedly changed the appearance of the church, but I think the result is very close to how the chancel originally looked, and is not at all unattractive. In restoring the traditional lime finishes to a rubble wall construction, the fabric is properly protected as originally intended, and the internal environment made more comfortable for everyone using the church for many years to come.

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Completed chancel

The vestry is C19 and may never have been rendered, and only limewashed

Existing evidence of render base coats with exposed porous rubble walling, all covered in lichen adding to inexorable decay

Condition of rubble walling once cement pointing was removed revealing many cavities allowing water to pass deep into the wall, saturating the masonry, and without being able to dry out effectively

Specialist glazier, Devlin Plummer, reinstating the glass to the east window

Poor condition generally of chancel windows and buttress dressing following cleaning, showing multiple fractures, loss of details, previous cement repairs and erosion from lichens and weather

Conservation of window masonry in progress, by Gem Conservation before shelter coating

Master plasterer, Roy Cafferty, about to apply a sample area

Main contractor, Spectrum Stone, during an inspection, and nearing completion

Chancel cross before and after clean and repairs

Detail of east window on completion, properly protected