

FACT SHEET No 210a

## MINSTER STONWORK

*(Based on information from the British Geological Survey)*

*With supplement by Richard Ellison October 2019*

The fabric of Southwell Minster is dominated by stone originating from within the Late Permian Cadeby Formation (the former 'Lower Magnesian Limestone'). The stone came from quarries in the neighbourhood of Mansfield and Mansfield Woodhouse, twelve or fourteen miles away through Sherwood Forest, although there have been suggestions that Bolsover (where the Cadeby Formation was also quarried) could have been an additional source.

The lithological characteristics of the Cadeby Formation vary quite dramatically along the length of its outcrop (which stretches from north Nottinghamshire to County Durham). Although by no means as dramatic as the unit as a whole, the nature of the Cadeby Formation does vary in the Mansfield area; the detrital quartz (and feldspar) content is highly variable (being small, moderate or substantial), such that the beds variably consist of slightly-to-significantly sandy dolostone or dolomitic sandstone. An examination of some of the blocks of Southwell Minster with a hand lens shows that the detrital sand/silt content is indeed rather variable.

It is also worth noting that Middle Jurassic Lincolnshire Limestone was used for modifications to the Chapter House passage 1429-30. Jennifer Alexander's 1995 paper in *Medieval Archaeology* contains the following: Stone from Heselburgh, in Heydour parish, to the SE of Ancaster, was used at Southwell Minster for work in the Chapter House and its vestibule, although the main walling stone that had been used for the building was Mansfield and stone roof tiles from Mansfield were used for roofing the new work. The work in question involved: removing the vaulted stone ceiling which dated from c1200-1300; increasing the height of the east wall of the passage and incorporating eight small double-light windows above the string-course; increasing the height of the west wall; and replacing the vault with a stone roof of very low pitch, to incorporate a timber ceiling. Fragmentary fabric accounts from that period appear to name "Peter de Hassilburgh" as the master mason for the work, leading to the conclusion that he insisted on stone from his home territory.

The stone used by the Norman builders is of a dark yellowish hue, while their Early English and Decorated successors found some of a lighter hue with blue-tinted veins. Since all the stone used to build and to repair the fabric of the Minster (with the exception noted above) has come from the same Formation, but not always from the same quarry, it is probable that the slight variations in appearance between the stone of the Nave (completed c1160), the Early English Quire (completed c1250), the Chapter House and its Passage (completed c1300) and the Pulpitum (completed c1340) are due to the different sourcing.

The Minster was fortunate in the choice of material and has always been envied. That eminent geologist Sir Roderick Murchison once expressed his regret that, when the Houses of Parliament were rebuilt, the Mansfield quarries were not used. "If Mansfield stone had been used", he wrote, "not one pinnacle in that otherwise grand building would have been caused to perish." There is no fear of the Minster perishing. Nave and transepts have already withstood the storms and rains of nine hundred years, and Quire and Chapter House for almost as long.

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Supplement provided in September 2019 by Richard Ellison, a geologist of the British Geological Survey at Keyworth following his visit to the Minster.

“Mansfield White” stone, part of the Cadeby Formation of Permian age is described in the literature as a dolomitic limestone (dolostone) which in places contains up to 80% quartz grains. The environment at the time of its deposition was a warm shallow sea in which lime mud was precipitated from carbonate rich waters. The quartz grains originated from erosion of nearby landmasses and were washed into the sea by contemporary rivers. The calcium carbonate mud was partially chemically altered to magnesium carbonate at some later geological time, giving the deposit its characteristic fabric, and subsequently over millions of years the sediment was buried and turned to the rock we now see.

So, the story is not simple! Strictly speaking, much of the building stone of the Minster, and particularly that of the Chapter House, is in fact a siliceous (sandy) dolomitic limestone. But of course from the point of view of informing visitors, simplicity is the key! It may be better to stick to “sandstone” but back up that classification if necessary! After all, the rock does feel like a sandstone and looks like sandstone - it’s just that the reality is slightly different.

Below I have selected some quotations from scholarly articles about the Cadeby Formation building stones and Mansfield Stone in particular, including a rather amusing anecdote about the Houses of Parliament.

From; Graham Lott 2001 Geology and building stones in the East Midlands . MERCIAN GEOLOGIST Vol 15, pp 97-122 Mineralogically the limestone has a mean composition of 54.35% (CaCO<sub>3</sub>) and 45.65% (Mg CO<sub>3</sub>), this defines it as a dolomitic limestone, or dolostone, in most modern rock classification schemes. There are some local variations, however, and perhaps the most distinctive is the development, at the southern end of the outcrop, of a significant component of detrital siliceous sand grains (up to 80% by volume). This sandy facies of the limestone is best developed around the Mansfield area where it has been worked for many centuries as a building stone. It was commercially produced as the Mansfield Red and White stone but the last quarry in the area closed in 2004. The presence of the fine detrital, siliciclastic sand grains in the limestone has helped to produce a particularly durable stone which was used extensively for the external and internal ashlar fabric of Southwell Minster, parts of the Houses of Parliament, Newark and Mansfield town halls, to name just a few examples.

Interest in the mineralogical composition of the Magnesian Limestone dates back to 1839 when, as part of the selection process for choosing a building stone for constructing the present Houses of Parliament, detailed analyses of these limestones and others was commissioned..... from 102 stones, the Lower Magnesian Limestone from the Bolsover quarry [was selected] as the most suitable stone .... ,apparently after admiring its durability on a visit to Southwell Minister. An erroneous assumption as the Minster is, as noted above, in fact constructed of Mansfield White Stone..... [it turned out that] the Bolsover Quarry could not meet the considerable demands placed on it by the project and most of the original magnesian limestone eventually came from quarries at Anston.

[extract from: LOTT, G.K. & COOPER, A.H.2005. *The building limestones of the Upper Permian, Cadeby Formation (Magnesian Limestone) of Yorkshire. British Geological Survey Internal Report, IR/05/048*].