Fforwm Cerrig Cymru Welsh Stone Forum

Number 12 March 2015 **Price £4.50**

Programme 2015

April 11th AGM & Lecture Swansea

The 2015 AGM, National Waterfront Museum Swansea at 11.00 am, coffee available from 10.30 am.

The AGM lecture will be given by Ms Monica Price (Oxford University Natural History Museum) on 'Classical Marbles and Ornamental Stones in Britain'. Monica is Head of Earth Collections at the Museum and and expert on decorative stone (see Newsletter 10). We hope to revisit Clyne Chapel after lunch.

Please notify the Secretary, Dr Jana Horak, if you wish to attend or bring a guest (see last page for contact details).

May 9th Meifod and surrounding area

Meet:11.00 am Old Station car park, Welshpool [SJ 229072]

Leader: John Davies

The trip will examine imported dressings from Cheshire and Shropshire compared to local sources. Route; Guildsfield, Meifod, [possibly Llangadfan, Llanerfyl] Llanfair Caereinion, Castle Caereinion, Berriew. Lunch will be at a pub in or around Meiford

June 13th Downton Castle Sandstone between Ludlow and Builth Wells

Leader: Dr Dick Waters

Meet: 11.00 am, Whitcliffe Forestry Commission car park [SO 505 743], Ludlow (situated on south side of a minor road just under one mile west of the bridge where the B3461 crosses the River Teme into Ludlow).

The Downton Castle Sandstone crops out over a wide area of the Welsh Borderland and east Wales between Clun Forest and Usk and was worked as a local building stone in the 19thC. This trip compliments that to the Tilestones Formation (visited last year) and will include the oone recently opened quarry working the stone.

July 4th Hay on Wye & Hay Castle

Leader: Martin McNamara

Meet: 11.00 am in the large Oxford Road car park, about 100 m. south of the castle.

Martin is an advisor to the Trust that has taken over the castle.The castle shows phases of development from Norman to Victorian, and a variety of stone. It is currently in an unrestored condition. We will be able to visit the castle inside and out and will have access to the parts normally inaccessible. In the afternoon we will visit other buildings in the town including St. Mary's Church and the town walls.

12-13th September, North Wales, Bala area and Snowdonia

Leaders: Andrew Haycock (Day1), Richard Suggett and/ or Margaret Dunn (Day 2)

Meet: Saturday 12th, 11am in the car park on the northeast side of Bala, at the junction of the A494 and B4391 (SH 9285 3615). Sunday 13th deatils to be confirmed.

From the meeting point we will walk around town looking at the various building stones that have been used. After a stop for lunch, we will travel back and collect the cars to visit Colleg y Bala and the Frondderw stone quarry, which has been worked underground (boots advisable).

On the first day we will examine the local building stone in Bala (volcanic rock). On the Sunday we will explore buildings documented in Richard and Margaret's recently published Discovering the Historic Houses of Snowdonia, (RCAHMW). Please consult the WSF website nearer to the time for further details of the meeting place on Sunday. Members will be responsible for arranging their own accommodation.

October 10th (Joint with GA) Vaynor and Pontsticill

Leader: John Davies

Meet: 11.00 am at Vaynor Church [SO 049103]

We will examine the varied building stones of the southern Brecon Beacons. The route will take in Vaynor, Pontsticyll, Cefn Coed-y-cymmer, Penderyn and Ystrad Fellte. Lunch at the Brecon Mountain Railway cafe.

Trip details will be posted on the WSF website. Please check nearer to each trip for changes to meeting place times and locations. Please inform the Field Secretary, Dr Tim Palmer, if you plan to attend any these meetings (tjp@aber.ac.uk or tel. 01970 627107).

Mapping the freestones of medieval ecclesiastical buildings in north Pembrokeshire

Branwen Hughes

The medieval freestones in 30 ecclesiastical buildings (28 churches, one cathedral and an abbey) in north Pembrokeshire were examined and mapped in order to find patterns in their use that related to the geography, geology and history of the area. A mixture of local and imported freestones was found, and these show differences in distribution, and in type and time of use.

The freestones found were named after their place of origin or a defining characteristic, and these are listed here: Caerbwdi Sandstone; yellow sandstone; Coal Measures sandstone; hard grey sandstone; sideritic sandstone; Bath Stone; Dundry Stone; Sutton Stone; Cilgerran breccia; Newport tuff; and fossiliferous mudstone.

Geographical trends in freestone use

Local stones tended to be used within a five mile radius of their outcrops except for Caerbwdi Sandstone, which can be seen in the font at Spittal and in a carved bowl at St Martin's, Haverfordwest, at least 15 miles from its source. This may be for two reasons: that the stone gained popularity due to its use in the cathedral, which was a popular site for pilgrimage; and that it was used to make fonts, which can be made to a standard size and transported over long distances.

Imported stones were used over a wider area, but were confined to the areas surrounding the larger, better connected towns of Cardigan, St Davids and Haverfordwest, leaving a deficit in the centre around Fishguard. The Coal Measures sandstone is mainly found in the more southerly part of the researched area. This is because it is closer to the source.

More imported stones were used in St David's Cathedral and St Dogmael's Abbey than in other ecclesiastical buildings. This is because imported stones were expensive, and the money was only available for the largest, most important buildings. The cathedral contains the largest variety of imported stones, most notable of which are the Purbeck Marble of the font and the Dundry, Bath and Sutton Stones in the Bishop Vaughan chapel.

In *The Description of Pembrokeshire*, George Owen says that the Newport tuff was one of Pembrokeshire's most important freestone resources, but it has been found only in a small area to the east of Fishguard. It may be that most of it has been replaced due to damage, but it is more likely that the author was biased. He claimed to be the Lord of Cemais, one of the cantrefi - the old districts of Pembrokeshire - stretching from Fishguard to the Teifi estuary. This cantref included the area in which the tuff is found, and although it may have been an important resource for the cantref, it was not for all of Pembrokeshire.

Trends in the use of different freestones

Although the Newport tuff and the Cilgerran breccia were only used in a small number of buildings, volume of stone used for these buildings is larger than for other stones. This stone is variable in its resistance to weathering; the stones at Cwm-yr-Eglwys have faced time well despite being subject to flooding and stormy conditions, while some stones in the tower door at Newport have been very badly weathered and are soft enough to be scratched by a fingernail. Like the tuff, the Cilgerran breccia was used in a small number of churches, but used extensively through the buildings in which it was found. This is because it was a locally quarried freestone and so it was easy to obtain in large quantities.

Fig. 1. Close up of the Newport tuff, with ten pence coin for scale.

The Coal Measures sandstone was used most frequently for interior work, as at St David's Cathedral where it is present as decoration around tomb niches in the walls. It is badly damaged because much of the cathedral was destroyed by parliament in the C16th, causing damage to the stones and leaving them exposed without a roof. Where this stone is found in external work, it is usually weathered and flaky-looking, as at St Mary's church in Haverfordwest.

A siderite-containing Coal Measures sandstone was found in one church within the research area, where it is present in works from the C12th to the C14th. The length of time through which it was quarried suggests that it was used more extensively than can be seen in this study, probably in the south of the county.

The hard grey sandstone was used for fonts in the C11th and C12th, and is not seen to have been used for anything

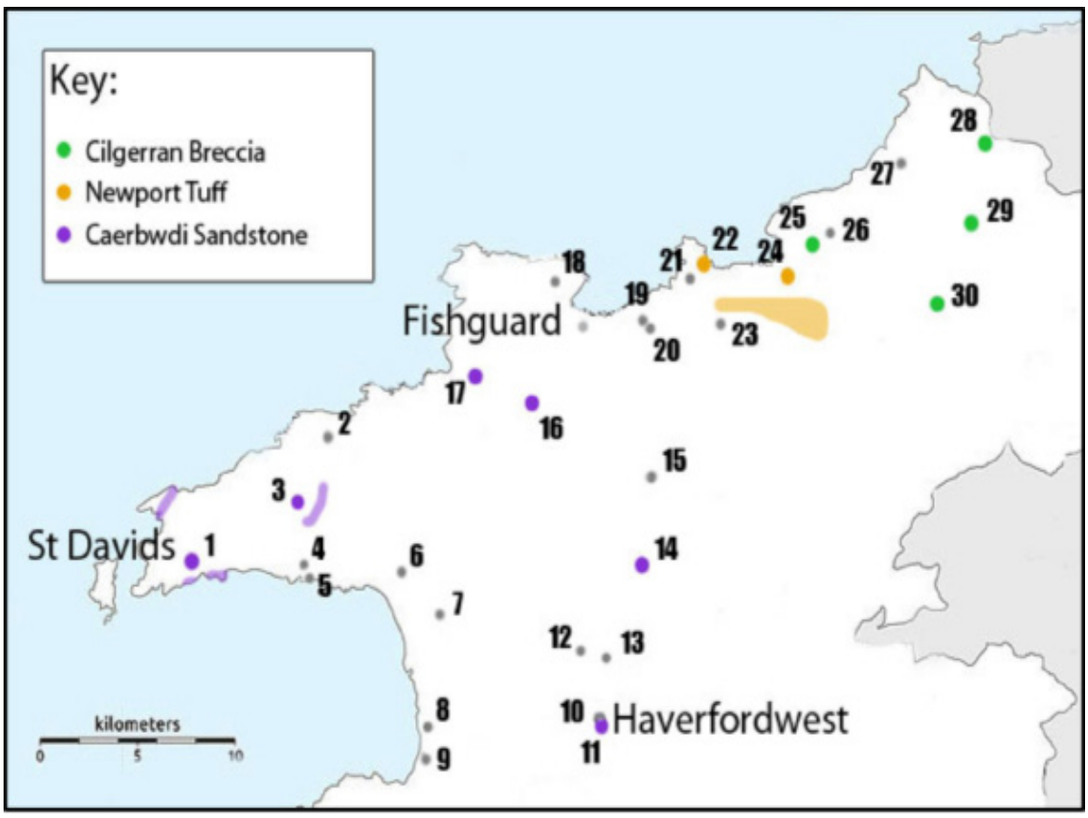


Fig. 2. Map showing the distribution of churches containing the three most important local stones. The likely outcrops of these stones are also shown (information taken from published geological maps of the area). An outcrop for the breccia could not be placed but is thought to be found around Llechryd in the northeast corner of the map, and probably from other areas as well. Localities: 1 St Davids; 2 Llanrhian; 3 Llanhowel; 4 Whitchurch; 5 Solva; 6 Brawdy; 7 Roch; 8 Haroldston West; 9 Walton West; 10 Haverfordwest St Martin; 11 Haverfordwest St Mary; 12 Camrose; 13 Rudbaxton; 14 Spittal; 15 Little Newcastle; 16 Jordanston; 17 Granston; 18 Llanwnda; 19 Llanllawer; 20 Llanychaer; 21 Dinas Cross; 22 Cwm-Yr-Eglwys; 23 Pontfaen; 24 Newport; 25 Nevern; 26 Bayvil; 27 Moylegrove; 28 St Dogmaels; 29 Llantood; 30 Eglwyswrw.

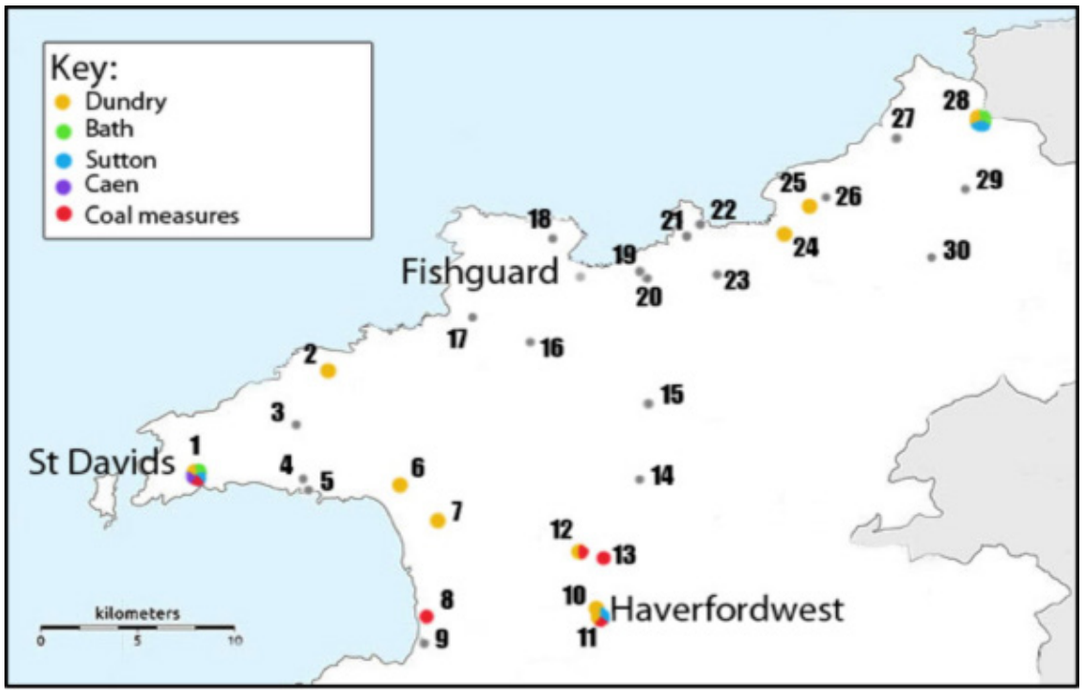


Fig. 3. Map showing stones imported from outside the research area – Dundry, Bath, Caen, Sutton and Coal Measures sandstone. The last of these originates from the South Pembrokeshire coal field. Site numbers are as above.

Fig.4. Dundry Stone, showing broken shell fragments and orange spots characteristic of this stone. The coin is a two pence for scale.

else. This could be because churches were usually built of wood during this time, or because the buildings were modernised or rebuilt, leaving only the original fonts.

Dundry Stone is a durable stone suitable for a variety of uses. It was used to make fonts and piscinae from the C12th onwards, but its most impressive use is in the fan vaulting of the Bishop Vaughan chapel in the cathedral and at St Mary's Abbey. This required vast quantities of stone to be imported, and the fine carving would have been expensive. The reason that this stone could be transported in such large volumes is that the quarry was near to the city of Bristol, which had good links by water to south Wales and Ireland.

During the medieval period, Bath Stone was used in the Bishop Vaughan chapel, as well as in decorative pieces in the rest of the cathedral and in the abbey, but it did not see the same volume of use as Dundry Stone. It was not until Dundry Stone was quarried out after the C16th that Bath Stone started to be used more in the area. The Victorian era was a time of restoration and modernisation, and Bath Stone was one of the most important stones used during this time and was used in almost every church in the area.

Sutton Stone was used in small amounts towards the end of the medieval period and later. It was chiefly used to make tombstones and effigies, and can be found in the cathedral, the abbey and in the churches around Haverfordwest.

Dundry Stone and the Cilgerran breccia were often found to occur together. These are found together throughout the ruins of St Dogmael's Abbey and in the piscina at St Brynach, Nevern.

During the C12th, there were fonts made in a particular style – square bowled with a scallop and dart design on the underside – and there are two stones associated with these. These are Dundry Stone and the hard grey sandstone. Fonts were probably made near to the quarries and then sent to where they were needed, and different masons had different styles that they preferred to use. Therefore, it is possible that the grey sandstone originated from the same area as Dundry Stone (Bristol), and that the same family of masons carved these fonts from both stones. This means that the hard grey sandstones are in fact two groups of stone – one local stone used by the Normans in the C11th, and the other imported from England with the Dundry Stone. Another possibility is that the sandstone fonts were made later, imitating the style of the Dundry fonts. This would mean that the sandstone is local.

Changes through time

Sandstones saw their greatest use early in the medieval period, with the grey sandstones and Caerbwdi Sandstone being found only up to the C14th. The earliest surviving works of this age, from the C11th, are all of the hard grey sandstone, while Caerbwdi Sandstone was used for the cathedral from the C12th onwards.

There is a clear boundary at the end of the C14th, when the grey sandstones and Caerbwdi Sandstone made way for the breccia and the tuff (though Caerbwdi Sandstone continued to be used around the cathedral). The reason for this is unclear, but it could be explained by the geographical distribution of the ages of churches. The earliest medieval freestones were found around Fishguard, most of the C13th pieces are from the St Davids peninsula and Haverfordwest area, and the C15th work is found predominantly to the north east of the county. This indicates that it was not a sudden change in fashion or the working out of the sandstone quarries that caused the change in use, but a wave of rebuilding and modernising churches in the Cemais area in the C15th.

During the early medieval period, the Normans favoured the strong but plain grey sandstones. There followed a focus on St Davids peninsula and the Haverfordwest area, using the local Caerbwdi Sandstone among others. In the C15th, the wooden churches in the north east were rebuilt from stone sourced locally in that area.

The only stone that was used throughout the medieval period in this area was Dundry Stone. This imported freestone is present from the C12th to the C16th, and is also the stone that has the widest distribution of use within the researched area.

Written as part of an undergraduate dissertation in the Department of Geography & Earth Sciences, Aberystwyth University, Summer 2013.

The Deanery, Brecon Cathedral

Liz Wheat

Situated on the edge of the Brecon Beacons National Park, the Cathedral of St John the Evangelist and its surrounding buildings form the architectural centrepiece of the Diocese of Swansea and Brecon. Cathedral Close, as it is known, is the only surviving medieval close in Wales, and was originally founded as a Benedictine priory towards the end of the C11th by Bernard de Neufmarché after his conquest of Brycheiniog.

The earliest phases of the remaining buildings, however, date to the C13th, and were constructed using red and green Devonian sandstone likely sourced from the Myddfai Gorge area on the River Honddu or the quarries of Bwlch. One of these buildings, known as the Deanery, is currently the focus of a major refurbishment project for the diocese, and the stripping back of the building's interior plasterwork and fittings has granted unprecedented access to the original stone fabric of the building (Fig. 1).

The history of the Deanery

The Deanery originally formed part of the Priory's western cloister, and is attached to the main cathedral by the vestries and choir room (Fig. 2). After the dissolution, these rooms were used as stables, while the Deanery portion of this wing was converted into a secular house. A number of revisions were made to the building after 1538, as indicated by the frequent re-use of medieval stone corbels to support later ceiling beams (Fig. 3), while the ceilings were raised at least once. The southern end of the Deanery was also extended c. 1700 (Fig. 4), and a number of windows and internal fittings dated to this period can still be seen throughout the building.

The most significant alterations to the Deanery, however, were overseen by the early C20th ecclesiastical architect W. D. Caroë after the building was purchased for the newly created Diocese of Swansea and Brecon in 1925. Caroë was tasked with converting what is now the Deanery into a Canonry for the cathedral and, while his craftsmen retained much of the medieval stone material of the building, a number of changes were made to its layout.

The most dramatic of these involved the central tower, to which Caroë added a third floor with a stepped stone parapet and flat lead roof, accessed via an iron spiral staircase. He also added a number of new windows throughout the building, installing a series of transom and mullion windows with dripstones designed to complement the building's existing windows, including a particularly fine C14th mullion example located on the second floor of the tower's eastern elevation (Fig. 5). The addition of these windows, however, as well as a number of Caroë's other alterations, clearly disturbed much of the building's stonework. Indeed, bricks were often used as a packing material and were very rarely tied to the existing walls (Fig. 6).

In addition to revealing much about the Deanery's original masonry, our renovations have also led to the discovery of a number of stone features that were unknown during previous architectural studies of the building[1]. One of the most unusual of these is a fireplace with a blackened stone lintel, previously obscured by a wooden surround, which has been uncovered in the southernmost ground floor room that formed part of the early C18th extension. The slab used for this lintel is of a shape and thickness that suggests it may be a re-used gravestone, laid horizontally across the top of the fireplace (Figs. 7). Such a practice has already been noted in earlier phases of the building,

Fig. 1. (Left) The exterior of the Deanery, vestries and Choir Room.

Fig. 2. (Right) Plan of Cathedral Close, after The Cathedral Church of St John the Evangelist (1994), p. 7, fig. 4.

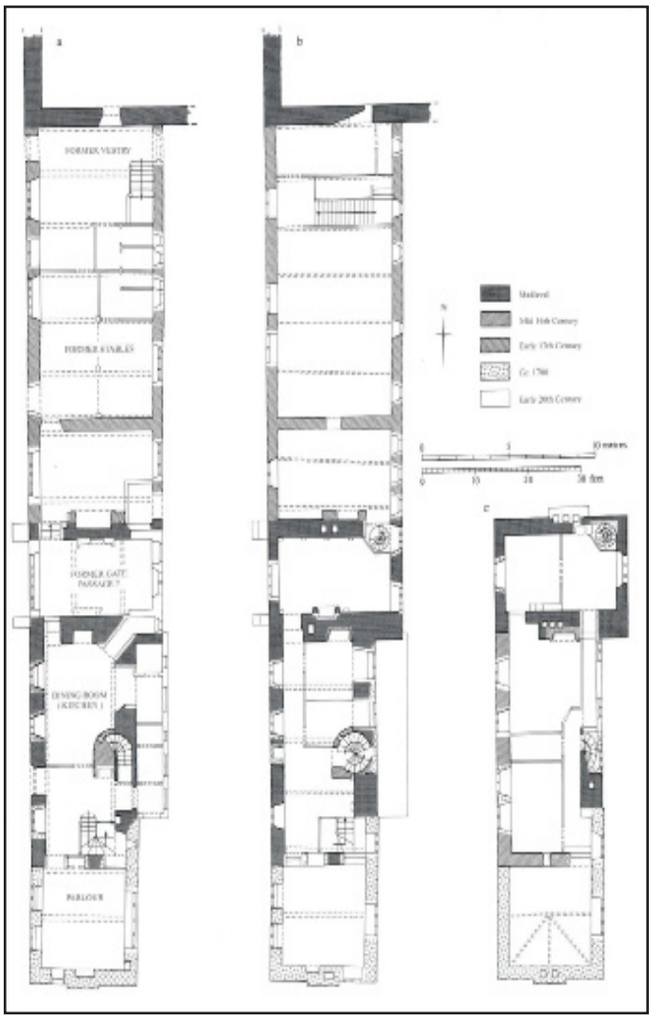


Fig. 3. A medieval stone corbel re-used to support a later beam.
Fig. 4. Plan of the Deanery, after The Cathedral Church of St John the Evangelist (1994), p. 43, fig. 62.
Fig. 5 The fourteenth century mullion window on the second floor of the tower's east elevation.

Fig. 6. (Top left). Bricks inserted into the existing masonry during Caroë's renovation.

Fig. 7. (Middle left). A recently uncovered fireplace in the early eighteenth century wing of the Deanery, possibly with a gravestone re-used as a lintel.

Fig. 8 (Bottom left). A medieval fireplace on the first floor of the central tower, with a gravestone re-used as a lintel.

Fig. 9 (Top right). The medieval ground floor entrance to the circular stairway in the eastern wall of the Deanery.

Fig. 10. (Bottom right). The second set of steps in the roof of stairway in Fig. 9.

as seen in the first floor room of the central tower where a gravestone bearing a partially legible inscription was used as a lintel for a medieval fireplace (Fig. 8).

Perhaps the most significant discovery, however, has been found within the C16th circular stone staircase set into the eastern wall of the building. The ground floor entrance to this stairway dates to the medieval period (Fig. 9), and the path followed by the lowest steps to the first floor suggest that the stairway was originally straight. These stairs were later altered to follow a circular pattern, most likely during the late C16th, continuing in a spiral shape to the second floor. Remedial work carried out to the stonework in this staircase at the first floor level has now revealed the outline of another set of steps in the roof of this stairway (Fig. 10), which appear to exit the building in the eastern wall. This suggests that at one time there was another building or extension located at a right angle to the Deanery, the remains of which have long since vanished.

The future of the Deanery

Preserving the existing masonry and reinstating a number of stone features in order to maintain the character of the original building remains a priority during the current renovation project. The modern slate roof, for example, has recently been replaced with stone tiles that more closely match the originals, and both the external and internal walls have been repointed using a traditional lime mortar. This will allow the walls to 'breathe', ensuring that the stonework can dry properly after periods of damp weather and avoiding the risk of cracking if the water inside the masonry freezes during winter.

Finally, although there are no longer any working quarries in the Myddfai Gorge or Bwlch areas from which the building's original stone was probably sourced, the project's lead stonemason, Kelvyn Dark of Kinsale Stone, has found a very close match from Llangorse Quarry. Located seven miles to the east of Brecon, this quarry provides a very similar product to the red and green sandstone used by the Deanery's original masons, allowing us to reconstruct the building in such a way that its essential fabric remains as authentic and close to the original as possible.

Additional information

The most extensive published study of the buildings in Cathedral Close, including the Deanery, can be found in T*he Cathedral Church of St John the Evangelist,* by The Royal Commission on the Ancient and Historical Monuments of Wales and Dean and Chapter of Brecon Cathedral (1994).

Mapping building stones in churches across Wales: a national map of vernaculars

Part 2 - Carmarthenshire

John Davies

The first part of this survey, recording the building stones of the churches in the counties of Wales, was published in Welsh Stone Forum Newsletter No.11. Part 2 of this work presents data for the churches of Carmarthenshire

Technique

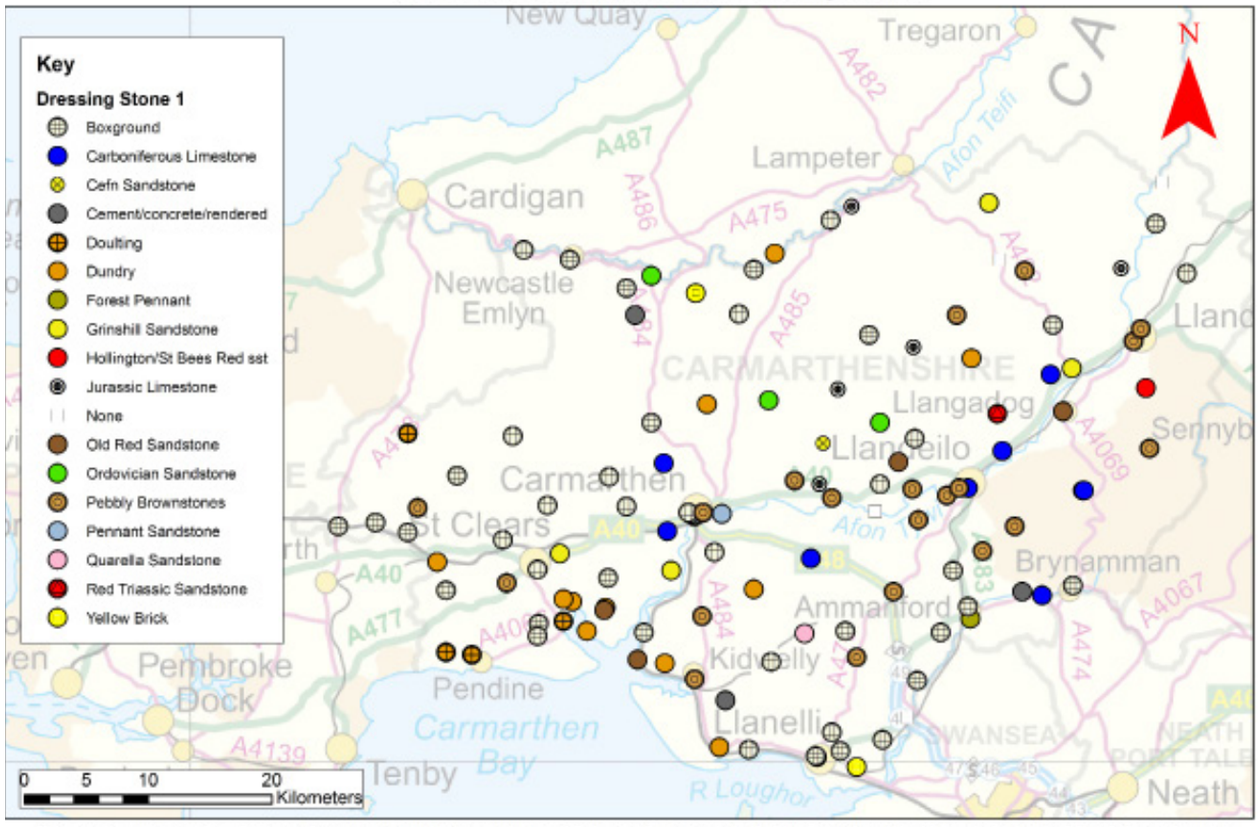
The method employed during the survey of the churches in the three counties of Powys was also used in Carmarthenshire for consistency. The external building stone was examined in order to record the nature and possible source of the materials used. Cadw's recommendation to whitewash many churches is being extensively taken up so it was vital to describe the building stones before they became obscured. The prospect of also mapping church interiors was more daunting due to many of the buildings being locked, un-safe or converted into private accomodation. Thus, due to the time available, it was decided not to deal with the interiors.

The length of time required to identify the stone in the walling and dressings was about fifteen minutes. This enabled as many as twenty churches to be visited each day and an average of ten digital images taken at each site. Maps of the building stone of Carmarthenshire are thus included in the same format as those for Breconshire, Radnorshire and Montgomeryshire.

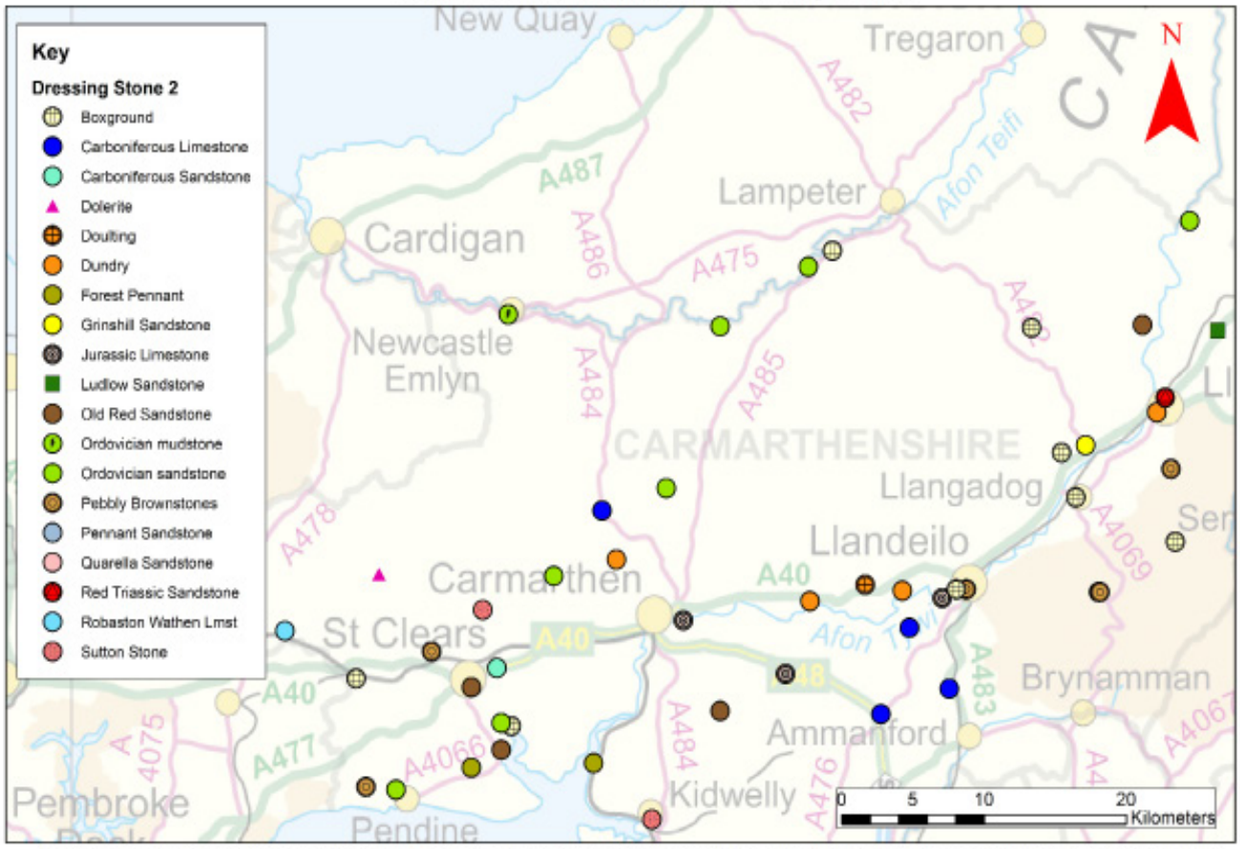
Initially many churches used local rubble for walling and local, or comparatively local, dressings and a simple rule applies to these buildings; if a church lies near to the outcrop of a good freestone, then this stone will frequently be used as dressed stone in the walls. Further from the freestone source all the dressings are of the freestone, with most of the walls of local rubble. Further away again, the freestone is used only for special dressings or in more prosperous churches.

After the arrival of the railways and improved roads dressing stone became much more variable. Frequently a church may include three or more different dressings, depending on the history of availability, which results in a chronology of stone use in each building which, in the future may be possible to match with different architectural styles. This creates a problem with regard to deciding which dressing to plot. Ideally all the dressings could be presented in some form, but at present only the two dominant stones have been plotted, on separate maps.

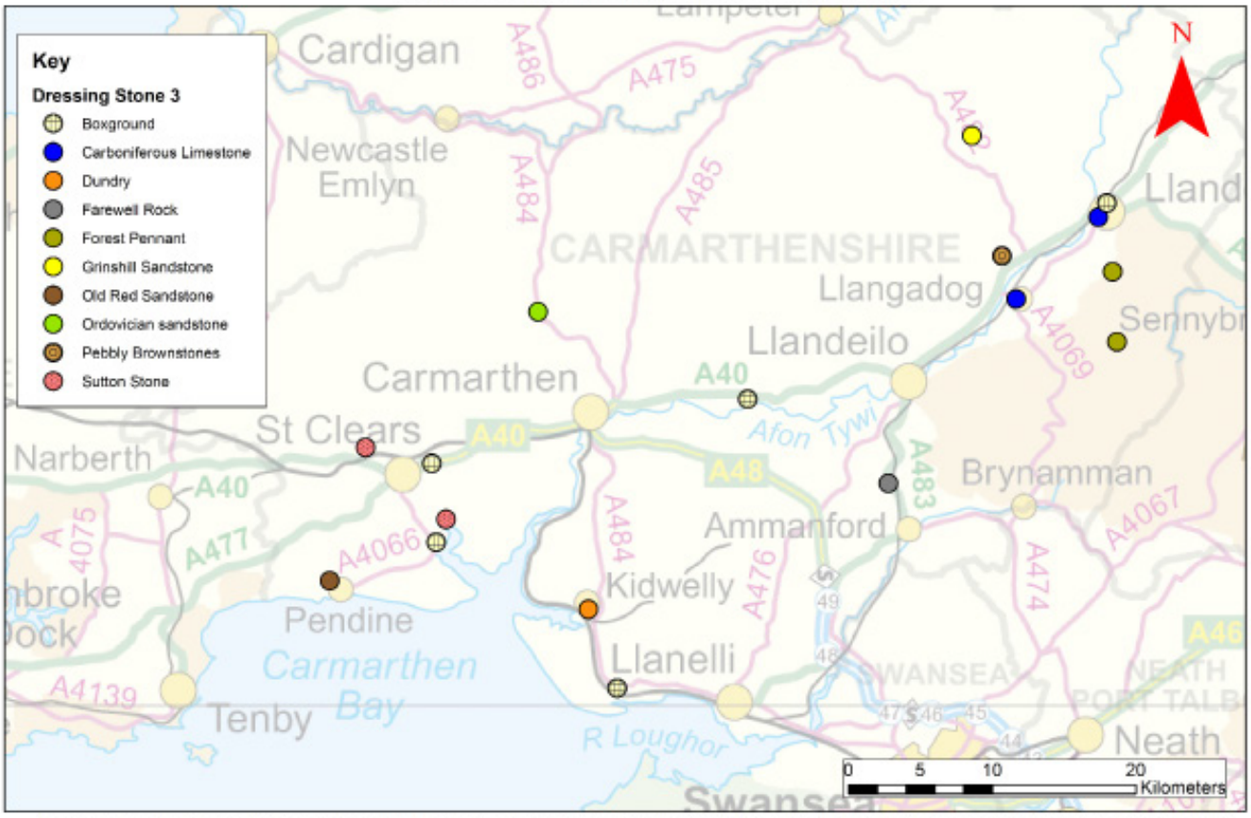
Churches of Carmarthenshire: Dressing Stone 1



Churches of Carmarthenshire: Dressing Stone 2



Churches of Carmarthenshire: Dressing Stone 3



Churches of Carmarthenshire: Dressing Stone 4

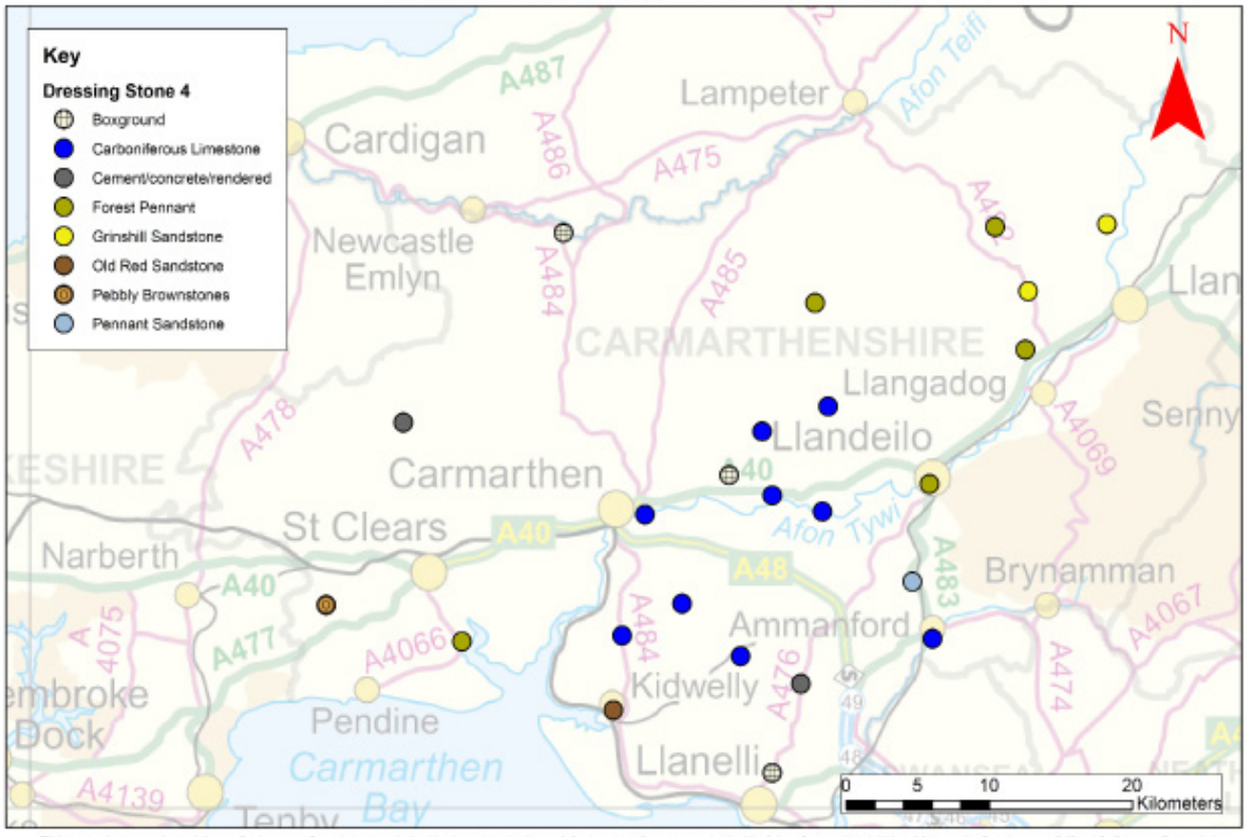


Fig. 6. (Top left) Dressed cleaved mudstone, Capel Mair.

Fig. 7. (Middle left) Dressed sandstone, like Pwntan Stone, Capel Mair.

Fig. 8. (Bottom left) Bath Stone windows, Pencader.

Fig. 9. (Top right) Bath Stone and Pennant Sandstone dressings, Pontiates.

Fig. 10. (Middle right) Carboniferous Limestone rubble walling, Llanvihangel Aberbythych (Golden Grove).

Fig. 11. (Bottom right) Pebbly Brownstones, Gorslas.

Carmarthenshire

Like Powys, the geology of Carmarthenshire is very variable, but can generally be divided into two areas; one to the north-west of the Tywi river valley and one to the south-east of it. North-west of the river the rocks are predominantly slaty, with areas of hard Ordovician and Silurian sub-quartzites and sub-greywackes – sandstones with varying proportion of quartz and rock grains. Some of these harder bands include pebbles. The slaty rocks include siltstones and thin sandstones, which have a pronounced cleavage that penetrates bands of various grain-size to different degrees and at different angles, giving rise to building materials of variable quality.

In addition, within the Teifi Valley, the materials and building techniques used in Pembrokeshire and southern Ceredigion influenced the local church buildings. Hard, cleaved silty mudstones, quarried around Newcastle Emlyn, were sawn and used as ashlar. The Ordovician sandstones of southern Ceredigion and in areas southeast of the Teifi, around Drefach Felindre, are softer and yellow-cream coloured. These are referred to locally as 'Pwntan' Stone [in Ceredigion] and were often used as dressings in this area.

Westphalian	Coal Measures	Pennant Sandstone
		Farewell Rock
Namurian	Basal Grit	Twrch Sandstone
Dinantian	Carboniferous Limestone	*Carboniferous Limestone
	Upper Old Red Sandstone	Quartz Grits
Devonian	Lower Old Red Sandstone	*Caeras Conglomerate [pebbly Brownstones]
		Senni Formation sandstones
Silurian	Lower Old Red Sandstone	St Maughans Formation ssts
		Quartz conglomerates [west of the Taf
		Tilestones
	Ludlow	Black Cock/Trechrug Sandstones
Ordovician	Llanvirn	Llandeilo Flags limestones
		Ffairfach Group quartz sandstones

Summary of the geological sequence in Carmarthenshire from Westpahlian in the south east (top of table) to older Ordovician rocks in in the north west (bottom of table)

South-east of the Tywi the sequence of rocks forms a series of north-east to south-west bands, which become younger from the north-west to south ie. from the Tywi Valley to the South Wales Coalfield in the following sequence (Only the two marked * were used in any way as dressings): There are many sequences of mudstones and siltstones in the strata both sides of the Tywi that were too soft or crumbly for building, particularely the Silurian Wenlock Shales. However, these were crushed and the resultant clay used for making bricks, as at Cynghordy Brickworks, north-east of Llandovery.

Although different indigenous building stones are used in the different areas, the building materials from each side of the Tywi valley were seldom carried across the river. Important ports in the south of the county enabled exotic dressings to be imported from mediaeval times and, from the C19th onwards, improved transport routes influenced what was available for use. For instance, in the ports along the Carmarthenshire and Pembrokeshire coasts Sutton Stone [C12th], Dundry Stone [later medieval] and Bath Stone [C19th] were imported by sea and then carried elsewhere by railway.

North-west of the Tywi the indiginous stone is Ordovician greywacke sandstones and Ordovician and Silurian conglomerates and cleaved siltstones (2/167); 'Pwntan' (5/167). Imported stone includes Bath Stone and Dundry Stone.

South-east of the Tywi the Indigenous stone is Llandeilo Flags limestones (1/167), maroon St Maughan's sandstone (4/167), Senni Formation (1/167), pebbly Brownstones [Caeras Formation] (26/167), Carboniferous Limestone (22/167), and Millstone Grit quartz-sandstones. Imported stone consists of: Grinshill (4/167), Quarella (2/167), Bath Stone (64/167), Forest Pennant Sandstone (10/167), Sutton Stone (4/167), Dundry Stone (22/167), Doulting (6/167) and red Triassic sandstones (5/167). There are also some concrete, yellow brick dressings and some wooden windows.

Other stones

Senni Beds sandstone and Dundry Stone dressings are sometimes repaired with Forest Pennant Sandstone. Unfortunately, around Llandovery in the east of the county, as in the Usk valley of Breconshire, maroon pebbly Brownstones dressings are replaced with Wilderness 'Brownstones' which are red in colour. These patches stand out and will never merge. Brownstone dressings are maroon in colour and gritty and resemble the pebbly Brownstones (Caeras Formation).

On the flanks of the Black Mountain, the building stones consist of quartz sandstones and conglomerates of the Upper Old Red Sandstone and quartz sandstones of the Millstone Grit. Carboniferous Limestone, which also occurs in the area, has only a very local use, but all three are frequently seen in the south-west of the county. Around Llandovery and Llangadog maroon Silurian marine sandstones from Cae Glas Quarry in the Sawdde Gorge are used.

Description of the maps

As with the counties of Powys, two maps have been used to avoid congestion. Both show the distribution of the dominant dressing stones, but the first and second maps should be given equal status and used together. The keys will hopefully be self explanatory. It is hoped that these will provide usful information for understanding how

building stones have been transported around Wales over the centuries. Developing a chronology of the use of stone is here left to architectural historians.

Further Reading:

Lloyd T, Orbach J & Scourfield R. 2006. *The Buildings of Wales – Carmarthenshire and Ceredigion,* Yale, pps 661.

R. & Haslam R. 2013. *The Buildings of Wales – Powys*, Yale, p 656.

Newport and Nevern, Pembrokeshire 10th May 2014

John Shipton

The first field trip of the year, around Newport and Nevern in Pembrokeshire, was led by Tim Palmer. In his introduction to the excursion Tim pointed out that the area contains a range of unusual stone fabrics, many derived from Ordovician volcanic rocks form the Preseli Hills, although some stones have come from further afield.

Leaving the car park we stopped at a large stone house at the junction of Market Street and Church Road. The stone in the walls is hard and dense but the quoins and some dressings are cut from ashy agglomerate (Fig.1). Tim explained that there were three main types of volcanic rock; intrusive rocks i.e. dolerites, that do not reach the surface but cool underground; extrusive rocks that cool at or on the surface and finally rocks that are formed following the explosion of volcanic ash which, forms tuff. When the ash from such explosions falls in water it cools quickly and sinks to the bottom and forms pebbles. The stone quoins and dressings have a very 'gassy' appearance, the gas bubbles being emphasised by the sand blasting that the house has suffered.

Walking up Castle Street we passed a small cottage, Bryn Tirion, which had also been sand blasted. However, being built mostly of harder dolerites and upper Ordovician sandstone it had faired a lot better. Calcite veins are evident in the Ordovician sandstones found between Newport Bay and Poppet Sands and are characteristic of west Wales sandstones. They were formed as a result of earth movements after the rocks were laid down that cracked the stone and through which calcite migrated and filled the cracks.

Newport Castle was built, or rebuilt, in the late C12th by William Fitzmartin who, although Norman by descent, was the son-in-law of the Lord Rhys. It fell into disrepair in later years and had been ruinous since at least the C17th. In the mid C19th Sir Thomas Lloyd built a grand three story house into the castle walls on the site of the castle gatehouse. The castle is privately owned but we were fortunate to have been granted access to areas of the C12th castle.

As we made our way up the drive, below the curtain walls that still towered above us, we noticed that the face stone had been robbed out at lower levels exposing the inner core work, which had been built of local rubble. Reaching the inner court yard it can be seen that most of the surviving structure is built of locally derived volcanic rubble with some local slate material used to construct vaults. Ordovician sandstones, again showing the calcite veins, have been used in the door casings. The central newels from a ruined spiral stairway are cut from grey sandstone whose grains are finer that those previously seen. This stone had no calcite veins but there were no suggestions as to where it might have been quarried. A few isolated, dark, fine-grained, volcanic stones were visible in the castle walls (Fig.2) and a few fragments of fine-grained slate were found in the base of a large tower, which Tim thought probably came from Llangolman.

Leaving the castle we walked down to St Mary's Church which, like many other churches in Wales, was much altered in the C19th. However, the mediaeval tower survives and the tower door, now blocked, has jamb stones cut from volcanic tuff. The erosion of these tuff dressings has been worsened by the use of hard mortar pointing in recent years. Also clearly visible in the tower are volcanic stones, the clasts pulling out from the flow when the stone was still molten.

We entered the church through the C19th porch and inside found an early font with many of the early fitments, locks and clasps still in place. The font is cut from Dundry Stone with a typical scallop style but missing the darts between the scallops. One of the reasons for visiting St Mary's was to inspect an old grave slab propped against the wall in the vestry. It has been set on a concrete backing and has been

Fig.1 Dressings of ashy conglomerate

heavily repaired. In fact, a coating applied to the surface made it impossible to identify the stone from which it was cut but Tim felt it was probably a tuff. Dating was also impossible but the style dictated that it was 'early'. The rest of the church building was rebuilt around 1880 in Victorian Gothic style using local stone in walls with oolitic limestone dressings.

Following lunch we walked down Lower St Mary's Street to inspect the Ebenezer Chapel (Fig.3), built in 1844-45. This replaces a chapel founded in 1740 and has an impressive façade built in a yellow/brown volcanic tuff. We were led to believe that the stone was quarried on farm land a short distance to the east of Newport where geological maps show tuff outcropping. However, although the quarry still exists, if somewhat overgrown, we were unable to obtain permission to access it.

Moving on to the nearby village of Nevern we parked outside the Village Hall, a fine structure built predominately in local yellow/brown tuff (Fig.4) under a slate roof. We moved on to the church, dedicated to Saint Brynach, which was built by the Norman Lord of Kemmes on the site of an earlier C6th structure founded by St Brynach. The tower is Norman and the nave and chancel may be C15th but the remainder of the church was rebuilt in the early C19th. Entering the church through the later porch we noted the grey sandstone dressings to the door casings, which were examined but as there were no outstanding features nobody could say where they might have been quarried. Inside the church is an ancient sandstone font, but again we were unable to establish the origin of the stone. Earlier in the day we had seen a stone newel in the castle cut from an unidentified grey sandstone so perhaps in past times there may have been an exposed sandstone bed that may have been quarried out or lost over time.

In a side chapel, in which much recent work has been carried out, is a large volcanic rock, possibly rhyolite, set in concrete as a window sill. It is inscribed with ancient Ogham writing, which probably dates from the C5th or C6th (Fig.5). The columns and arches are of fairly fresh-looking grey sandstone, the corbels in the wall are of tuff on which the tooling appearing quite fresh, and the ribs of ceiling are of a limestone similar to Bath Stone.

Outside once again we passed a tall, C10th stone cross thought to be cut from local igneous rock before finding a somewhat overgrown plot at the rear of the church where the Bowen family were buried. The Bowens lived

Fig. 2 (Top) Dark fine-grained volcanic stones in the castle wall. Fig. 3 (Botton) The Ebenezer Chapel.

Fig. 4 (Top right) Tuff in Nevern Village Hall
Fig. 5 (Bottom right) Ogham inscribed stone in Nevern church

in the nearby Llwyngwair Manor and were patrons of St Brynach's Church. The square piers which support an iron rail around the plot were surmounted by football sized spheres, both of which had been expertly cut from volcanic tuff.

Being late in the afternoon an end was called to the meeting and John Davies thanked the leaders. We returned to our cars and paused for a short while to inspect the famous 'bleeding' yew tree that stands in the grounds at the front of the church.

East Gower and Mumbles 28th June 2014

John Shipton

On 28th June Ron Austin and Jana Horak led an excursion trip to the Mumbles and east Gower. After assembling at the car park adjacent to Clyne Gardens we visited Clyne Chapel (Fig.1) which sits just inside the park. It was built in 1907 by Graham Vivian, who owned the nearby Clyne Estate, and it was used as the private chapel for his family. Inside there are a number of artefacts that were collected on Vivian's tours of Italy including a marble altar (Fig.2) and a stone relief of the Transfiguration. The chapel is built of Forest of Dean Pennant Sandstone and, although fairly plain externally compared to the highly decorative interior French limestone dressings to the outside of the windows, has strings of garlic cloves carved into them. Inside the group inspected the many examples of marble and polished limestone (see details in box right).

Outside the chapel stands a war memorial. This is built of blocks of Upper Old Red Sandstone conglomeratic sandstone, possibly quarried near Rhossili, which contains pebbles of Lower Palaeozoic rocks. The gate piers at the park entrance are of local Namurian sandstone. Before leaving the group discussed the weathering of the stone used in the extension to the Chapel.

Our next stop was St Peters Church, Newton (Fig.3), where we met Mr Bert Harris. The church was built between 1901 and 1903 in pale grey Quarrella Sandstone (a Triassic sandstone from the Bridgend area) with dressings of Box Ground Stone, a middle Jurassic limestone commonly referred to as Bath Stone. Mr Harris explained that when it was proposed to build a new village hall adjacent to the church the local Conservation Officer insisted that the new hall should be built using Blue Pennant Sandstone to match the church. However, once it was recognised that the stone was in fact Quarrella Sandstone the Conservation Officer suggested that this should be used for the new building only to find that it was no longer available. It was eventually agreed that availability held sway over geological correctness and Forest of Dean Pennant Sandstone was chosen instead.

Fig.1 Exterior of Clyne Chapel

Following confirmation that the chosen stone for the village hall was in fact Forest of Dean Pennant Sandstone, we examined the stone chosen for the dressings. This is not Bath Stone, a limestone that is readily available and had been used in the construction of the church, but appears to be a sandstone from Derbyshire or Yorkshire. However, on closer inspection it was thought not to be a carved stone at all but cast, reconstructed stone. At the front of the hall stands a memorial dedicated to the American servicemen who lived and trained on the site during WW II, 80% of whom had lost their lives on Omaha Beach. Tim thought that the stone was a Portugese limestone. Tea, coffee and biscuits were taken in the hall after which John proposed a vote of thanks for Bert and the Ladies for provision of refreshments.

The medieval church of All Saints, Oystermouth, is built on the site of an earlier Roman settlement. Although the earliest reference to the church dates from 1141 it was during the Norman occupation of Gower that much of the original church was built. The Lady chapel is thought to be C12th and the tower early C13th. In the mid C19th the north wall of the church was pulled down and a side aisle built. However, in 1915 this new build was also taken down and replaced during the extensive building works carried out in early C20th.

The modern church has been built in Blue Pennant Sandstone from Cockett, Swansea with dressings of an oolitic limestone from Hartham Park, Somerset. The bulk of the medieval church is mostly Carboniferous Limestone with odd blocks of sandstone. The original dressings are of Sutton Stone but there are some Bath Stone replacements.

As you enter the church on either side of the modern porch are two ancient heads carved in Sutton Stone (Fig.4) that have probably been taken from the earlier church which has been incorporated into the build. Inside we were met by the Verger, Mr Bill Barrington, who had an extensive knowledge of the church and who acted as our guide. Items of interest included an early medieval piscine that had been cut from Sutton Stone and dated from the late

Decorative stones of Clyne Chapel

Information on the sources of these decorative stones is based on research by Dr Ron Austin, information from Mr Ian McDonald, a specialist dealer in ancient marbles and discussion during the WSF visit. It is suggested that the altar rail is worked from Torquay Marble (Devonian limestone) and that the ball is Swiss in origin. There are two circular wall plaques which show examples of classic porphyries. Porphyry is a term used for a fine-grained igneous rock with prominent larger crystals refererred to as phenocrysts. The centre of one plaque (image top left, bottom left) is occupied by porfido *verde*

antico from Levetsova in Greece. This is identified by the green groundmass, of andesite or dolerite composition, with the green colour caused by alteration of the original minerals to epidote and chlorite. The white phenocrysts are plagioclase feldspar. Red porphyry is present in the centre of the second plaque and as a border to the green porphyry (image bottom left). This is red Imperial porphyry from the Eastern Desert of Egypt. It is also a volcanic rock, of andesitic or dacitic composition. The red colour in this sample is caused by the presence of iron, in the form of hematite, and manganese epidote. The smaller, white plagiolclase phenocrysts have a less clearly defined crystal shape. The rectangular plaque has a brecciated texture, angular fragments of yellow/orange limestone in a brownsih carbonate matrix. This resembles the Tunisian *Gallo antica*, but it has also been suggested that it comes from Sienna.

The ornate chancel floor is made from a range of 'marbles' and one type of serpentine. The latter shows some resemblance to *Tinos green* from Greece although this identification has not been substanciated. Of the 'marbles' some are true metamorphic marbles, two examples being a white Carrarra-type and a white variety with grey streaks. The remaining stones are limestones of different colours and textures. The red and grey tiles in front of the alter are considered to be Belgium red marble (Rouge royale type) from around Rance. This may also be the source of the dominantly grey marbles with a minor amount of red. Other suggested sources include a Greek rosa marble and pink white Devonshire marble.

Fig. 2 (Top left) Alter rail of Torquay Marble, Clyne Chapel
Fig. 3 (Top right) St Peter's Church, Newton.
Fig. 4 (Bottom right) Ancient head carved in Sutton Stone, All Saints Church, Oystermouth.
Fig. 5 (Bottom left) Mumbles marble plaque, All Saints Church, Oystermouth.

C11th to early C12th. The Romanesque font dates to 1215 and, following close inspection, Tim Palmer confirmed that the stone had all the characteristics of Dundry Stone, that it was identical to one in Cardiganshire and that fonts of this nature usually date from C11th or early C12th. Near the font was a panel of Roman tesserae, that had been found close by in 1860, and which confirmed an earlier Roman presence. The pulpit is of Caen Stone.

A grey marble strip set in the floor in front of the altar and a plaque on the wall dated 1813 (Fig.5) were both identified by Ron Austin as almost certainly of Mumbles Marble. Ron said that although not common today Mumbles Marble was widely used in Swansea area during C19th. It is not a true marble, but a limestone that is capable of taking a polish. It is usually grey but colours can vary and Ron described a recent discovery of pink Mumbles Marble found in a fireplace at the Mansion House, Swansea. It is less durable than true marble and is therefore generally reserved for internal use. Mumbles Marble is, as its name suggests, a local stone deposited approximately 350 million years which outcrops around the coast.

Our last visit of the day was to Oystermouth Castle. First founded in 1106, following capture of the Gower by the Normans, the structure that you see today dates from the late C13th. Arriving at the south gate of the castle, mostly built of Carboniferous Limestone, we stopped to inspect a new low wall. This is built of regular sized blocks of Lias limestone, probably originating from Somerset as Lias stone quarries in south Wales do not provide quantities of building stone, most being used for producing cement. The wall is capped with Forest of Dean Pennant Sandstone slabs as is a low retaining wall just inside the castle gate. The area is paved with Pennant Sandstone slabs from

Fig.6 Beds of Carboniferous Limestone outcropping at the base of Oystermouth Castle walls

Gwyryd Quarry. On the north side of the castle John Davies pointed out the beds of Carboniferous Limestone at the base of the castle wall (Fig.6) which are virtually at the top of the Carboniferous Limestone sequence, and used to be referred to in the past as Black Lias. The only stone to be seen above this is a chert horizon which can be examined a little further on. Further around the north side of the castle we noted that most of the dressings are of Sutton Stone but that four jam stones, of a small window at modern ground level, are of Dundry Stone with Sutton Stone dressings on top. This is a strange arrangement as chronologically the use of Dundry Stone as a freestone comes after that of Sutton Stone.

Reaching the front of the castle once more John proposed a vote of thanks to Ron and Jana before closing the meeting. Ron wanted to give thanks to all of the local people who had made the trip possible, especially Father Danny Evans, Canon Keith Evans, Canon Bennett, Bert Harris, Bill Barrington, Tony Martin, Basil Tavinor and Bob Wigley.

Brecon and Llanfair
26th July 2014

John Shipton

A fine morning at the end of July found members taking refreshments in a café in the grounds of Brecon Cathedral in preparation for a trip to look at the building stones of the area led by John Davies and Jana Horak. As an introduction John explained that the Old Red Sandstone in the area is divided into five divisions;

Upper Old Red Sandstone Group
Brownstones Formation
Senni Formation
St Maughan's Formation
Raglan Mudstone Formation

Much of the Old Red Sandstone is not of use for building, being mostly soft mudstones with occasional thin limestones. However, there are sandstones in the lower part of the St Maughan's Formation and within the Senni Formation are many more, mostly fine-grained, grey-green sandstones some of which occur in thin beds - flags. Thick sandstones and flags also occur in the Brownstones, and predominantly it is these flaggy beds which were quarried for dry-stone walling.

Stone from the St Maughan's Formation was used to build the cathedral and was possibly quarried on site and/or from old quarries in the adjacent river Honddu gorge. The St Maughans Formation is very varied both in colour and content with some beds containing pebbles of mudstone or limestone (Fig.1). Some of the Old Red Sandstone shows banding produced by deposition by fluvial currents. At the base of many of these sandstones are holes which indicate where muddy pebbles once sat. Some stone replacement work has been carried out in Forest of Dean Pennant Sandstone, which is close in colour and texture but, more importantly, was available.

Tilestones, used mostly for roofing, are also present and were quarried from a narrow band stretching from Llandeilo to Builth Wells. They are usually greenish grey and split easily due to the mica content. Some of the stone from the top of the Senni Formation and lower Brownstones was strong enough for tile production and for floor flags, and these are the maroon coloured tiles that can be seen on the roof.

Inside the cathedral members congregated around a large, round font cut from Millstone Grit (Fig.2), which was probably quarried near Crickhowell. An alabaster tomb, topped with an effigy of Sir David and Lady Williams (Sir David was the Kings Justice in 1613), was probably sourced from Derbyshire or Staffordshire. The arcading is cut from Old Red Sandstone, probably from the St Maughan's Formation, and mud clasts and currents structures are visible in the columns.

Members spent some time inspecting the grave slabs. One, in a black marble from the Carboniferous Limestone, probably came from Ireland or Belgium and contains bivalve fossils. The altar dais is predominantly two different stones neither of which are easily identifiable; the grey limestone is probably Wenlock Limestone (Silurian) or Carboniferous Limestone whilst the brown could have come from Ancaster or Clipsham, but precise identification eluded us. Before leaving the cathedral we inspected the reredos (Fig.3), designed in 1937 by WD Caroe, which is cut from a Jurassic limestone, possibly Painswick Stone, but an application of lime wash to the surface prevented confirmation of this.

Following lunch we reassembled at Christ's College and made our way to the chapel. Although much of the building is medieval it has been restored many times over the years and a major restoration was undertaken in the C19th, when

Fig.1. (Top left) Muddy pebbles in St Maughans Formation sandstone. Fig.2. (Bottom left) Millstone Grit font inside the cathedral. Fig.3 (Top right) Jurassic limestone of the rerodos screen. Fig.4 (Middle right) Polychromatic effect in the walls of one of the college buildings. Fig.5 (Bottom right) The new Herbert Jones Science Centre.

the school was re-founded. Standing in the roofless nave we noted that the chapel is built of Old Red Sandstone from the St Maughan's Formation and, like the cathedral, Forest of Dean Pennant Sandstone has been used in repairs and replacements. Quartz in a sandstone dressing shows specks of red that may be either due to iron staining or could possibly be small fragments of jasper.The chapel houses an alabaster tomb effigy of Richard Lucy, which lies on a black Carboniferous limestone on a pale marble base. In the crossing we found a small font, formally from the Chapel of the Good Sheppard in Swansea, that is carved in red marble containing stromatolilte fossils. This is probably Devonian in age and from Belgium.

Inside the choir a number of marble memorial plaques are fixed to the wall at high level, but in the north-eastern corner stands a carved figure thought to be of St Nicholas. The figure is fairly modern and carved from an oolitic limestone, thought to be Painswick Stone, but it stands on a much older Old Red Sandstone corbel.

We left the chapel to look at some other buildings in the college grounds. A building on the other side of the cloisters, erected around 1865, has Old Red Sandstone in its walls. The dressings to the windows and doors are in Box Ground Stone and another oolitic limestone that is very 'shelly' and possibly transported to Brecon via the canal that terminates nearby in the town. The front of another building has used many different types of local Old Red Sandstone, both red and green/grey in colour, that with pale grey Hay Sandstone and a yellowish sandstone similar to the Downton Castle Sandstone, gives a polychromatic effect (Fig.4). Some of the window dressings are of Box Ground Stone but dressings to the doors are of sandstone.

Nearby stands Donaldson's House (built in 1889) the walls of which are of local Old Red Sandstone but the dressings are a red aeolean sandstone, possibly St Bees from Cumbria. An administration building is built of a red sandstone but this is not Old Red Sandstone, but possibly a Silurian sandstone from the upper part of the Ludlow Formation. The dressings are of an imported sandstone, possibly from the Midlands. The final college building that we looked at was the modern Hubert Jones Science Centre, the stone in which was thought to be Old Red Sandstone from Llangorse Quarry (Fig.5).

As usual on our field trips we had run out of time with a number of locations still unvisited. However, after members thanked John and Jana we tempered disappointment by visiting Llanfaes Dairy, just across the road from the College, where members indulged in the large selection of delicious ice creams that they had available.

The Tilestone Formation between Llandeilo and Builth Wells, 6th September 2014

John Shipton

On the morning of 6th September members assembled in Llandeilo to meet Dick Waters, who previously worked for the British Geological Survey (BGS) and was our leader for the day in our quest to examine the Tilestones Formation, which outcrop between Llandeilo and Builth Wells. These were worked predominantly for roofing tiles in the C19th and were of great economic importance to the area. Dick explained that BGS had mapped the area and told us that the tilestones are a unit of sandstone at the base of Old Red Sandstone equivalent to the Downton Castle Sandstone. The Tilestones Formation were thought to die out before reaching the Wye Valley but they have subsequently been found to occur as far as the River Wye. Their work also discovered that they and the Downton Castle Sandstone are the lateral equivalents of each other. The beds vary in thickness from up to 40 metres thick in the south west of the outcrop that tapers to just 4-5 metres in the Wye Valley.

The first stop was St Dyfan's Church and Llandyfan Farmstead. The church is located on the site of the Chapel of Ease for the Llandybie Parish. The site of a well, Ffynnon Llandyfan, is located in the north west corner of the churchyard, which was popular with pilgrims because of the reported healing powers of its water. The current church was built in 1864-1865 as was the nearby rectangular pool. Both are built from a pebbly red sandstone provenance unknown (Fig. 1). Although there is an outcrop of Caeras Formation conglomerates nearby it was thought that this may not be the source of the building stone. The church is roofed in stone tiles and it is logical to assume that they came from the tilestone outcrop 3 miles away.

Both the church and the farmhouse sit on an outcrop of Carboniferous Limestone and the farmhouse, barns and outbuildings are predominantly constructed from this rock which was presumably quarried on site or nearby. The farm (Fig. 2), which was originally a meeting house and Inn for visitors to Llandyfan Well, is approximately 400 years old only becoming a farm in the early C19th. It is roofed in diminishing courses of stone tiles that the occupant told us were taken from St Teiloes church, Llanteilo around 1985. The outbuildings and barn are, with the exception of what appeared to be a 'holiday cottage' roofed with slate probably from North Wales, also roofed in stone tiles. The site had been levelled by cutting into the hill exposing the Carboniferous Limestone below. This may well have provided much of the building material and here we found the remains of what appeared to be old lime kilns.

Our next stop was Cil-maen-Llwyd Quarry (Hollow of the grey rooks) also known as Long Quarry (Fig. 3), which is thought to be the least degraded, best preserved example of tilestone workings. What remains is two or three slots that have been worked with the un-worked areas left intact in the centre. The exact method of extraction is unknown but they probably only worked the weathered beds as the un-weathered 'blue hearted' stone is difficult to split.

The northern and southern ridges are covered in spoil and were left intact because they are not best suited for use as tile stones. Inspecting the ridges there are blocks of stone with no laminations, possibly due to turbidite action, making them difficult to split. The beds are variable and not consistent, while other beds of un-worked stone are conglomeritic or contain cross stratification and are therefore, not suitable for extraction (Fig. 4).

T.C. Cantrill noted in the 1907 Geological Survey Ammanford Sheet Memoir that the quarry showed the following sequence although at this time it was not being worked:

- Green pebbly micaceous flags (left un-worked as the southern ridge) 3.66m
- Highly micaceous sandstone (quarried) 3.05m
- Greenish/yellow pebbly sandstone (left as middle ridge) 12.19m
- Highly micaceous green sandstone (quarried as tilestone) 9.75m
- Greenish/yellow pebbly sandstone (left as un-worked northern ridge) 9.14FFm

Following lunch we set off to a site between Carn Powell and Trichrug. From a viewpoint the abandoned workings over the Tilestones Formation and intervening crags are visible for miles. Looking north from the workings, because the beds are vertical or slightly overturned to the north west the whole succession from marine Silurian to Old Red Sandstone can be seen from north west to south east across the outcrop. In sequence from the fossiliferous Ludlow sandstones and mudstones to pebbly sandstones of the Trichrug Formation, followed by mudstones and siltstones of the succeeding marine units, and all these before the Tilestones Formation. To the south east the Tilestones Formation are succeeded by

Fig.1 (Top left) Pebbly red sandstones in St Dyfan's church wall. Fig.2 (Top right) The rear of Llandyfan farmhouse. Fig.3 (Bottom) Cil-Maen-Lloyd quarry.

Fig.4. (Top) Quarry waste in boundary wall, Cil-Maen-Lloyd quarry.

Fig.5 (Right) Capel Horeb Quarry.

the Raglan Mudstone Formation (Silurian) and these by the St Maughans Formation (Devonian).

The fossiliferous Ludlow sandstones outcrop in the Cwar Glas quarry, in which the cars were parked, were used to build the Red Lion Hotel in Llangadog and the better known Llandovery College, in Llandovery.

At Pont ar Llechau, in the Sawdde Gorge, a complete section through the Tilestone Formation and contiguous units are present on the north east bank of the river, and workings are present on both sides of the river. Here the Ludlow sequence is very thick, and it is about half a mile downstream before you reach the Wenlock Formation. Members made their way gingerly down the steep bank from the road to the river bed where they were able to inspect the top of the Tilestone Formation.

A few stoic members made their way to the final visit of the day at Capel Horeb Quarry (Fig. 5). Here, in this abandoned quarry, there is a complete section through the Tilestones Formation. Stone was extracted originally for building purposes but latterly it became a road stone quarry and there is no evidence that the Tilestones were ever worked for tiles at this location. Although the quarry is now abandoned there is anecdotal evidence that it was still operational in the early 1960's. The quarry is now a British Institute for Geological Conservation site especially important for its early plant fossils. However, despite everybody searching we were unable to find any fossils so late in the day John thanked Dick for an interesting and informative day and closed the meeting at 5.30pm.

Welsh Stone Forum Bursaries

In 2015 the Welsh Stone Forum will be offering two bursaries, up to a value of £200 each, to support and promote projects with a building stone theme. The project should either relate to building stone in Wales, or the use of Welsh stone outside Wales.

Applicants do not need to be members of the Welsh Stone Forum or in formal education. There is no application form but you should send us a document and include the following information:

- Full name
- Institute (if relevant)
- Relevant qualifications or course being followed (where appropriate)
- Advisor/Mentor (where relevant)
- Aim of project, timeframe, and how the aims will be addressed (1-2 paragraphs)
- Intended output/outcomes from the study
- Sum requested and how this will be spent

Applications should be sent to jana.horak@museumwales.ac.uk by 4th May 2015. These will be reviewed by the committee and applicants informed of the outcome as soon possible after this. Successful applicants will be required to submit an article summarising their work to the WSF Newsletter.

Book Review:

The Quarrying industry in Wales – a history / Y diwydiant Chwareli yng Nghymru – hanes

Ian Thomas, National Stone Centre / Y Ganolfan Gerrig Genedlaethol - 2014

This is a very useful, well illustrated, bi-lingual, volume that deals with the history of stone use in Wales. As it proclaims on the inside cover: "This book is a UK first - it illustrates for a broad readership, the development of an industry vital to us all, but largely overlooked – in the key producing area"

The book commences with a tribute to Trevor Thomas and his book on The Mineral Wealth of Wales. A very useful introduction follows, commencing in early times and then dealing with health and safety and conservation issues. The subject of planning is discussed and there are a series of production graphs for the industry before reference is made to production companies such as Hansen, Cemex, Lafarge and others.

The following section, on stone extraction from Wales, divides the country into 11 areas. Each has an introductory geological map followed by descriptions under the headings of geological setting, history and the sources of further information, churches and the history of individual quarry developments.

Finally, the appendices present further sources of information, lists of contacts, Ideas for school and college projects and examples of training opportunities before ending with a glossary of terms.

This book, published and distributed by the National Stone Centre, is worth having in the library as an important reference.

John H. Davies

Contact Details

Welsh Stone Forum
c/o Dr Jana Horák
Amgueddfa Cymru - National Museum, Wales
Cardiff CF10 3NP
jana.horak@museumwales.ac.uk

http://www.museumwales.ac.uk/en/welshstoneforum

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