Historic England

Herefordshire

Building Stones of England

The Building Stones of England

England's rich architectural heritage owes much to the great variety of stones used in buildings and other structures. The building stones commonly reflect the local geology, imparting local distinctiveness to historic towns, villages and rural landscapes.

Historic England and the British Geological Survey (BGS), working with local geologists and historic buildings experts, have compiled the Building Stones Database for England to identify important building stones, where they came from and potential alternative sources for repairs and new construction.

Drawing on this research, plus BGS publications and fieldwork, guides like this one have been produced for each English county. The guides are aimed at mineral planners, building conservation advisers, architects and surveyors, and those assessing townscapes and countryside character. The guides will also be of interest if you want to find out more about local buildings, natural history, and landscapes.

This guide is based on original research and text by Andrew Jenkinson, Herefordshire & Worcestershire Earth Heritage Trust.

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Front cover: Triumphal Arch, Berrington Hall. Raglan Mudstone Formation Sandstone. © The National Trust Photolibrary / Alamy Stock Photo.

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How to Use this Guide

Each guide describes the local building stones in their geological timescale order, starting with the oldest layers through to the youngest. The guide ends with examples of other notable building stones from other parts of England and further afield.

Geological time periods, groups, formations and building stones

Each building stone is listed under the relevant geological timescale, group and formation. A formation may be divided into members and where relevant these are referenced in individual building stone sections.

Middle Jurassic
↑— geological time period

Inferior Oolite Group, Lincolnshire Limestone Formation
↑— geological group ↑— geological formation

Lincolnshire Limestone
↑— building stone (alternative or local name)

Bedrock geology map and stratigraphic table

To help you with the geology of the area, there is a bedrock geology map and a stratigraphic table which shows the layers of rocks and the associated building stones in this geological timescale, group, formation order.

Page numbers for each building stone are included in the stratigraphic table for ease of reference. The page numbers are inverted to correspond with the geological age order.

Contents list

If you click on the page number for a building stone in the Contents list, you will go straight to the relevant section in the guide.

Building stone sources and building examples

A companion spreadsheet to this guide provides:

- More examples of buildings. Information is included on building type, date, architectural style, building stone source, and listed/ scheduled status
- A list of known (active and ceased) building stone sources such as quarries, mines, pits and delphs
- Additional information on building stones including lithology, grain size, sedimentary structures, key identification features, and notes on failure/weathering, and use.

The Building Stone GIS map allows you to search the Building Stones Database for England for:

- A building stone type in an area
- Details on individual mapped buildings or stone sources
- Potential sources of building stone sources within a given proximity of a stone building or area
- Buildings or stone sources in individual mineral planning authority area.

Further Reading, Online Resources and Contacts

The guide includes geological and building stone references for the area. A separate guide is provided on general Further Reading, Online Resources and Contacts.

Glossary

The guides include many geological terms. A separate Glossary explaining these terms is provided to be used alongside the guides.

The guides use the BGS lexicon of named rock units.

Mineral and local planning authorities

This guide covers the mineral and unitary planning authority area of Herefordshire Council.

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Introduction

Herefordshire is one of the most sparsely populated counties of England, with only six towns of any significant size (Hereford, Leominster, Bromyard, Ledbury, Ross-on-Wye and Kington) and a wide scatter of mostly small villages and isolated hamlets. Within this essentially rural landscape, the timber-framed or 'black and white' building style constitutes the most striking regional architecture particularly so in the north-western quarter of the county.

A closer examination, however, reveals that the vernacular architecture strongly reflects the local geology. Large swathes of the county are underlain by the three main formations of the local Lower Old Red Sandstone succession: the Late Silurian Raglan Mudstone Formation and the Early Devonian St Maughans Formation and Brownstones Formation. Within the areas underlain by strata assigned to these units, the village churches are almost always built from local stone. The plinths upon which the sole plates (bottom-most horizontal beam) of timber-framed houses rest are, or were, of local stone, linking the house above ground almost 'organically' to the rock beneath. A few farm buildings are stone built, at least on their gable ends, and a small number of 17th to 19th-century houses are constructed of stone. Such was the isolation of the county's settlements, with inadequate roads, no canals and a poorly developed railway network, that building stone would have come from very local sources up until the mid-19th century.

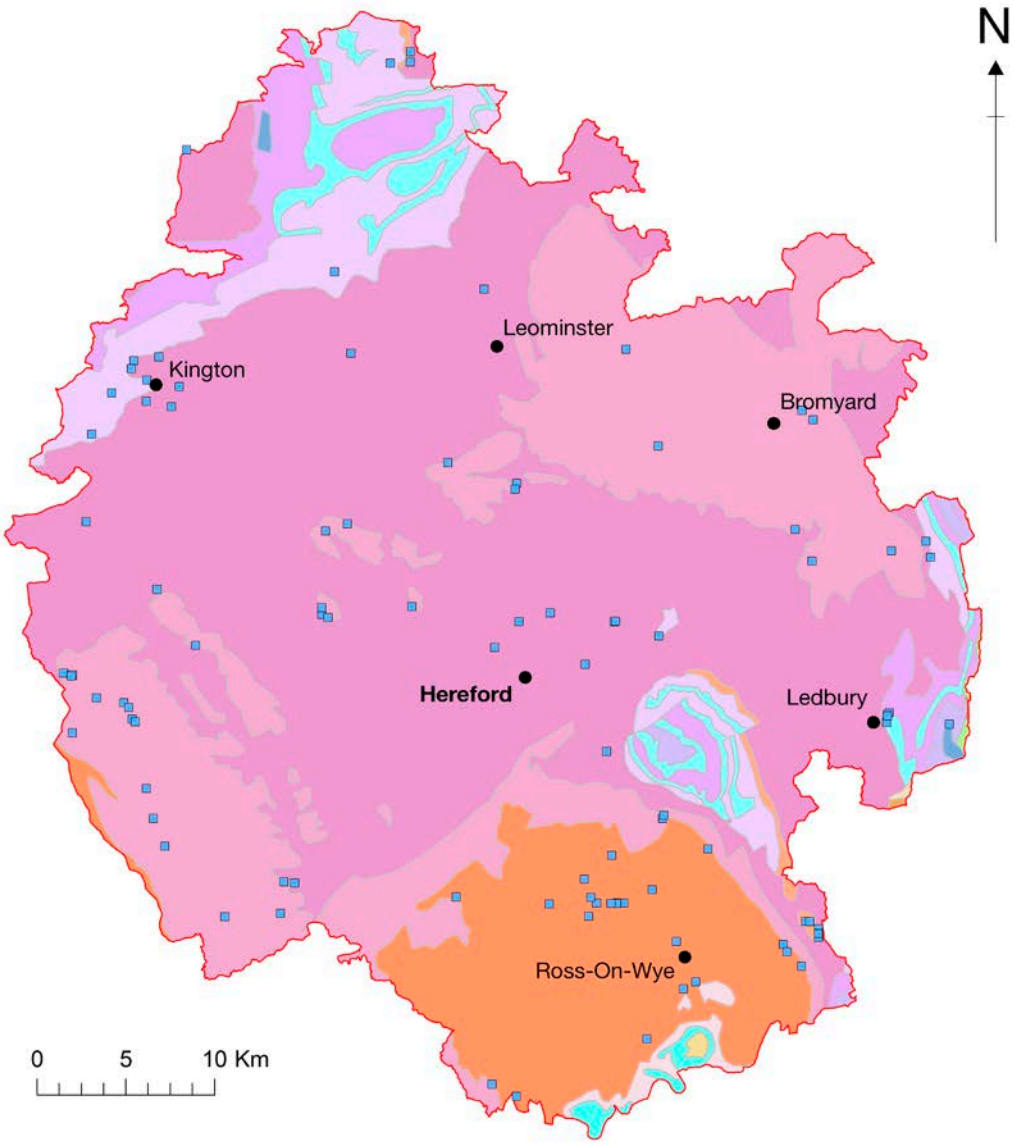
Only in four areas of Herefordshire, the north-west corner of the county, a narrow strip along the western flank of the Malvern Hills (East Herefordshire), a very small area adjacent to May Hill in the far south-east, and a roughly circular area taking in the concentric limestone outcrops of the Woolhope Dome, are there any significantly different rock types present, and this is reflected in the stone use in these areas.

A striking feature of the stone buildings in most parts of the county is the variability of the stone itself, especially within the churches. There is none of the uniformity of, for example, a Cotswolds village. The stone varies in colour and texture, often within a single wall, ranging from purple-red to greenish-grey and including coarse-grained sandstones through to well-laminated, fine-grained sandstones and very soft siltstones. This is particularly the case with the lithologies of the Raglan Mudstone Formation and the St Maughans Formation.

From the mid-19th century onwards, with improved transport facilities, a certain amount of stone was imported from beyond the county boundary, notably for church restoration work, which required better quality material for window frames and tracery, in particular. Much of this was either Jurassic limestone from the Cotswolds or Triassic sandstone from neighbouring Shropshire or Worcestershire.

Figure 1: Timber framed building, Colwall. Stone sole plate.

Bedrock Geology Map



Key

Building stone sources

Bedrock geology

Triassic Rocks (undifferentiated) — mudstone, siltstone and sandstone

Permian Rocks (undifferentiated) — sandstone and conglomerate, interbedded

Warwickshire Group — mudstone, siltstone, sandstone, coal, ironstone and ferricrete

South Wales Upper Coal Measures Formation — mudstone, siltstone, sandstone, coal, ironstone and ferricrete

Dinantian Rocks (undifferentiated) — limestone with subordinate sandstone and argillaceous rocks

Upper Devonian Rocks (undifferentiated) — sandstone and conglomerate, interbedded

Lower Devonian Rocks (undifferentiated) — mudstone, siltstone and sandstone

Lower Devonian Rocks (undifferentiated) — sandstone and conglomerate, interbedded

Pridoli Rocks (undifferentiated) — mudstone, siltstone and sandstone

Pridoli Rocks (undifferentiated) — sandstone and conglomerate, interbedded

Ludlow Rocks (undifferentiated) — mudstone, siltstone and sandstone

Wenlock Rocks (undifferentiated) — mudstone, siltstone and sandstone

Llandovery Rocks (undifferentiated) — mudstone, siltstone and sandstone

Silurian Rocks (undifferentiated) — limestone, mudstone and calcareous mudstone

Tremadoc Rocks (undifferentiated) — mudstone, siltstone and sandstone

Unnamed extrusive rocks, Neoproterozoic — mafic lava and mafic tuff

Unnamed igneous intrusion, Neoproterozoic — felsic rock

Unnamed igneous intrusion, Neoproterozoic — mafic igneous rock

Stratigraphic Table

Geological timescale		Group	Formation	Building stone	Page
Quaternary		various	various	Tufa	28
Permo-Carboniferous		Warwickshire Group	Haffield Breccia Formation	Haffield Breccia	28
Carboniferous			Trenchard Formation		
		Pembrokeshire Limestone Group	Cromhall Sandstone Formation		
		Avon Group	various limestone formations		
Devonian		Upper Old Red Sandstone	Tintern Sandstone Formation		
			Quartz Conglomerate Formation		
		Lower Old Red Sandstone Group (Downton Subgroup)	Brownstones Formation	Brownstones Ross Stone	26 26
Silurian	Pridoli Series		St Maughans Formation	Garnstone, St Maughans Sandstone	23
			Raglan Mudstone Formation	Lyde Stone Luston Stone Withington Stone Bishop's Frome Limestone	23 23 21 21
			Downton Castle Sandstone Formation	Downton Castle Sandstone	18
	Ludlow Series	Upper Ludlow Shales Group, Lower Ludlow Shales Group	Upper Ludlow Shales Formation (including the Upper and Lower Leintwardine formations)	Upper Ludlow Shales	15
			Aymestry Limestone Formation	Aymestry Limestone	12
			Lower Ludlow Shales Formation (including the Lower Bringewood and Elton formations)	Lower Ludlow Shales	
	Wenlock Series	not defined	Much Wenlock Limestone Formation	Wenlock Limestone Ledbury Marble	11 10
			Coalbrookdale Formation		
			Woolhope Limestone Formation	Woolhope Limestone	9
	Llandovery Series	May Hill Sandstone Group	Haugh Wood (Yarleton) Formation, Wyche Formation	May Hill Sandstone	8
Cambrian		not defined	Hollybush Sandstone Formation	Hollybush Sandstone	7
Precambrian		Wentnor Group	Brampton Formation	Broomie Hill Stone	6
		Malverns Complex		Malvern Stone	6

Building stones in geological order from the oldest through to the youngest layers.

2 Local Building Stones

Precambrian

Malverns Complex

Malvern Stone

The Herefordshire–Worcestershire county boundary follows the crest of the Malvern Hills at their southern end. Some stone, especially from small quarries located on the western flank of the range, has been used in buildings found immediately to the west. The Malvern stones comprise a mixture of meta-igneous lithologies, which yield a rubbly, but nonetheless attractive, building stone. The typically strongly sheared and faulted nature of the Malverns Complex rocks makes them very difficult to cut, and true dimension stone is rarely seen. Despite this, the stone has been used in the construction of a few houses around Colwall and more extensively as a rough walling stone as far west as Ledbury. The stones are often grey, pink or green, but frequently show a wide range of colours due to their variable composition, both when fresh and weathered.

Wentnor Group, Brampton Formation

Broomie Hill Stone

On the opposite side of the county, in the far north-western corner, lies a small sliver of Precambrian strata, comprising variably coloured sandstones and conglomerates. Structurally, the outcrop is a portion of the Western Longmyndian, caught up within the splays of the Church Stretton Fault system. The main quarry is found on the Brampton Bryan estate, and this produced a sedimentary rock that rarely shows definite bedding or lamination. It has almost always been used as blocks of irregularly shaped rubblestone. The stone was used on the estate for boundary walls, farm buildings and estate workers' cottages, and within the village of Brampton Bryan itself.

Brampton Bryan estate cottages at Walford show the inherent irregularity of the blocks, which necessitates the use of brick for quoins, sills and lintels. At Buckton Mill, a late 18th to early 19th-century water mill near Brampton Bryan, the grey siltstone of the Upper Ludlow Shales Group is used for the mill building and the Broomie Hill Stone for the wing building.

Figure 2: Cottages, Walford. Broomie Hill Stone.

Figure 3: Buckton Mill, near Brampton Bryan. Upper Ludlow Shale and Broomie Hill Stone.

Cambrian

Group not defined, Hollybush Sandstone Formation

Hollybush Sandstone

The Hollybush Sandstone is not commonly used as a building stone because of its restricted outcrop. However, this green, flaggy, micaceous sandstone can be seen in farm buildings and walls in the area around Hollybush Quarry, at the extreme southern end of the Malvern Hills.

Silurian

During the Silurian, Herefordshire lay on the eastern margin of an ocean basin that stretched westwards through what is now Wales. This was a time of fluctuating sea levels, which saw the deposition of shallow water sediments, ranging from fine-grained sandstones and siltstones to fossiliferous limestones.

There are four separate areas within Herefordshire where Silurian rocks crop out, three of which, north-west Herefordshire, east Herefordshire and the Woolhope Dome, are sufficiently extensive to have had some impact on the local built environment:

North-west Herefordshire

The most extensive development of Silurian rocks occurs in the north-western part of the county, where the distinctive ridge and vale topography that characterises Shropshire to the north continues across the county boundary into Herefordshire. Folding affects these strata, notably forming the Ludlow Anticline and giving rise to the pronounced horseshoe-shaped outcrop pattern of the Wigmore area. Moving south-westwards, the strata resume their north-east to south-west strike, extending to Kington and beyond into Wales.

East Herefordshire

The east Herefordshire outcrop of Silurian strata varies in width and runs along the eastern edge of the county, following the western side of the Malvern Hills from Cradley through Colwall to Eastnor Castle and then extending westwards in the direction of Ledbury. The strata here include older beds than those in the north-west of the county and, in general, they have been used rather less systematically as building stone.

Woolhope Dome

The third outcrop of Wenlock and Ludlow Series strata is centred on Woolhope, to the east of Hereford, and it exists as a domed inlier known as the Woolhope Dome. The effect of this structure on the Silurian limestones and shales is clearly evident in the topography. These lithologies have had minimal influence on building stone usage, however, due to the paucity of dwellings in the area.

May Hill Sandstone Group, Haugh Wood (Yarleton) Formation, Wyche Formation

May Hill Sandstone

Consisting of purple-brown to buff, coarse-grained sandstones, grits and conglomerates, the Llandovery Series beds would have made a more important local building stone were they not restricted to a small outcrop in the Eastnor Park area, just west of Midsummer Hill. It is recorded that they

were used in the construction of Bronsil Castle near Eastnor, and in other local farm buildings and walls.

Group not defined, Woolhope Limestone Formation

Woolhope Limestone

The main value of the Woolhope Dome limestone was as a source of lime, but it was used to construct a few isolated dwellings.

Figure 4: Wall, Woolhope. Woolhope Limestone.

Figure 5: Wall, Woolhope. Woolhope Limestone nodules.

Group not defined, Much Wenlock LImestone Formation

Ledbury Marble

Ledbury Marble is of particular note. It is a hard, crystalline, fossil-rich limestone, which was polished for use locally as a decorative stone. It was worked at Upper Hall Farm (a Site of Special Scientific Interest) and in the adjacent commissioner's quarries near Ledbury. Although Church Road Ledbury is the epitome of black and white timber-frame buildings, Wenlock Limestone features there as cobbles, some of which clearly show crinoid fossils.

Figure 6: Church Road, Ledbury. Ledbury Marble cobbles.

Wenlock Limestone

In east Herefordshire, the Wenlock Limestone crops out along the border with Worcestershire around Cradley, and also forms part of the ridge east of Ledbury. It was quarried predominantly for lime burning, but close to the outcrops around Cradley and in Ledbury, it was used in cottage and boundary walls, including at St Katherine's Hospital, Ledbury.

The limestone was also quarried and burnt for lime in the vicinity of its outcrop within the Vale of Wigmore. Only a handful of properties around Pipe Aston incorporate this local limestone in their structures.

Figure 7: Stone wall, Ledbury. Wenlock Limestone.

Figure 8: Cobbles. Wenlock Limestone.

Figure 9: Barn, Ledbury. Wenlock Limestone.

Ludlow Series, Lower Ludlow Shales Group, Aymestry Group, Upper Ludlow Shales Group

North-west Herefordshire and south-west Shropshire are the classic research areas for the rocks of the Ludlow Series and they form the basis of the Ludlovian stratigraphical framework. From a building stone perspective, however, a classification based on rock type is most appropriate, not least because the best building stone yielded by this series, the Aymestry Limestone. The Aymestry Limestone and Ludlow Shales can be seen in buildings located close to their outcrops, both north and east of Ledbury. In the north-west Herefordshire outcrops, the Ludlow Shales comprise two distinct geological units, the Lower and Upper Ludlow Shales groups. They are separated by the Aymestry Limestone Formation.

The Ludlow Shales are thinly bedded, blue-grey siltstones and mudstones, with some interbedded limestones. When weathered, they become a more olive-buff colour and tend to be more fissile in character. Although not widely used as a building stone in the area, the Ludlow Shales may have been extracted during the quarrying of the Wenlock Limestone (stratigraphically below the Lower Ludlow Shales Group) and/or the Aymestry Limestone.

Aymestry Group, Aymestry Limestone Formation

Aymestry Limestone

Aymestry LImestone is diachronous and, in north-west Herefordshire, tends to be variable in its limestone content. It grades into the Lower Ludlow Shales Group (below) and Upper Ludlow Shales Group (above) to such an extent that both the precise age and source of the limestone blocks observed in buildings are often difficult to determine.

A very large quarry within Aymestrey itself, known as the Great Quarry, evidently produced much of the stone seen in the village. The succession in this quarry comprises fine-grained and well-laminated Lower Ludlow Shales, which are overlain by the more lime-rich, shelly beds of the true Aymestry Limestone (characterised by the large, strongly ribbed shells of the brachiopod Kirkidium knightii). In turn, these are succeeded by a thin development of Upper Ludlow Shales.

Typical of the villages of this area, Aymestrey has a church built predominantly of local stone, with several cottages and outbuildings of stone and numerous stone boundary walls fronting onto the main street.

The Aymestry Limestone also crops out on the lower slopes of the Woolhope Dome and it has been quarried extensively for aggregate at Perton. Cottages in Colwall are built with the limestone, and in the vicinity, it has also been used for farm buildings such as those seen at Moorcroft Farm. Gatley Park Folly at Leinthall Earls is another example.

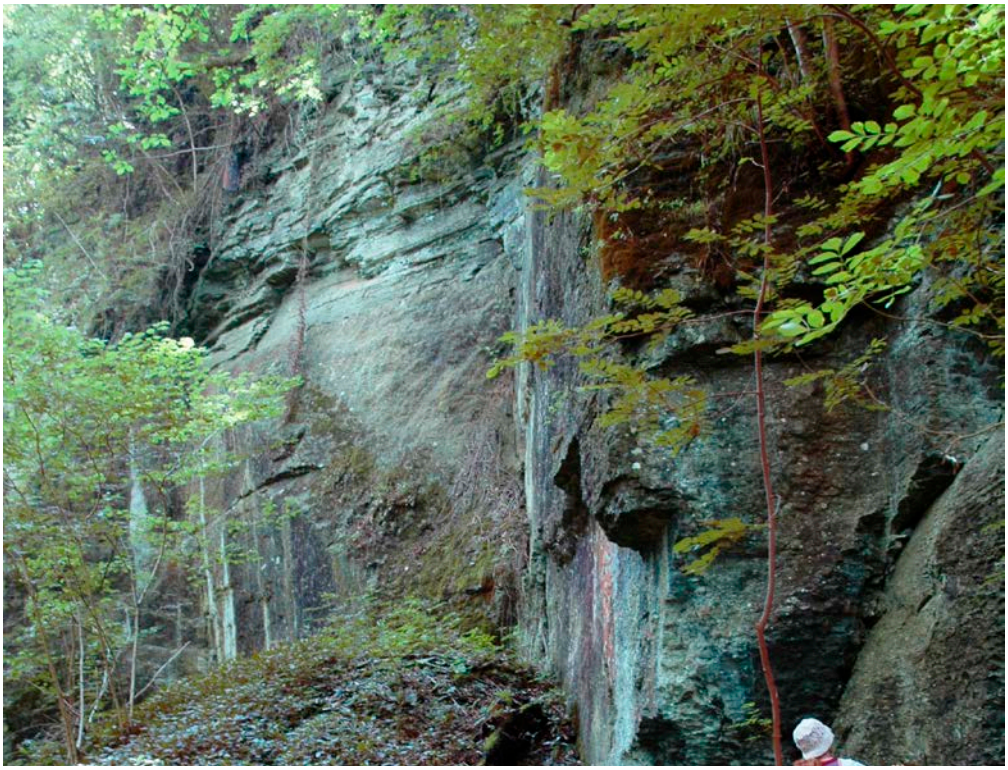


Figure 10: The Great Quarry, Aymestrey. Lower Ludlow Shale, Aymestry Limestone and Upper Ludlow Shale.

Figure 11: Cottage, near Woolhope Dome. Aymestry Limestone.

Figure 12: Farm buildings, Moorcroft. Aymestry Limestone.

Figure 13: Farmhouse and boundary walls. Aymestry Limestone.

Figure 14: Gatley Park folly. Aymestry Limestone.

Upper Ludlow Shales Group, Upper Ludlow Shales Formation

Upper Ludlow Shales

In the north-west Herefordshire outcrops, the Ludlow Shales comprise two distinct geological units, the Lower and Upper Ludlow Shales groups. They are separated by the Aymestry Limestone Formation. The Ludlow Shales are thinly bedded, blue-grey siltstones and mudstones, with some interbedded limestones. When weathered, they become a more olive-buff colour and tend to be more fissile in character. Although not widely used as a building stone in the area, the Ludlow Shales may have been extracted during the quarrying of the Wenlock Limestone (stratigraphically below the Lower Ludlow Shales Group) and/or the Aymestry Limestone.

The Upper Ludlow Shales appear to have provided a more useful building stone, because this group is more flaggy in character and has fewer calcareous beds occurring in the sequence. The shale is often used for walling as it was more easily coursed than the limestone blocks however, they weather badly.

Like Aymestrey and its Aymestry Limestone buildings, the Upper Ludlow Shale villages follow the same pattern of locally-quarried stone. For example, buildings in Leintwardine have employed shales quarried from Church Hill above the village. The Church of St Mary Magdalene at Leintwardine is largely constructed of local Ludlow Series stones, although they clearly represent different build periods and were probably from different sources. The window surrounds and buttresses are of better quality sandstone, possibly Grinshill Sandstone from the Triassic of Shropshire, thus suggesting either a deliberate selection of two contrasting colours or a lack of suitable local dimension stone sources.

Figure 15: Church of St Mary Magdalene, Leintwardine. Ludlow Series stones.

Figure 16: Bank House, High Street, Leintwardine. Upper Ludlow Shale stone.

The village of Wigmore has a similar mix of buildings, with a few stone dwellings, a ruined castle on the ridge outside the village and a church that clearly exhibits the various lithologies of the local Ludlow succession. The oldest stonework dates to late Saxon times and was laid in a herringbone pattern, as seen in the north nave wall of the Church of St James, for example. The west transept wall is the later and more typical Lower Ludlow Shales Group siltstones.

Figure 17: St James' Church, Wigmore. Lower Ludlow Shales siltstones.

Figure 18: St James' Church, Wigmore. Lower Ludlow Shales siltstones.

Other small villages lying within or just outside the outcrop area of the Ludlow Series, such as Bircher, Byton, Kinsham and Titley, show similar limited use of these siltstones and limestones in churches and agricultural buildings. Further south-west in the small border town of Kington (as in most towns), the stone-built nature of the buildings is somewhat concealed by the main street frontages. Down the alleys and in the older parts of the town, however, Ludlow Series stones are in evidence. Several rows of cottages found on the western side of the town are good examples. These show the same variations in hardness, colour (grey to pale brown), grain size and lithology that characterise the villages previously mentioned. The rocks were quarried, in part, from the steep slopes below the church and from a number of quarries located to the west of the town.

Figure 19: Cooper's Yard, Kington. Ludlow Series stones.

Siluro-Devonian

Pridoli Series

The Pridoli Series succession of Herefordshire and adjacent parts of Shropshire commences with the distinctive Ludlow Bone Bed Member. This marks a fundamental change in sedimentation patterns in the area, as marginal marine and, ultimately, fully continental depositional environments became established. It is still convenient to refer to the lithologies of the Pridoli Series, along with the overlying red mudstones and sandstones of the Lower Devonian, as the Lower Old Red Sandstone, despite the fact that much of the succession is neither red nor composed of sandstone.

Lower Old Red Sandstone Group (Downton Subgroup), Downton Castle Formation

Downton Castle Sandstone

Named after its type area in the north-west of the county, the Downtown Castle Sandstone has been used historically both as a freestone and as a tilestone. The formation comprises thin, planar beds of yellow-brown or buff sandstone, with interdigitations of brown-grey siltstones and mudstones. It is this lithological variability that allows the sandstone beds to be split into thin stone tiles or, where the beds are thickest, to be trimmed into regular blocks of freestone.

The sandstone is fairly hard when freshly exposed, but the sand grains are poorly cemented and often separate when exposed to the agents of weathering. The sandstone is up to 20m thick in the Downton area, but only 5m thick, at most, in the east of the county. The stone is intermittingly worked at Brakes Farm, just to the north of Downton Castle.

The sandstone has been used in the construction of Downton Castle and Croft Castle. Thanks to its ferruginous brown colour, it can also be identified in the fabrics of a number of buildings along its very narrow outcrop in the north-west of the area.

Figure 20: Downton Castle, Downton. Downton Castle Sandstone.

In the east, it has been quarried from several small outcrops near Colwall and Cradley and used for buildings and walling. A thin band of the sandstone located to the east of Ledbury has been quarried for use in the town, most conspicuously in parts of the Church of St Michael and All Angels, where its colour contrasts with that of the other locally available building stones.

The sandstone also crops out around the margins of the Woolhope Dome. A quarry at Prior's Frome is the probable source for the noticeably browner sandstone used in nearby Mordiford.

Figure 21: Tower, St Michael and All Angels Church, Ledbury. Downton Castle Sandstone.

Lower Old Red Sandstone Group (Downton Subgroup), Ragland Mudstone Formation

The Raglan Mudstone Formation, which underlies more than half of Herefordshire, marks the onset of fully terrestrial Old Red Sandstone sedimentation. Much of Herefordshire's built heritage has been constructed using stone types worked from this unit. As its name suggests, the formation is predominantly a red mudstone succession, although bands of sandstone occur throughout. In addition, thin, nodular, calcretes occur sporadically. These are often referred to as cornstones in the historical literature.

The mudstones themselves have been used as a source of clay for the well-known Herefordshire brick, tile and pipeworks industries. Some 250 brickworks are listed in the Herefordshire Historic Environment Record. The mudstones can have a high mica content and, as a result, they become fissile and flaggy in places. Many small building stone delves appear to have exploited this lithological variant, although the resultant micaceous (and usually red) slabby stone weathers very badly.

Figure 22: Flagstone roofs. Raglan Mudstone Formation.

Sandstone beds occur sporadically throughout the formation, and they can be easily recognised in the landscape because their greater resistance to erosion results in the development of obvious topographic features. Many of these sandstones have been exploited for building stone, and they were often worked from small delves that are now mostly overgrown or ploughed out. A good example is Berrington Hall, a classical style late 18th-century neoclassical mansion located between Leominster and Ludlow. The dark purplish-red sandstone, finely cut into ashlar blocks, is remarkably uniform throughout the building. The source of this stone is said to be Shuttocks Hill, located about 1km to the north-west of the hall.

Figure 23: Berrington Hall. Raglan Mudstone Formation Sandstone.

Bishop's Frome Limestone

The top of the Raglan Mudstone Formation is marked by the Bishop's Frome Limestone Member. At 2 to 5m thick, it is more conspicuous and persistent than the minor calcretes or cornstones developed elsewhere within the formation. Where it crops out, it creates a spring line, and calcareous tufa often forms (see 'Quaternary' section).

The limestone itself commonly has a rubbly appearance, with grey-white limestone nodules set within a colourful, red, brown or purple, mudstone matrix. Close to the top of the unit, the limestone nodules often coalesce to the extent that they form a locally continuous limestone bed. It would appear that it is this part of the unit that was quarried for building stone, with the rubbly part being used as lime or aggregate. Bishop's Frome Limestone was seemingly in high demand locally, and it has been mined underground at two separate locations in the county: Credenhill, just west of Hereford, and Bishop's Frome (the type area of the unit). It tends to have been burnt for lime and used to 'sweeten' the more acid soils, rather than being employed as a building stone.

Withington Stone

Quarried just to the north of Withington (east of Hereford), Withington Stone is unusually coarse grained. It is described as being brownish-grey and mottled, with rounded quartz pebbles and obvious cross-bedding. This sandstone was used extensively for buildings in Withington.

It is clear, however, that many other sandstone and siltstone bands were also exploited locally for building purposes wherever they occurred. Despite being known as the black and white villages, those north-west of Hereford, notably Eardisland, Pembridge, Almeley, Dilwyn, Yarpole and Weobley, all boast some stone buildings. The churches are invariably stone, and most exhibit the wide range of lithologies found within the Raglan Mudstone Formation. The coarser, usually white or grey sandstones are commonly used for the quoins and buttresses. Variably coloured purple, red, cream and striped sandstones are used, frequently at random, for the main walling, while many churches are, in part, constructed of (readily weathered) red micaceous siltstone.

The timber-framed houses in these characteristically black and white villages incorporate varying amounts of local stone. In particular, the sole plate usually sits on a sandstone or siltstone plinth, or occasionally on staddle stones. However, over the years, many of these have been replaced with brick or are concealed beneath a layer of black bitumen. Characteristically, and unsurprisingly, the large external chimney stacks of these buildings are commonly of local sandstone.

Another group of stone-built features common to all the villages of north-west Herefordshire in particular, but frequently encountered elsewhere, too, includes garden, farmyard and churchyard boundary walls.

Figure 24: St Mary's Church, Dilwyn. Raglan Mudstone Formation.

Figure 25: Cottage, Dilwyn. Raglan Mudstone Formation.

Figure 26: School building, Dilwyn. Raglan Mudstone.

Luston Stone

In the Luston area, just north of Leominster, the formerly quarried sandstone is described as a medium-grained, drab and grey mottled rock. Sourced from the Eye quarries, Luston Stone was used in the villages and hamlets of the local area.

Lyde Stone

This was quarried and used around Pipe and Lyde, just to the north of Hereford. The stone is described as 'drab' coloured.

Lower Old Red Sandstone Group (Downton Subgroup), St Maughans Formation

Garnstone, St Maughans Sandstone

Lying stratigraphically above the Bishop's Frome Limestone is the Early Devonian St Maughans Formation. This unit underlies the Bromyard Plateau of north-eastern Herefordshire, the tops of the cornstone hills to the north-west of Hereford, the area to the west of the Golden Valley (and extending up onto the flanks of the Black Mountains) and a roughly east–west trending swathe of land to the south of Hereford. The formation comprises a mix of red-brown, green or purple mudstones, sandstones, conglomerates and calcretes, which are superficially similar to the lithologies of the Raglan Mudstone Formation. Where present, the mudstones have again been used for brick making. The sandstone bands, meanwhile, have been quarried for flagstone and, where thick enough, for dimension stone. Although not often occurring in continuous bands, the sandstones of the St Maughans Formation are more abundant and thicker than those of the underlying Raglan Mudstone Formation.

These sandstones (and perhaps some of the sandstone bands within the Raglan Mudstone) are the principal sources of Herefordshire stone roofing slate. A small number of quarries still work the St Maughans Formation sandstones for building and roofing stone, and there are numerous active permissions in the extreme west of the county in the Golden Valley area.

Both the colour and grain size of the beds suitable for building stone are highly variable. This is evident in one of the active quarries within the formation at Tredomen, just over the border in Wales. In general, the coarser beds tend towards a pale grey colour, and these are the beds most often used for the main quoin stones and buttresses of churches and other large buildings.

Quarried from the Weobley quarries at Burton Hill, west of Hereford, Garnstone is described as a drab, medium-grained sandstone.

There are also essentially medium-grained, cream-coloured sandstones, which often show stripes of purple-red. The finer grained sandstones and

Figure 27: Quarry, Tredomen. St Maughans Formation.

siltstones are often well laminated but tend to be very soft and easily eroded. Although usually a more uniformly darker red or purple colour, they may occasionally be greenish-grey. Within any one building, therefore, it is not unusual to find the full range of stone types, sometimes doubtless indicating different ages of construction, but not necessarily a common source.

Further up the Olchon Valley and into the foothills of the Black Mountains, the village of Longtown is largely stone built, featuring St Maughans Sandstone of a predominantly grey colour. Part of Longtown Castle is built of notably long but thin slabs of grey siltstone. Older cottages in Longtown are still roofed with flagstones which are representative of the more fissile local sandstones.

Figure 28: Longtown Castle. St Maughans Sandstone.

Figure 29: School building. Longtown. St Maughans Sandstone.

Figure 30: Flagstone roofs, Longtown. St Maughans Sandstone.

Figure 31: Dore Abbey Church, Abbeydore. St Maughans Sandstone.

Figure 32: Dore Abbey Church, Abbeydore. St Maughans Sandstone.

Lower Old Red Sandstone Group (Downton Subgroup), Brownstones Formation

Ross Stone

Quarried from the river cliff at Ross-on-Wye, Ross Stone is described as a soft, deep chocolate brown-coloured, medium-grained sandstone. The sandstone features in garden walls and extensively in the older buildings of Ross-on-Wye, including the Market House, St Mary's Church and Pye's Almshouses.

Brownstones

Southern parts of Herefordshire are characterised by outcrops of the stratigraphically higher beds of the Lower Old Red Sandstone, known as the Brownstones. Not only are these pebbly sandstones of a red-brown, occasionally chocolate brown, colour, they are of a much more uniform appearance than the underlying Lower Old Red Sandstone formations. Like the rest of the Lower Old Red succession, the sandstones were quarried for both tilestones and dimension stone, depending on their suitability. Active permissions to work the Brownstones as a building stone remain in place. The village of Hoarwithy, standing above the River Wye to the south of Hereford, is typical in having a significant proportion of Brownstone buildings, ranging from the church to rows of cottages.

Buildings constructed of Brownstones sandstone, ranging from farmhouses to churches, are more likely to be of regularly coursed rubblestone than, say, ashlared blocks.

Figure 33: Church and other buildings, Hoarwithy. Brownstones.

Figure 34: St Catherine's Church, Hoarwithy. Brownstones.

Figure 35: Barn conversion, Hoarwithy. Brownstones.

Permo-Carboniferous

Warwickshire Group, Haffield Breccia Formation

Haffield Breccia

The Haffield Breccia is a very locally exploited building stone, used in the construction of Haffield House, south of Ledbury, for example. It is not employed as a dimension stone, but as either roughly dressed blocks or rubblestone.

The rock itself is a very coarse-grained, purple-red, breccio-conglomerate, containing reworked, angular, lithic fragments set within a sandstone matrix. It was formed by flash flooding in a desert setting.

Quaternary

Various groups, various formations

Tufa

Tufa is a porous carbonate precipitate that often forms on slopes where permeable limestone bands overlie impermeable rock. In Herefordshire, tufas have commonly formed in areas where the Bishop's Frome Limestone is well developed at the top of the Raglan Mudstone Formation. At the limestone–mudstone junction, springs develop. Given the carbonate-saturated nature of the waters emerging from the limestone, rapid precipitation of calcium carbonate takes place due to the change in physio-chemical environment. Tufas can form on the surfaces of rocks and over vegetation present along spring lines, and also in streams.

Fresh tufa is very soft and malleable, but it hardens on exposure to the atmosphere, forming a good workable dimension stone if the deposits are thick enough. The former extent and distribution of tufa in the county are not fully known as yet, but deposits have been worked extensively for use in Norman churches, in particular. The Church of St Michael and All Angels at Moccas in the Wye Valley is a good example. Tufa blocks have been identified in the fabrics of the churches at Aymestrey, Wigmore, Bredwardine, Letton and Lower Brockhampton, in the Bishop's Chapel at Hereford and also in the ruins of Craswall Priory.

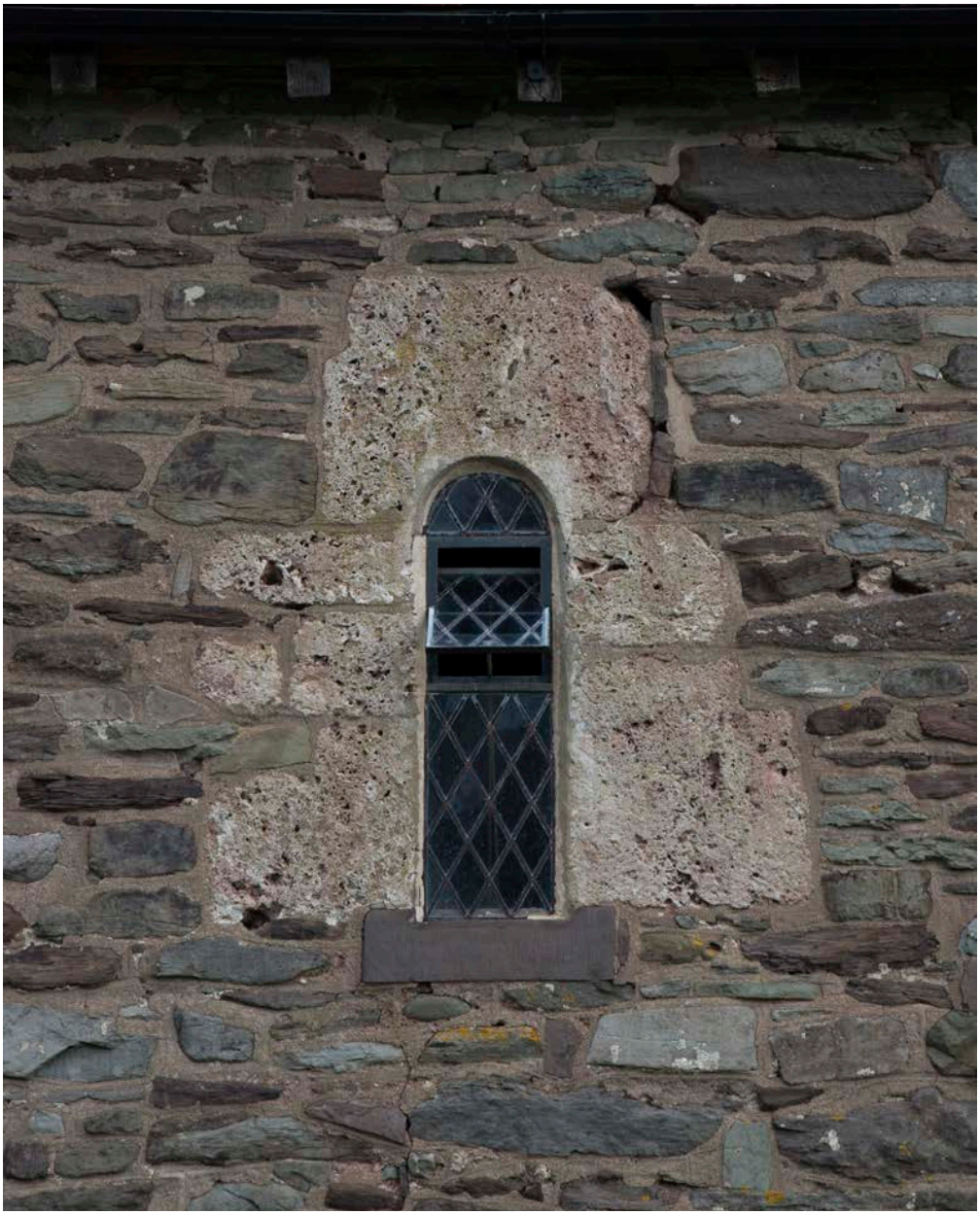


Figure 36: St Andrew's Church, Bredwardine. Tufa.

3 Further Reading

The Further Reading, Online Resources and Contacts guide provides general references on:

- Geology, building stones and mineral planning
- Historic building conservation, architecture and landscape.

There is also a separate glossary of geological terms.

Herefordshire references

Herefordshire & Worcestershire Earth Heritage Trust 'Building Stones Database' http://www.buildingstones.org.uk/building-stones/

Herefordshire & Worcestershire Earth Heritage Trust's trail guides www.earthheritagetrust.org/introduction-explore-trail-guides/

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Figures

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