STRATEGIC STONE STUDY

A Building Stone Atlas of NORTH-EAST YORKSHIRE

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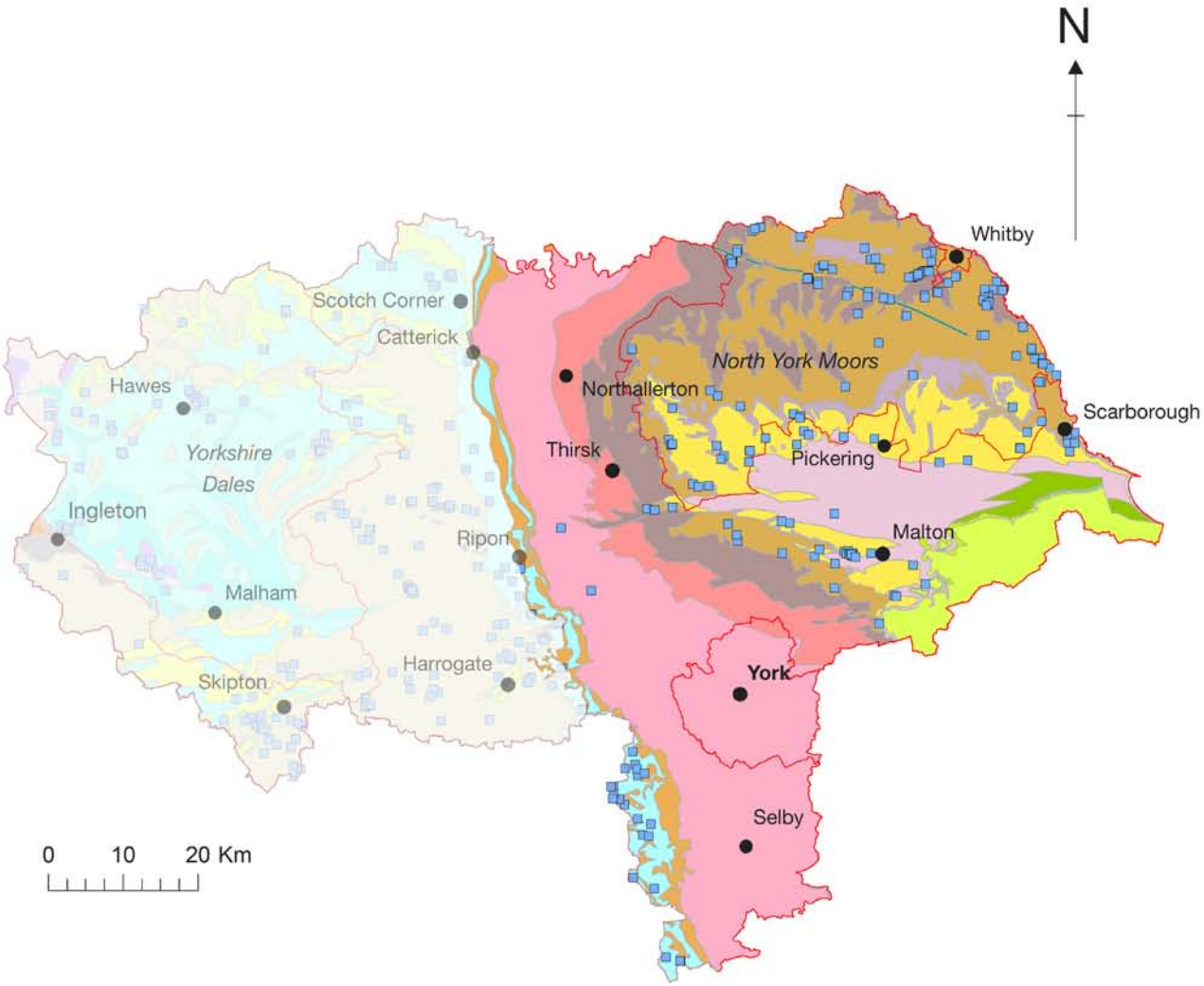
NE Yorkshire Bedrock Geology



North-East Yorkshire Bedrock Geology

- BUILDING STONE SOURCES
- WHITE CHALK SUBGROUP - CHALK
- GREY CHALK SUBGROUP - CHALK
- CHALK GROUP
- SPEETON CLAY FORMATION - MUDSTONE, LIMESTONE, SILTSTONE, TUFFS
- AMPTHILL CLAY FORMATION AND KIMMERIDGE CLAY FORMATION - MUDSTONE and SILTSTONE
- CORALLIAN GROUP - LIMESTONE, SANDSTONE, SILTSTONE AND MUDSTONE
- OSGODBY FORMATION AND OXFORD CLAY FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE
- RAVENSCAR GROUP - SANDSTONE, SILTSTONE, MUDSTONE AND LIMESTONE
- LIAS GROUP - MUDSTONE, SILTSTONE, LIMESTONE AND SANDSTONE
- TRIASSIC ROCKS (MERCIA MUDSTONE GROUP) - MUDSTONE, SILTSTONE AND SANDSTONE
- TRIASSIC ROCKS (SHERWOOD SANDSTONE GROUP) - SANDSTONE AND CONGLOMERATE, INTERBEDDED
- ZECHSTEIN GROUP (CADEBY AND BROTHERTON FORMATIONS) - DOLOMITISED LIMESTONE AND DOLOMITE
- PERMIAN ROCKS - MUDSTONE, SILTSTONE AND SANDSTONE

Igneous Rocks

- CLEVELAND DYKE, PALAEOGENE - DOLERITE

Click on this link to visit NE Yorkshire's geology and their contribution to known building stones, stone structures and building stone quarries (Opens in new window http://maps.bgs.ac.uk/buildingstone?County=North-EastYorkshire)

Stratigraphical column of the Permian (in part), Triassic, Jurassic and Cretaceous rocks and Quaternary deposits in North-east Yorkshire showing the common buildings stones (bold) and alternative stone names. The oldest rocks are at the bottom of the table. Gp., Group; Fm., Formation; Mbr., Member.

North East Yorkshire: Permian, Triassic, Jurassic, Cretaceous & Quaternary Building Stones				
PERIOD	GROUP	FORMATION	MEMBER	**Common/alternative Stone Name**
Quaternary				Calcareous Tufa; Aquarium Stone
				Till (Boulder Clay) and Fluvio-glacial sand and gravel; boulders
Tertiary	**Cleveland Dyke**			Whinstone
Cretaceous	**Chalk Group**	**Flamborough Chalk Fm.**		Flamborough Chalk; White Chalk
		Burnham Chalk Fm.		Burnham Chalk; White chalk
		Welton ChalkFm.		
		Ferriby Chalk Fm.		Grey chalk
	ungrouped	Hunstanton Fm.		
		Speeton Clay		
Jurassic	ungrouped	Kimmeridge Clay		
		Ampthill Clay		
	Corallian Group	**Upper Calcareous Grit Formation**	**North Grimston Cementstone**	Upper Calcareous Grit North Grimston Cementstone
		Coralline Oolite Formation	**Coral Rag Member**	Coral Rag
			Malton Oolite Member	Malton Oolite; Hildenley Limestone; Hildenley Stone
			Middle Calcareous Grit Member	Middle Calcareous Grit
			Birdsall Calcareous Grit Member	Birdsall Calcareous Grit
			Hambleton Oolite Member	Hambleton Oolite
			Yedmandale Member	Passage Beds; Wallstone
		Lower Calcareous Grit Fm.		Lower Calcareous Grit
	ungrouped	Oxford Clay Fm.		
		Osgodby Fm.	Hackness Rock Mbr.	Hackness Rock
			Langdale Member	
			Redcliff Rock Member	Kellaways Rock; Kellaways sandstone
		Cornbrash Fm.		
	Ravenscar Group	Scalby Formation	Long Nab Member	Upper Estuarine Sandstone
			Moor Grit Member	Moor Grit
		Scarborough Fm.	Brandby Roadstone Mbr.	Pierstone; Grey Limestone; Scarborough limestone
		Cloughton Fm.	Lebberston Mbr./ Whitwell Oolite Mbr.	Whitwell Oolite; Millepore Bed; Cloughton Sandstone
		Ellerbeck Fm.		
		Saltwick Fm.		Aislaby Stone; Bilsdale Stone; Lower Estuarine Sandstone; Fairhead Stone Great Sandrock; Saltwick Sandstone; Pierstone
		Dogger Formation		Dogger Ironstone /Limestone/Sandstone
	Lias Group	Whitby Mudstone Fm.		
		Cleveland Ironstone Fm.		Cleveland Ironstone
		Staithes Sandstone Fm.		Staithes Sandstone
		Redcar Mudstone Fm.		
Triassic	Penarth Gp.			
	Mercia Mudstone Gp.			
	Sherwood Sandstone Gp.			Warlaby Stone; Sherwood Sandstone
Permian (in part)	**Zechstein Gp.** (in part)	**Brotherton Fm.**		Upper Magnesian Limestone
		Cadeby Formation		Lower Magnesian Limestone

Introduction

The character of the landscape, towns and villages of North-east Yorkshire are reflected in its underlying geology, principally the Jurassic rocks. Locally quarried stone was used for vernacular buildings, monastic abbeys (e.g. Ampleforth, Byland, Mount Grace, Rievaulx,) municipal town buildings, churches and country houses, and in the construction of harbours and railway/road bridges over a wide area, but principally where good quality stone was readily available. Development of the railway network in the 19C and transport of building stone by ship from local ports such as Whitby allowed the higher quality building stones to be used in buildings over a wider area, including major cities such as London and the docks at Tangier.

The Permian rocks that crop out in the west of the area include the dolomitic limestone units of the Cadeby and Brotherton formations that were widely used as building stone, including York Minster.

Red and grey Triassic Sherwood Sandstone was worked widely for building stone in the English Midlands, and was transported by rail throughout the UK, including North-east Yorkshire. However, in this region these rocks are mostly obscured by thick deposits of Quaternary glacial sediments in the low ground of the Vale of York. The thicker beds of the Sherwood Sandstone were quarried locally for building stone near Warlaby and Ripon.

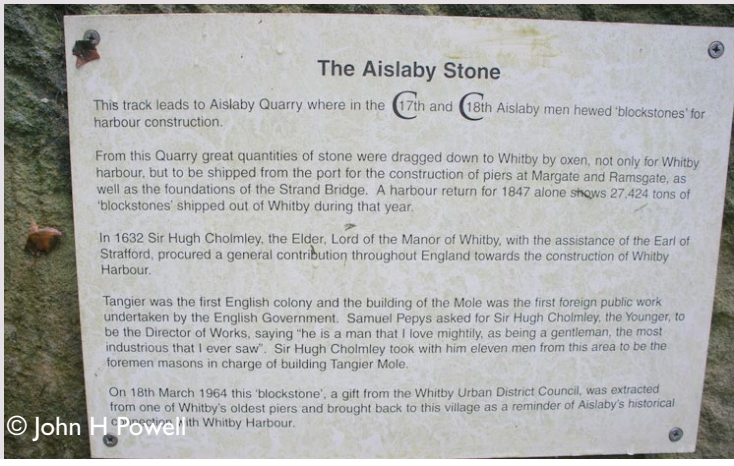
The Jurassic rocks that typify the landscape of the North York Moors and Hambleton Hills (Cleveland Basin) range in age from about 199 to 145 million years; these are overlain by younger Cretaceous clays and the chalk, the latter characterising the Yorkshire Wolds. The oldest Jurassic strata in the area, the Lias Group, are generally too soft to be used as building stone, but the Middle Jurassic Dogger Formation and overlying Ravenscar Group provided excellent building stones, especially the harder yellow, dark brown and grey sandstone **Lithologies**. These rocks form many of the escarpments of the bold north and west-facing escarpments of the North York Moors allowing local quarrying and their use in village and farms buildings across the northern moors from Whitby to Osmotherley, and to the south as far as Kilburn.

These **Sandstones** were also quarried for building stone in the Howardian Hills along with Middle Jurassic limestones such as the Whitwell **Oolite** and Brandsby Roadstone.

Higher in the sequence, the pale brown Middle Jurassic Osgodby Formation sandstones and, especially, the Upper Jurassic Corallian Group limestones and calcareous sandstones typify the buildings and walling stone of the Hambleton Hills and Tabular Hills of the North York Moors and the Howardian Hills, located to the south-west. These pale grey and yellow-brown building stones were widely used in towns, villages and important country houses (e.g. Nunnington, Dunscombe Park and Castle Howard). A local variant, the Hildenley Limestone, has been much prized since Roman times as fine-grained **Freestone** widely used for monumental sculpture and architraves.

The Chalk Group (Cretaceous age) of the Yorkshire Wolds is notably harder than its counterpart in southern England, and was, therefore, used as a local building and walling stone in churches and village buildings. Finally, the Quaternary glacial deposits have provided large boulders locally incorporated in the foundations and lower courses of village buildings, especially where good quality building stone is sparse, such as the Yorkshire Wolds.

The following summary of the principal local building stones describes them in **Stratigraphical** order from the oldest to the youngest rocks. It is based on a number of published sources (see Further Reading) and recent field investigations. A Glossary of terms is also provided. The Plaque below, commemorates the quarrying and use of Aislaby Stone (Middle Jurassic, Saltwick Formation) nearby Aislaby Quarries, north-west of Whitby.



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PERMIAN

The Permian succession is very well exposed along the outcrop southwards from Tadcaster to Womersley, but is generaly obscured by superficial deposits and is poorly exposed over much of the area to the north of Ripon. Lithologically, the Lower Permian succession comprises reddened, coarse-grained **BRECCIAS** and sandstones, which have not generally proved suitable for use as building stones. In contrast, the Upper Permian succession includes the **DOLOMITIC LIMESTONE** units of the Cadeby and Brotherton formations in the south, which historically were important building stone sources and remain so today. North of Richmond these Zechstein Group limestones form part of the Raisby Formation and were quarried locally for building stone in the distant past but today are only worked for lime.

Zechstein Group (southern area)

Cadeby Formation

Lower Magnesian Limestone

The pale yellow-white, fine to coarse-grained, bioclastic and ooidal, dolomitic limestones of this formation are particularly important sources of local building stone. The outcrop is pock-marked by quarries many of which have produced fine quality building stone since at least the 12C, most noticeably at the Huddleston, Smaws, Lords and Jackdaw Crag quarries. Most of the villages on or close to the outcrop, are constructed of these pale limestones e.g. Tadcaster, Sherburn in Elmet, Monkfryston, Womersley and Little Smeaton. The quarries of the Tadcaster to Sherburn area have also provided stone for numerous buildings in the City of York e.g. York Minster, and the City Walls. There are currently three active quarries still producing building stone from the formation. Top right image is of Sherburn Church, middle right, Elmet Church and bottom right, York Minster, which are all built of Permian Cadeby Formation dolostone from the Tadcaster area of north Yorkshire.

Brotherton Formation

Upper Magnesian Limestone

The more thinly bedded limestones of this formation were generally quarried principally as a source of lime but were also used locally in field walls and farm buildings along its **OUTCROP**. Currently, the formation is still quarried for building stone at Brotherton and Darrington.


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TRIASSIC
Sherwood Sandstone Group

Triassic Sherwood Sandstone was worked widely for building stone in the English Midlands, where it is known as Staffordshire (Hollington) 'Red' and 'Grey'; these varieties were transported by rail throughout the UK, including North-east Yorkshire. In this region the Sherwood Sandstone is mostly obscured by thick deposits of Quaternary glacial sediments in the low ground of the Vale of York. However, where rivers have locally cut down through the Quaternary deposits to reveal the underlying bedrock, the thicker beds of the Sherwood Sandstone, quarried near Ripon (Rainton) and Boroughbridge (Aldborough), were used as local building stone.

JURASSIC
LOWER JURASSIC
Lias Group
Cleveland Ironstone

The Cleveland Ironstone was mined and quarried extensively along its outcrop, especially in North Cleveland. It is a grey to yellow-brown sideritic and berthierinitic **IRONSTONE** and iron-rich sandstone with abundant ooids and shelly fossils. The stone was not as commonly used as a building stone, but ironstone extracted from nearby Skelton mine was used in the 19C in the construction of Rushpool Hall, near Saltburn.

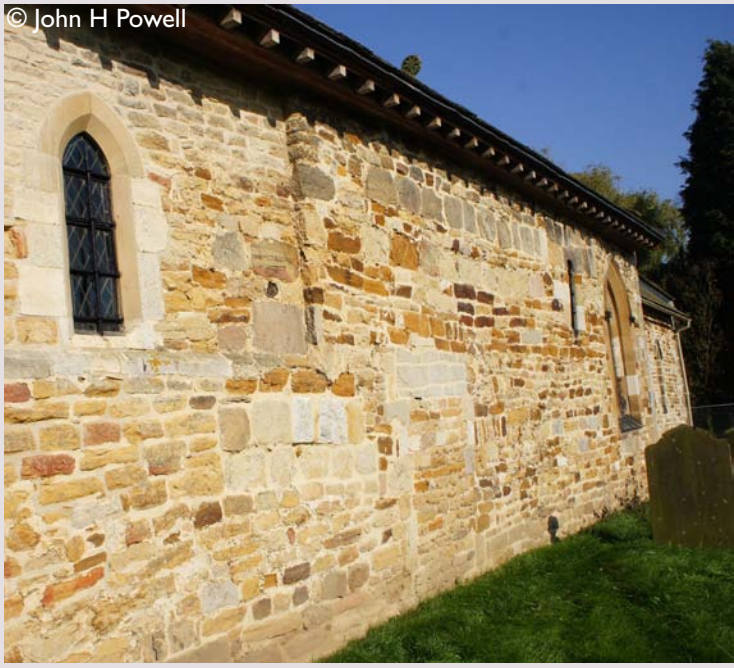
Staithes Sandstone Formation

This yellow-grey, fine-grained calcareous sandstone was not widely used as a building stone because it is relatively soft, but it has been used as a flooring flagstone in coastal villages such as Staithes and Runswick where it crops-out.

MIDDLE JURASSIC
Dogger Formation (sandstone & limestone lithology)

This is generally a thin red-brown ferruginous (iron)-rich sandstone in North-east Yorkshire and was quarried for local use in the area around Crambe and Spy Hill, near Whitwell-on-the-Hill as a **QUOIN** and **ASHLAR** stone.

The top image is of Crambe Church, showing a red-brown and yellow-brown Dogger Formation sandstone (Spy Hill variety) used together with a variety of other building stones, including pale grey Hildenley Limestone. However, in the Cleaves area, near Sutton Bank (Hambleton Hills), and at Mowthorpe in the Howardian Hills, it is represented, atypically, by a pale grey and brown, ooidal **CROSS-BEDDED**, shelly limestone. This limestone was formerly quarried for use as freestone and **RUBBLE** blocks for use in local farm buildings in the Lower Mowthorpe area, and nearby at Sheriff Hutton Castle (bottom image) where it was used in the 12C for the construction of walls, and subsequent use in adjacent village buildings.



Ravenscar Group

‘Aislaby Stone’ & other Middle Jurassic Sandstones

Buff, yellow and brown, medium to coarse-grained Middle Jurassic sandstone (known locally as Aislaby, Bilsdale or Fairhead Stone) is widely available in the North York Moors and the Howardian Hills, and was used as a building stone in villages, farm buildings and walls, and for monumental sculpture over a wide area. The thicker sandstones generally form laterally impersistent beds and crags along the escarpment of the northern moors where they were quarried, locally, for freestone and ashlar. The most productive large quarries at Galley Hill, Aislaby near Whitby were used in the construction of many domestic and civic buildings in, and around the town (e.g. Whitby Abbey). High quality stone was exported from here for use in London (e.g. Covent Garden, Waterloo and London bridges). It was used in many churches in the area, including Guisborough Priory, in the construction of road and railway bridges, and railway stations as well as ‘pierstone’ or ‘blockstone’ for the harbours at Whitby, Saltwick, Ramsgate, Margate and Tangier. The stone is still worked at Aislaby.

The distribution of sandstone quarries in the North York Moors (Upsall, Boltby, Thirlby, Goldsborough) shows that it was generally the thick sandstone beds in the lower part of the Ravenscar Group, i.e. the Saltwick Formation, that were exploited. Ease of transport down-slope, to villages located on more fertile Lower Jurassic rocks facilitated its extraction (e.g. Osmotherly; Mount Grace Priory). The quarries provided slabs of variable thickness that could be easily worked for a variety of uses including freestone, ashlar, quoins, walling stone and rubble fill, including early parts of Rievaulx Abbey. Fine examples of the stratigraphically higher (but similar) Cloughton Formation sandstones can be seen in the villages of Cloughton, Burniston and Hayburn on the coast, and it was used in the construction of Goathland Railway Station. It also provided good quality flagstone (image below).

A variety of this sandstone known as the Moor Grit Member is generally white or pale grey in colour and is found higher up on the moors. It varies from a pebbly, coarse-grained rock to a white, fine-grained variety; the latter is easily split along bedding planes and was used as flagstones (e.g. near Cloughton; Smeaton and Whitby quay), and was used in early buildings at Byland Abbey.

The relatively hard, coarse-grained variety was quarried as large blocks in Riccal Dale for use in road and railway bridge construction on the Helmsley branch line. The top right image is of a farm building, constructed of 'Aislaby Stone', probably Saltwick Formation, showing the effects of weathering due to water ingress from failed guttering. The image directly below, of a chapel near Kettleness, is also constructed of 'Aislaby Stone' and has a Welsh slate roof. This stone has also been used in the construction of cottages in Egton, as can be seen in the bottom right image, it has a Westmorland slate roof and there is a glimpse of a red pantile roof to left. In addition, Mount Grace Priory, Osmotherley, is constructed of stone from the Saltwick Formation, this building is highly weathered (bottom image).

Lebberston Member

Whitwell Oolite & Cave Oolite

This is a white, shelly, ooidal limestone found in the southwest of the North York Moors (Hambleton Hills) and especially in the Howardian Hills where it was extensively quarried for building stone near the village of Whitwell-on-the-Hill. It forms part of the fabric of nearby Kirkham Priory and fine examples of its use as a freestone can be seen in the local villages such as Kirkham and Westow. Top right image is of a public house in Kirkham; pale grey Whitwell Oolite used in the walls with occasional red-brown Dogger Formation sandstone; quoins are of Corallian limestone. Its ease of working made it suitable for piers, breakwaters and docks (e.g. Hull docks). In the Humberside area, south of the district, it is known as the Cave Oolite; a fine-grained variety known as 'Cave Marble' was used for interior decoration.

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Scarborough Formation

Brandsby Roadstone Member

Brandsby Roadstone

Throughout much of the North York Moors the Scarborough Formation is represented by **CALCAREOUS** mudstone with thin beds and concretions of pale grey limestone, little used as building stone, although large limestone blocks were used in the construction of the pier at Scarborough. However, in the Hambleton Hills and Howardian Hills the formation passes laterally to a pale grey, cross-bedded, thin-bedded (flaggy) limestone known locally as the Brandsby Roadstone.


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This limestone is **SILICEOUS** and relatively hard, and is overlain by softer yellow-brown, coarse-grained, shelly sandstone called the Crinoid Grit Member. The Brandsby Roadstone was used locally for houses (middle right image), walling and road metal; the thin-bedded flagstone, easily spit into large slabs, was used in the Brandsby area, and more widely, as a walling and roofing stone ('slate'), for example, Brandsby Church. The bottom right image shows the yellow-grey, cross-laminated siliceous limestone (Brandsby Roadstone) used in walling at Brandsby Church.


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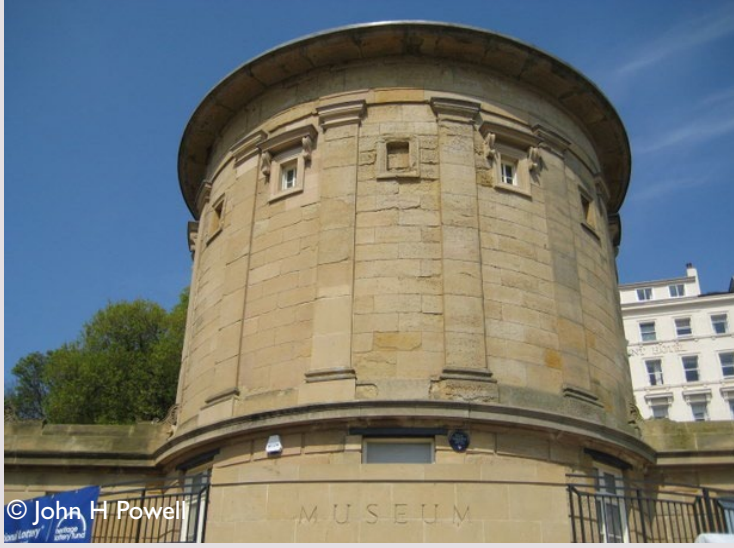
Osgodby Formation (including the Hackness Rock and former Kellaways Rock)

The 'Kellaways Rock' is yellow-brown, medium-grained **FERRUGINOUS** and calcareous sandstone with occasional fossil shells or voids where the original shells have been dissolved away. Its yellow to deep red-brown colour is due to the presence of iron in the form of berthierine (iron silicate, also known as chamosite) ooliths. The iron-rich sandstones comprising the Hackness Rock Member and the underlying Kellaways Rock Member (now known as the Redcliff Rock Member) provided good freestone and ashlar, but their relative softness and calcareous 'cement', as compared to the hard, silica-cemented Ravenscar Group sandstones (e.g. Aislaby stone), makes it prone to weathering and **SPALLING** over time. The Kellaways Rock was quarried extensively along the escarpment at Levisham Moor, above Newton Dale where it was used in the construction of Skelton Tower. It was transported by railway along Newton Dale for use in buildings in Levisham village and Pickering (e.g. the Railway Station). The overlying Hackness Rock was quarried near the eponymous village and was used in the construction of the Rotunda Museum in Scarborough designed by the eminent 19C geologist William Smith.



Other noteworthy uses of this stone are Hackness Church and Hall, York Museum, and in some of the earlier buildings at Rievaulx Abbey. The yellow-brown Middle Jurassic sandstones used in the lower levels of the transept and Saltwick Formation used in the foreground walls. Note the upward transition and later use of Birdsall Calcareous Grit (pale grey) and Hambleton Oolite for the arches in Rievaulx Abbey, image below. Osgodby Formation sandstone (Hackness Rock Member) used in construction of the original Rotunda Museum tower (image above); note the weathering of the Hackness Rock sandstone compared to the Carboniferous sandstone used in the lower modern refurbishment (e.g. 'Museum' blocks).

UPPER JURASSIC

Corallian Group limestones & calcareous sandstones

The Corallian Group includes pure, pale grey, mostly ooidal limestones and yellow-buff calcareous sandstones ('grits'); these rock types are locally distinct, but in some areas such as the Hambleton and Howadian Hills they grade laterally one in to another. The most distinctive and widely used building stones are the pale grey to white ooidal limestones represented by the Hambleton Oolite (Member) and the Malton Oolite (Member), and the yellow-buff calcareous sandstones represented by the Lower Calcareous Grit (Formation), Birdsall Calcareous Grit (Member), Yedmandale Member (formerly Passage Beds), Middle Calcareous Grit (Member) and Upper Calcareous Grit Formation. Ooids are small, generally circular grains that appear like 'fish-roe' and are made up of concentric layers of lime (calcium carbonate). The calcareous 'grits' may have dispersed ooids, but consist predominantly of small globule-like silica spicules derived from fossil sponges; both building stone types have a calcareous matrix (limey cement) and contain shelly, calcitic fossils.

Lower Calcareous Grit Formation and Birdsall Calcareous Grit Member

Describing these buildings stones from oldest to youngest, the Lower Calcareous Grit Formation was used widely from Scarborough to the Hambleton and Howardian Hills, although in the Hambleton Hills and Tabular Hills, some of the quarries originally designated Lower Calcareous Grit are actually in the stratigraphically higher Birdsall Calcareous Grit Member. The Lower Calcareous Grit was quarried near Oliver's Mount, Scarborough for use locally and in the Malton area. In the Howardian Hills, the Lower Calcareous Grit and Birdsall Calcareous Grit were quarried extensively for freestone as it was easily fashioned into blocks. They were used extensively at Byland Abbey the later buildings at Rievaulx Abbey and at Castle Howard, and in vernacular buildings in and around Birdsall and Huttons Ambo. Unfortunately, these stones can weather badly over time and is subject to spalling where exposed to rain. The Yedmandale Member is yellow, quartz-rich, fine to medium-grained calcareous sandstone that was quarried for local building and walling stone near the villages of Dalby, Levisham and Lockton where it outcrops. Byland Abbey (image below) is an example of the use of Lower Calcareous Grit and Birdsall Calcareous Grit as ashlar and wall rubble-stone in a Cistercian abbey.

Hambleton Oolite (Member)

This is a pale grey to white fine-grained ooidal limestone that crops out in the Hambleton Hills and Howardian Hills. It is generally thin-bedded and flaggy making it suitable for walling and building stone in the area, as can be seen in the top right image; shallow quarries for this purpose are common in the Hambleton Hills (e.g. Kepwick Quarry). Thicker beds were used for freestone and ashlar in local churches, village and farm houses (e.g. Scawnton; Cold Kirby; Old Byland; Helmsley and parts of Pickering). The middle right image of Scawton Moor shows repairs being carried out to the walls, built using thin-bedded Hambleton Oolite limestone; note the new (yellow) and grey (weathered) stone.

Middle Calcareous Grit Member

This is lithologically similar to the Birdsall Calcareous Grit but is generally softer and has fewer sponge spicules. It is a good building stone and was worked for freestone and ashlar near Helmsley, Thornton Dale and Pickering at the southern margin of the Tabular Hills. It was used in construction of Ampleforth College and Dunscombe Park house, and in village buildings in the Tabular Hills and Howardian Hills.

Malton Oolite Member

Lithologically similar to the Hambleton Oolite, although the size of the ooids is generally larger in the Malton Oolite. It was widely quarried in the Tabular and Howardian hills for local use as ashlar and quoin stone in country houses, churches, village and farm buildings (e.g. Malton; Hovingham; Cawton; parts of Slingsby Castle). It is currently worked for aggregate near Hovingham.

Coral Rag Member

Overlying the Malton Oolite, the Coral Rag comprises yellow-grey and pale grey limestone, locally rich in shelly fossils and corals. These two limestone units are shown 'undivided' on BGS maps of the Howardian Hills, but it is the Coral Rag that was quarried around Nunnington for village and farm buildings, and for ashlar used at Nunnington Hall (middle right image). The bottom right image shows the contrasting use of buff-coloured Middle Jurassic sandstone (left) and Corallian limestones (lower part of building to the right).

Hildenley Limestone

This is a distinctive variety of the Malton Oolite Member and was worked locally in a series of quarries south-west of Malton, near Hildenley Home Farm. It is a white to pale grey, thin-bedded, fine-grained, porcellanous limestone with a small proportion of sponge spicules and occasional small shelly fossils, the latter often replaced by silica. Its compact nature made it highly suited for use as freestone and ashlar and, especially, in monumental sculpture. There is evidence that it has been prized and worked since Roman times for coffins, carved fireplaces and window quoins. Examples can be seen in the churches at Old Malton (St. Mary's Priory Church), Crambe, Hildenley, Hovingham and Appleton-le-Street, Howsham Hall and Hildenley Hall, the chapel at Castle Howard and in part of the fabric of Kirkham Priory, Slingsby Castle and York House (Malton). This prized stone was often reused in vernacular houses in local villages and towns (e.g. Amotherby; Malton).

Above image shows pale-grey Hambleton Oolite Member used in a bank (former house) in Helmsley. Below image shows the use of Upper Jurassic Hildenley Limestone used in a finely carved arch at Kirkham Priory.

Upper Calcareous Grit Formation

This is lithologically similar to the Lower and Middle 'calcareous grits', described above, but was less commonly used as a building stone because the sandy beds are generally softer and, locally, the beds containing abundant sponge spicules are too hard to work easily. Quarries located north-northwest of Pickering suggest that it might have been used for building stone in the town, but it is difficult to identify this stone from the Middle Calcareous Grit.

North Grimston Cementstone

The North Grimston Cementstone is a locally developed, pale grey, fine-grained siliceous limestone. However its 'splitery' nature made it poorly suited for widespread use as a building stone, although it was used in Warram Church, North Grimston and in the villages of Langton and Birdsall. The below image of Crambe Church tower is built mainly from pale grey Hildenley Limestone.

CRETACEOUS
Chalk Group

The white chalk of the Yorkshire and Humberside Wolds is lithologically similar to the chalk of southern England and comprises microscopic calcareous (limey) remains of marine plants; some Chalk formations have bands and/or nodules of grey to black flint (silica) originally derived from siliceous marine microfossils. However, the chalk rock of northern England is much harder and better cemented than the southern variant due to it being buried at greater depths over geological time. Consequently, hard white chalk has been used as a building stone more widely in this region. It was formerly quarried at Boynton, west of Bridlington, near Flamborough. It has been used as irregular walling blocks of cottages and farm buildings, often combined with brick, the latter used as quoins and surrounds to windows and doors in Flamborough, Bridlington, Reighton and surrounding villages, including the old lighthouse at Flamborough Head and Buckton Hall, near Bempton. Walls and some cottages in the area around Flamborough comprise large rounded boulders derived from the Quaternary glacial deposits at the base with higher courses of chalk and brick.

TERTIARY

Cleveland Dyke

This hard durable dolorite (whinstone) was intruded as a sub-vertical, molten dyke during Tertiary times. It was quarried widely in the late 19th and early 20th centuries across the North York Moors (e.g. Roseberry Topping, Cliff Rigg, and Goathland) mainly for use as durable roadstone. However, large blocks have been used locally as a decorative building stone such as the clock tower at Redcar.

QUATERNARY DEPOSITS

With an abundance of good quality building stones throughout North-east Yorkshire, little use was made of Quaternary deposits (except as a source of brick clay). However, in the villages of the Vale of York and in the Yorkshire Wolds where brick dominates the vernacular buildings, and good quality building stone either absent or too expensive to transport, use was made of local pebbles and boulders derived from the Quaternary deposits. These mostly comprise large 'exotic' boulders of hard sandstone or quartzite. These were often combined in foundations and footings for village houses and walls along with chalk and brick (e.g. Speeton, Bempton, Buckton and Flamborough villages). The image below shows a lower course of rounded sandstone and quartzite boulders with higher courses of chalk and red brick used in a wall in Bempton.

Calcareous Tufa

Calcareous Tufa (a porous pale brown limestone) forms around springs emanating from calcareous bedrock, especially the limestones of the Corallian Group. This relatively light ornamental stone was worked in the upper part of Forge Valley and used in Scarborough Aquarium.

Glossary

Ashlar: Stone masonry comprising blocks with carefully worked beds and joints, finely jointed (generally under 6mm) and set in horizontal courses. Stones within each course are of the same height, though successive courses may be of different heights. 'Ashlar' is often wrongly used as a synonym for facing stone.

Breccia: A sedimentary rock made up of angular fragments of rock in a finer-grained matrix.

Calcareous: A rock which contains significant (10-50%) calcium carbonate principally in the form of a cement or matrix.

Cross-bedding: A feature principally of sandstones formed by the movement of sand grains in currents to produce layering oblique to the margins of the beds.

Dolomitic, dolomitised limestone, dolostone: Descriptive terms for a limestone that has had some of its calcium carbonate replaced by magnesium carbonate.

Ferruginous: Containing iron minerals usually in the form of an iron oxide which gives the rock a 'rusty' stain.

Freestone: Term used by masons to describe a rock that can be cut and shaped in any direction without splitting or failing.

Ironstone: Sedimentary rock which is composed of more than 50% iron-bearing minerals.

Limestone: A sedimentary rock consisting mainly of calcium carbonate (Ca Co_3) grains such as ooids, shell and coral fragments and lime mud. Often highly fossiliferous.

Lithology: The description of a rock based on its mineralogical composition and grain-size e.g. sandstone, limestone, mudstone etc.

Oolite: A limestone composed principally (>50%) of ooids and known as an oolite.

Outcrop: Area where a rock unit is exposed at the ground surface.

Quoin: The external angle of a building. The dressed alternate header and stretcher stones at the corners of buildings.

Rubble: Rough, undressed or roughly dressed building stones typically laid uncoursed (random rubble) or brought to courses at intervals. In squared rubble, the stones are dressed roughly square, and typically laid in courses (coursed squared rubble).

Sandstone: A sedimentary rock composed of sand-sized grains (i.e. generally visible to the eye, but less than 2 mm in size).

Siliceous: A rock which has a significant silica content (non-granular) usually in the form of an intergranular cement e.g. siliceous limestone, siliceous sandstone.

Spalling: Deterioration in the form of detaching flakes, scales or lens-shaped fragments from a generally sound surface.

Stratigraphy: Branch of geoscience dealing with stratified rocks (generally of sedimentary origin) in terms of time and space, and their organisation into distinctive, generally mappable units.

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