Fforwm Cerrig Cymru Welsh Stone Forum

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Welcome to the 18th WSF Newsletter, we hope that this finds you still in good health and looking forward to the time when we can safely resume WSF activity. As we were not able to run the field programme in 2020, a result of Covid-19, this is a smaller Newsletter than normal. We thank everyone for their contributions, it is good to see some building stone activity has continued, even during lockdown. Although we missed out on field meetings, in December we held our first virtual meeting. The delayed AGM was followed by a programme of short presentations by members. This included:

A discussion stimulated by Tim Strang's talk 'Random rubble stonework in mid-Ceredigion; what constitutes a ' style '?'

An update on the Llandygwydd font, the original stone and subsequent remedial work, by Tim Palmer (this is the locality we visited in May 2019, Tefi Valley trip) .

Porth Y Pistell Dolerite quarries, Llŷn, by Mike Statham (see the article in this newsletter)

A synopsis of stone survey work in SE Wales, by Graham Oliver and Jana Horak. See the article on part of this work in this Newsletter.

Goldcliff Priory and use of Sudbook Stone, by Jana Horak. It is hoped that work will progress on this in 2021 and so will be reported in the next Newsletter.

An invited talk on the stone findings from the community excavation at the Llandaff pound (abutting the Bishop's Castle) by Tim Young (GeoArch).

We hope that everyone enjoyed this event and that we can make this a regular feature of our winter programme. We would encourage anyone to let us know of any items to report on, however small. No problem if you are not used to using Zoom or similar platforms for giving talks as we can guide you through. Congratulations and thanks to everyone for contributing to an enjoyable evening.

Subscription 2021

You may have noticed that we haven't sent out invoices for WSF subscriptions this year. As we were unable to run the field programme last year we have rolled over all subs from 2020. However, if you have any outstanding dues then please contact Andrew Haycock (Treasurer) at andrew.haycock@ museumwales.ac.uk.

Field programme

We are still unsure at this stage what may be possible this year. However, as vaccinations are rolled out there may be a possibility of running our first field meeting in July.

Provisional trips suggested include an examination of ballast stone in Cardiff, possibly combined with a short talk about the ballast trade. There has also been the suggestion of a return to the Gwent Levels area. If anyone has any other ideas for non-residential trips then please let Mike Statham (Field Secretary) know (stathammichael@ hotmail.com). When we have any definate plans we will contact you by e-mail.

Just a reminder to everyone that the Welsh Stone Forum is affiliated to the Geologists' Association. Through them we are able to obtain liability insurance for our field meetings. A requirement of this is that we comply with a field *Code of Conduct* and also record those attending meetings.

Use of Sudbrook Stone, Holy Trinity Church, Sudbrook. A proposed conservation project and possible location for a future trip. Photo P.G. Oliver.

Purbeck Stone in Canton, Cardiff and William Symonds (1848-1921) - Preliminary Findings

Graham Oliver

Introduction

Although Canton can be recognised as a medieval hamlet it was primarily developed in late 19th century when it was absorbed into the city of Cardiff (Jones, 2003). As the majority of domestic properties were built in a relatively short period of time the architecture and building stones used varied little. The majority of the fabrics are Pennant Sandstone and brick with the dressings almost invariably of Bath Stone or brick. Triassic Radyr Stone, Carboniferous Limestone, river cobble and ballast are also present as fabrics but to a minor degree. It was therefore surprising to find properties that were dressed in a pale grey, rough-hewn stone, quite unlike the smooth finished, honey-coloured Bath Stone. Other than petrology a clue to the identity of this stone can be found in a work on the photographic history of Canton by Bryan Jones (2003, p.46) '*He (William Symonds) is responsible for the only name of a street in Canton known to reflect an association with its builder; in Purbeck Street* (Figure 1) *he used stone from the Purbeck quarries of his native county'*. It will be seen later that William Symonds was responsible for most if not all use of Purbeck limestones in Canton.

This study aims to; catalogue the occurrences of Purbeck limestones in Cardiff and ultimately in Wales, identify the lithology or the lithologies used, and identify the sources and suppliers of stone in Dorset

Occurrence

Dressings identical to those in Purbeck Street were found on 119 properties (Fig. 2):- Nos 17, 79-101 Romilly Road, Nos 1- 12 Purbeck Street (Fig.1A), Nos 1-39 /2-46 Brunswick Street (Fig. 1B), 2-102 Windway Road. In addition the house at 135 Clive Road (Fig. 1C) is also dressed in Purbeck limestone but of a rather different character and will be considered separately at the end of this paper. The stone is used in quoins, window dressings, and in some remaining coping stones on the boundary front wall. No 17 Romilly Road was built as a residence for William Symonds in 1893[1], whilst others in Romilly Road date from 1898 [2], as do all the houses in Purbeck Street[3]. The houses in Brunswick Street date from 1897/98[4] and those in Windway Road from 1905/06[5]. The Glamorgan Archives confirm that the 119 properties were built by Symonds. Those in Romilly Road and Purbeck Street were designed by Seward & Thomas or George Thomas and houses in Brunswick Street and Windway Road were designed by Veall & Saint. The related Portland Stone is used in the civic buildings of Cathays Park, central Cardiff (Perkins, 1984) but Perkins only mention of Purbeck limestone is in Llandaff Cathedral, where it was installed about 1960. Purbeck Marble is a well-known decorative stone and also from part of the Purbeck Limestone Group, but it is not present in Cardiff as a structural stone.

The Stone

Most of the stone is pale grey (Fig. 2A), is very finely bedded with few recognisable entire macro-fossils. Thin veins frequently cut through the stone at roughly right angles to the bedding (Fig. 2A). On closer examination the stone can be seen to be formed of dense aggregations of crushed bivalve shells (Fig. 2B). In many stones whole bivalve cross sections are present and filled with sparry calcite (Fig. 2B) and in cross section are oval, and no more than 7 mm in length. Tim Palmer has identified these as *Neomiodon*, now considered to belong to the Sphaerioidea that are the Pea and Fingernail clams abundant in our streams and lakes today. In the mullions and sills of No 17 Romilly Road the stone has been used face-bedded (arrowed in Fig.2C) and in such stones considerable weathering has occurred delaminating the surface (Fig. 2D).

Fig. 1. Purbeck limestone quoins, window and door dressings Canton, Cardiff. A, Purbeck Street. B, Brunswick Street. C, Clive Road.

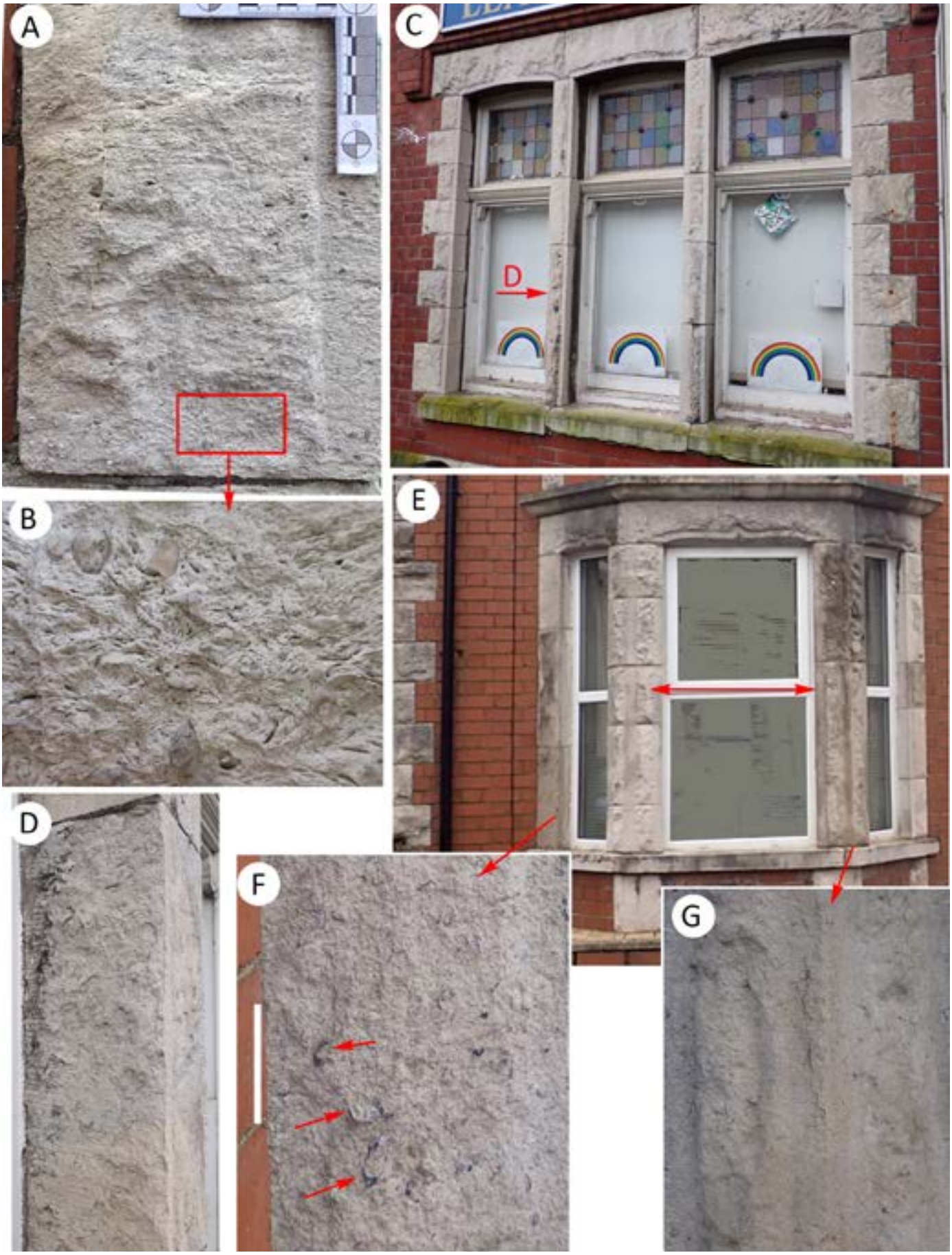

Fig. 2. Purbeck limestone in Cardiff, detail and variations. A–D, No 17 Romilly Road. A, ground floor window, arrows indicating face-bedded, weathered stones. A, quoin, B, enlargement of A showing dense shell fragment and occasional cross-sections of Neomiodon shell filled with sparry calcite. D, delaminating mullion arrowed in C. E, Lower ground floor of No. 1 Purbeck Street window comparing face bedded and normal bedded stone in mullions. F, mullion with shelly stone including black oyster (Praeexogyra) fragments (arrowed). G, part of badly weathered face bedded mullion.

Typically *Neomiodon* is the only recognizable entire fossil visible and the quoins on the other properties resemble those on No 17 Romilly Road (Fig. 2A). On some of the mullions of No 1 Purbeck Street (Fig. 2E) the stone is distinctly shelly containing much larger fragments of black shell, identified as the oyster *Praeexogyra distorta* (Fig. 2F). Where the mullions have been made up of only two or three stones they contain oyster shells and are more weathered than those made up of five to seven stones that lack oysters (double arrow in Fig. 2E). The longer stones are face-bedded whereas the smaller ones have normal bedding. This is particularly noticeable in the lower window of No. 1 Purbeck Street (Fig. 2E, G). It is possible that the stones come from different horizons in the Purbeck series or that the observed difference is due entirely to the different bedding surfaces exposed.

The Purbeck Limestone Group (Berriasian Stage) is primarily of Early Cretaceous age. However, there is some debate about whether the lower beds belong to the top of the Portlandian Stage and so are of Upper Jurassic age (Cope, 2012). Beds within the Portlandian stage are primarily of marine origin whereas the Purbeck Limestone Group comprises brackish and freshwater facies with some marine ingressions. Consequently, the petrography of the Purbeck limestones is complex with 219 levels (beds) recognised by the quarrymen and masons (El-Shahat & West, 1983). Given this complexity it is difficult to accurately identify exactly the levels and quarries that the stone may have come from. This is exacerbated by the lack of (to date) a hand specimen of the Cardiff building stone. *Neomiodon* indicates fresh/brackish water conditions while *Praeexogyra* indicates a more marine influence, suggesting that the stones seen here were obtained from more than one bed. At least in two beds, the Laning Vein (Bed 144) and the Red Rag (Bed 133), small numbers of oysters are present with *Neomiodon* (El-Shahat & West, 1983; Radley, 2002). However, Haysom (2020, p. 15) illustrates Roach and Thornback stones which come from Beds 125 and 123, both of which also show sparse oyster shells. Treleven Haysom (*pers. comm*.) suggests that the stone with oyster fragments is reminiscent of Thornback stone but it appears more weathered and with larger fragments than he would expect. It is likely the stone originates from the Intermarine Member where *Neomiodon* is a major constituent (Radley, 2002) and both Treleven Haysom and Nick Crocker (*pers. comm*.) suggest that the stone of entirely *Neomiodon* shells is inland Freestone (i.e. Bed 121). The photograph in Haysom (2020, p. 15) of Freestone matches this but until we can directly compare the stones or find documentary evidence of the source, the identification must remain provisional. At this time all of the stone in Cardiff can be thought to come from the Intermarine Member (Beds 121-125) (Fig. 3). It is not possible to recognise which quarry the stone came from, as Treleven Haysom (*pers.comm.*) says that in the

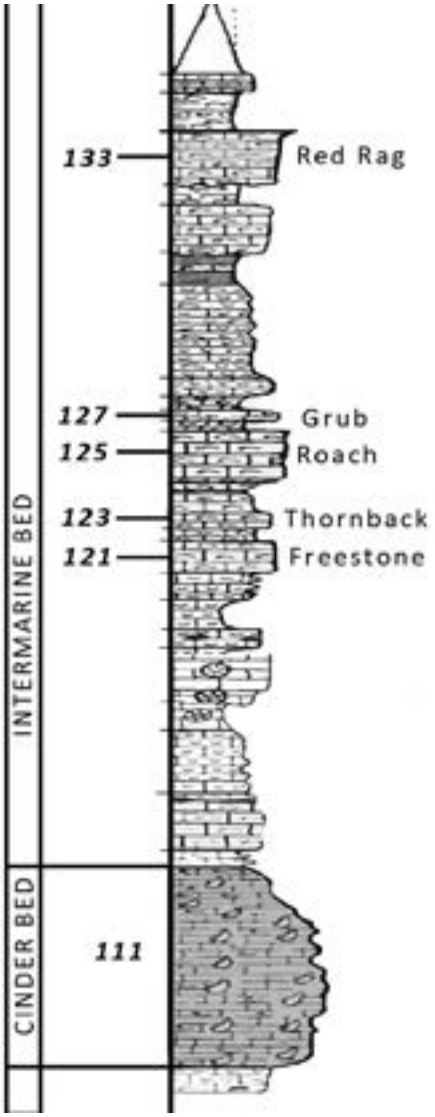

Fig. 3. Part of the Purbeck limestone sequence showing relationships of probable sources of building stone used in Cardiff. Redrawn from https://wessexcoastgeology.soton.ac.uk/jpg-Durlston/7DB-West-El-Shahat-3

1890s/1900s many quarries produced Freestone but he also said that both Thornback and Freestone can come from the same quarry.

Cardiff Work

The style of masonry on the Cardiff houses is identical throughout, the mullions of the bay windows with drafted smooth edges bordering unworked stone direct from the quarry (Figs 2A, C, E). Haysom (2020, p. 88) illustrates identical work on a house in Swanage (No. 1 Linden Road) (Fig. 4) and terms this style as *Cardiff Work.* Haysom remarked that such work was done by George Burt and one may assume it was he who supplied the stone for Cardiff.

The association with Cardiff is probably down to one man, William Symonds, who can be traced as the primary, if not sole, builder using Purbeck stone in Cardiff. Symonds (1849-1921) was a builder, contractor and town councillor in Cardiff who first appears in Cardiff in the census of 1881. In 1893/4 he built a large town house for himself at No. 17 Romilly Road, which he named Durlston House.

Fig. 4. No.3 Linden Road, Swanage sharing the style of dressings known as Cardiff Work (Haysom, 2020).

Naming his house after a village near Swanage indicates his association with the Isle of Purbeck and his genealogy confirms that he was a Dorset man, born in Long Bredy in 1849. Aged 12 he is listed as a dairy boy but in the 1871 census he is listed as a mason living in the Dorset village of Steeple. Jones (2003) states that Symonds went to America for two years before coming to Cardiff and must have moved to Cardiff in the 1870s. It is not known how he had the means to establish a building company but this period saw the peak of house building in Canton and opportunities would have been many. A comparison of houses in Linden Road (built mid 1900s[6]) (Fig. 4) Swanage, with those in Purbeck Street (Fig. 1), Romilly Road and Brunswick Street (Fig. 1), Cardiff, show them to have identical stone-work and design. Despite this Symonds was not the builder of the Linden Road houses. This was Fred Pond who also built The Mount in Swanage for Symonds (see below)[6].

In the 1911 census Symonds appears to be living in Swanage at The Mount, Durlston Road (Fig. 5). This large house was commissioned by Symonds and may have been a second home. It was built by Fred Pond. As with the other domestic properties commissioned by Symonds the dressings are in Purbeck Stone done in Cardiff Work.

The connection between Symonds and his native Dorset remained strong and he would have been familiar with both quarrymen and stone merchants, such as George Burt. Further confirmation of a link with Burt is found in Stanier (2015, p. 97 from the diary of George Harris[7], p196-7) Re Cowleaze Quarry *'Four beds were worked here Roach (9 inches), Grey bed (7 inches), Thornback (10 inches) and Freestone (2 feet). The masons preferred this freestone to Portland stone, it was harder but could be tooled off in large flakes. It was the main stone sent for buildings in Bournemouth, Ryde, Cowes and even Cardiff, but not London'*. Research continues to confirm which quarries the stone came from but as Symonds was the only builder using Purbeck limestone in Cardiff during the 1890s it is very likely that Burt & Burt were the suppliers. The assumption is that the worked blocks were made in Dorset and then transported to Cardiff or Swanage ready for construction. The Swanage Railway opened in 1885[8] and this saw the demise of transport by sea and the shift to rail transport for Purbeck Stone. The advent of the railway may have made the importing to Cardiff more cost effective.

135 Clive Road

The house at 135 Clive Road (Fig. 1C), while having some Cardiff Work, is rather more ornate than those developed by William Symonds. Furthermore it stands alone in a street primarily of Pennant Sandstone and Bath Stone. The fabric of this house is of Pennant Sandstone with four or five courses of Lias limestone between the storeys (Fig. 6E) and in the plinth (Fig. 6F). This stone is pale grey, almost with a bluish tinge, in comparison with the paler coloured Purbeck quoins adjacent to it. It appears to be fine grained with sparse but relatively large shell fragments (Fig. 6F).

The coping stones of the front wall are also in Purbeck limestone. The mullions show particularly dense aggregations of whole *Neomiodon* shells and some of the stones have a dense bed of such shells within them (Figs 6A-C). The quoins adjacent to the lane are badly weathered (Fig. 6D) and the stone appears to be less shelly than in the quoins of Symonds's houses. Glamorgan Archives[9] record the building of a house and bakery in Clive Road

Fig. 5. The Mount, Swanage. Built for William Symonds, 1908

Fig. 6. Purbeck limestones at 135 Clive Road. A, mullion showing banding and a dense bed of Neomiodon. B/C, details of the mullion stone in A. D, quoin showing bedding and weathering. E, decorative course of Liassic limestone between ground and first floors. F, a block of Liassic limestone in the plinth.

in 1898 with the developer one EM Luke. The 1901 and 1911 census record Edwin Luke, builder and contractor, living at 135 Clive Road. One can assume that Luke built the house for himself and the bakery for his son, Charles, who is recorded in the census as a master baker Other houses built by EM Luke in Cardiff are either Pennant Sandstone or brick with brick and Bath Stone dressings, no other use of Purbeck could be found. To date no link can be found between Luke and Purbeck Stone nor with William Symonds but both men were contemporaries living in Canton.

Conclusion

To conclude, this research has revealed the previously undocumented use of a substantial amount of Purbeck limestone in domestic buildings in Cardiff. Although the use of Purbeck limestone is well documented across southern England its use in Wales is either minimal or unrecorded. Bringing this stone from Dorset to Wales would have been costly, especially before the advent of the railways, which probably explains the predominance of Bath Stone in Cardiff. Furthermore, beds of Purbeck freestone are thin, only a few feet thick (Fig. 5), making

this stone unsuitable for fashioning long single slabs unless used face-bedded. While Purbeck limestone in Cardiff has weathered well, and in many cases much better than Bath Stone, its limited bed thickness may also be a factor limiting its use. It is hoped that this paper will bring attention to the use of Purbeck stone in Wales and encourage others to look for it elsewhere. Continued research will make efforts to document the sources of the stone in Dorset.

Acknowledgements

I would like to thank Tim Palmer for his help in identifying both stones and fossils and along with Jana Horak their encouragement to venture into the world of building stones. I must thank Treleven Haysom for his discussion with me on all matters relating to this paper and to him and Nick Crocker of Suttle Purbeck Stone Ltd for the identification of stone types. To staff of the Glamorgan Archives for records pertaining to William Symonds in Cardiff and the staff of the Dorset History Centre for data pertaining to houses in Swanage. To Elaine and Carl, the owners of The Mount, Swanage, for sharing their knowledge of the history of their house. To the owners of 135 Clive Road for letting me photograph their property in such detail. To Peter Stanier for further information on the diaries of George Harris and the transcribed pages relevant to Purbeck stones. To my neighbour Elaine Davies for directing me to the books on the history of Canton.

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Notes

1) Glamorgan Archives Doc. Ref. BC/S/1/9358
2) Glamorgan Archives Doc. Ref. BC/S/1/14034
3) Glamorgan Archives Doc. Ref.BC/S/1/13238
4) Glamorgan Archives Doc. Ref. BC/S/1/12187, BC/S/1/13110
5) Glamorgan Archives Doc. Ref. BC/S/1/15810, BC/S/1/16118
6) Data from archives of Dorset History Centre
7) George Harris (18672-1906), geologist, visited the southwest of England including the Isle of Purbeck during 1883/4 and recorded his travels in his diaries that are now held in the Geological Survey Archive ref. 1/969, at Keyworth.
8) History of the Swanage Railway by Andrew PM Wright from https://www.swanagerailway.co.uk/history
9) Glamorgan Archives Doc. Ref.BC/S/1/13053

The Co-operative Granite Quarries, Aberdaron

Michael Statham

A desk study of the Co-operative Granite Quarries was undertaken in 2019 and a summary of the findings were published in the Welsh Stone Forum Newsletter in 2020 (Statham 2020a). A fuller report was published in British Mining last November (Statham 2020b).

Additional extremely interesting information about the site is to be found in documents held in the John Johnson Collection by the Bodleian Library (see References). This includes lengthy articles by W. Walter Crotch and Ada Jones (later Ada Chesterton), accompanied by several photographs of the site taken during construction of the harbour at Porth y Pistyll along with its associated quarries and the model village.

On September 17 last year my brother Ian and I managed a brief visit to Aberdaron. Ahead of the visit, Colin Evans, who runs the Bardsey Island ferry, was contacted to ask if he knew anyone who would take people out to the harbour and without hesitation he very kindly volunteered to take us. I also invited members of Gwynedd Archaeological Trust to come along, but unfortunately nobody was available on September 17.

It is difficult to appreciate the scale of the site from views that can be obtained from the cliff path or from sailing past on the Bardsey ferry. The main harbour wall on the south side is quite impressive but has suffered from wave action over the years (Fig. 1) and evidence of repairs undertaken in the 1930s using concrete can be seen in several areas. A dolerite sett (8 x 6 x 4 inches) made during the 1930s was recovered from the south quay and has been donated to Amgueddfa Cymru-National Museum Wales (Fig. 2). The area on the north side of the harbour has suffered very badly from erosion by the sea, with large parts of it completely washed away, as shown in Figure 3, in which the foreground was once part of the quayside. It is known from aerial photographs that this area was substantially intact in 1960.

The boat sails out of Porth Meudwy and to get ashore it was necessary to anchor off Porth y Pistyll harbour, transfer to a rubber dingy and then negotiate very slippery rocks to gain dry land. Once ashore the whole harbour

Fig. 1 Porth y Pistyll, south side of harbour

Fig. 2. (top) Dolerite sett recovered from south quay. Fig. 3 (centre) View of harbour from the north side looking south. Fig. 4. (botton) 1930s quarries.

area is, with care, reasonably easy to explore, although a bit of rock scrambling is needed in some places. The site of the model village was also visited after telephoning for permission to enter the area. The extant remains comprise two partly constructed workmen's cottages of unequal size, designed by Harold Clapham Lander. Figure 5 shows the rough layout of the site while Figure 6 shows the full length of the west elevation. Inside it can be seen that the construction included a slate damp-proof course and was intended to have suspended floors. The dolerite quarries at Craig Cwlwm, high above the coast path, were also visited (Fig. 7), in the vicinity of which are the remains of a small stone-built structure, presumably having once been a shelter/tool store for the quarries (Fig. 8).

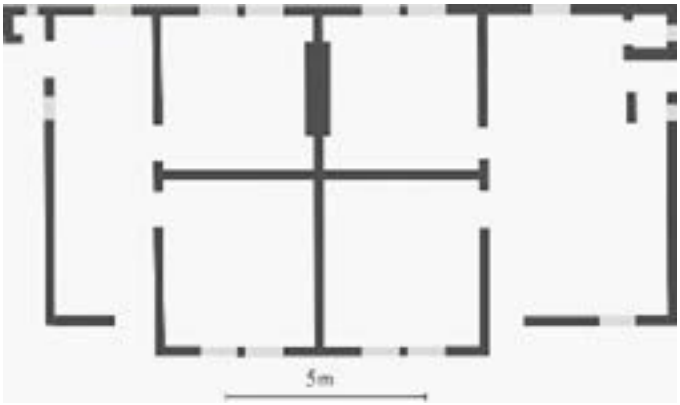

Fig. 5 (top) Rough layout of workmen's cottages. Fig. 6 Partly constructed cottages, west elevation. Fig. 7. Dolerite quarries, Craig Cwlwm. Fig. 8 (bottom) Remains of quarrymen's shelter/ store.

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Bodleian Library. *John Johnson Collection: an Archive of Printed Ephemera*. Uncatalogued at JJ/MPS/10/90 Box 4 National Trading Bodies – Granite Quarrying Society.

Acknowledgements

Many thanks to Colin Evans for providing transport to Porth y Pistyll harbour.

WWI Memorials Produced by W Clarke of Llandaff

Michael Statham

From late 1918 until 1924, the records of W. Clarke of Llandaff show the firm was involved in the production of at least 57 war memorials, this part of the business alone turning over more than £11,000 – equivalent to more than half a million pounds today. Of these works, at least nine were constructed of oak and are not considered here. The rest were entirely or partially stone structures, which fall easily into two main categories; Outdoor and Indoor memorials.

Outdoor Memorials

The firm was involved in the construction of sixteen outdoor WWI memorials, which are summarised in Table 1. It is believed that the only example that was not also designed by the firm is the one in St Illtyd's churchyard, Bridgend. With the exceptions of the memorials commemorating workers at the Byass Tin Plate Works, now in Vivian Park in Port Talbot (Fig.1), and that commemorating members of the Glamorgan Yeomanry at Stalling Down (Fig.2), the rest are all parish/village/town memorials. The choice of stone generally reflects what was suitable for the purpose and was readily available at the time i.e., Portland, Hopton Wood, Forest of Dean Pennant and to a lesser extent Bath Stone and Aberdeenshire granite, all of which were utilised. In the case of Stalling Down, the main construction is of the local Carboniferous Limestone with just the panels and badge being of Aberdeenshire granite while the Wenvoe memorial is entirely built of local Carboniferous Limestone. From the point of view of design, the Celtic cross was popular, with the those in Llantwit Major, Pontyclun and St Nicholas (Fig.3), being the most ornately decorated. The Llanharran (Fig.4) and Monmouth town memorials are based on the commonly used design of a standing soldier, whilst that at Miskin (Fig.5) is a bolder design. Here, above the plinth which bears the inscriptions and names, there is a large stone carved with wreathes each side. Above these each side holds a statue, which comprises a soldier holding an upturned rifle, a sailor holding a hawser and an anchor, an airman holding a map and a nurse holding a bandage, all in canopied niches above which the memorial tapers to a Celtic ring cross; Figure 5 shows the side with the nurse. Arguably the most outstanding of all the memorials from the point of view of originality of design and choice of appropriate material is that at Wenvoe (Fig.6). By the

Location and date	Date	Brief Description	Notes	Stone
Llanddewi Velfrey, Pembs., A40 Roadside	1920	Celtic Cross		F
Port Talbot, Byass Tin Plate Works (demolished)	1920	Celtic Cross	Relocated in Vivian Park	F
Rudry churchyard.	1920	Celtic Cross	Cleaned and names repainted	G
Llantwit Major, Church St/Wine St.	1921	Celtic Cross on Medieval cross steps	Refurbished, new black polished stone name plates	H
Pontyclun. A4222 opposite Park Crescent	1921	Celtic cross		P
St Nicholas Village Green, Vale of Glamorgan	1921	Celtic Cross	Cleaned, new black polished stone inscription plates	P
St. Fagans churchyard, Cardiff	1921	Celtic circle cross	Needs refurbishing	P
Bonvilston, churchyard, Vale of Glamorgan and external roadside wall on A40	1920	Simple cross on Medieval cross steps and roadside tablet	Roadside tablet new black polished stone name plate	F & P
Newcastle, Bridgend, St Illtyd's churchyard	1920	Square stone supporting pillar topped with crucifix all on octagonal base	Designers Cook and Edwards, Bridgend	H
Margam Abbey church, lawned area outside churchyard	1924	Square base, tall pillar topped with Celtic ring cross		H & P
Miskin, Rhondda Cynon Taff, centre of road opposite Miskin Arms	1919	Niches with statues of airman, sailor, soldier and nurse.	Cleaned and repaired with new black polished stone name plates	P & B
Wenvoe, Vale of Glamorgan, roadside park adjacent Wenvoe Arms	1919	Rough stone monolith surrounded by smaller stones	Names need refurbishing	C
Monmouth Town Memorial, St James' Square	1921	Soldier on plinth	Bronze name plates have been added	P & B
Llanharran, Hillside Avenue, junction with A4723	1923	Soldier on plinth	Relocated from playing fields. Cleaned, names re-cut & painted	P
Porthcawl, Victoria Avenue, All Saint's churchyard	1921	Plinth finished with canopies surmounted by a Celtic ring cross	Bronze name plates have been added	P
Open country on Stalling Down, St Hilary, Vale of Glamorgan (ST 0149 7400)	1922	Tall obelisk with granite panels and badge (no names)	Masonry work Wybert Thomas, Cowbridge. Battle Honours tablet added 1925	C & G

Table 1 Summary of Outdoor Memorials. B = Bath Stone, C = Carboniferous Limestone, F= Forest of Dean Pennant Sandstone, G = Granite, H = Hopton Wood Stone, P = Portland Stone.

Top row fig.1-3, left to right. Bottom row fig 4-6, left to right. Fig. 1 Memorial formerly in the Byass Tinplate Works. © Michael Statham Fig. 2. Yeomanry Memorial Stalling Down. © Michael Statham, Fig. 3 Llanharran Memorial. © Michael Statham.Fig. 4 St Nicholas Memorial. © Michael Statham. Fig. 5 Miskin Memorial. © Michael Statham. Fig. 6 Wenvoe Memorial with William Clarke, 1919. © W Clarke, Llandaff.

time WW1 had ended William Clarke had been semi-retired for some time and lived in the village at Upper House, leaving his son Guy in charge of the firm. Whilst there is no extant design drawing of the memorial, the firm's archive contains several photographs of it at various stages of completion and also a photograph cut from a newspaper (source untraced) beneath which the caption states that it was designed and carried out by Mr William Clarke of Wenvoe and Llandaff and that the stone came from the Alps Quarry at Wenvoe. It goes on to say, '*the rugged primitiveness of the whole gives it the impression of nobility that would be lacking in a more ornate memorial*'. As the Alps Quarry is local to the village, what better material could have been used than that which many of the men of the parish had been involved in producing? The Western Mail published the same photograph with a different caption which stated that, '*It is considered by many travellers to be one of the most effective war memorials in the country*'. A photograph of the recently completed work, with William Clarke standing cap in hand beside it, is shown in Figure 6. A full report on this memorial, including archive photographs and drawings, was sent to RCAHMW, as a result of which it is now a Grade II listed structure. Sadly, the stones are showing signs of cracking, possibly a result of tensions produced by the use of explosives at the time they were extracted, and the inscription and names need recutting and repainting.

Indoor Memorials

Clarke's indoor memorials are summarised in Tables 2 and 3. The majority comprise tablets/wall memorials. Notable exceptions are a Bath Stone reredos in the crypt of Hereford Cathedral (Fig.7), designed by W. Goscombe John and dedicated to Basil Webb [the first boy scout] (Andrew 2017) and a pulpit, principally constructed of Penarth alabaster, in St James' church,

Memorial	Materials	Notes
Cardiff, Canton, Salem Chapel	Bronze statue on Pavonazzo marble tablet	Designed W. Goscombe John
Cardiff, The Hayes, The Tabernacle	White marble tablet, Pavonazzo marble and Penarth alabaster surround	
Cardiff, Canton, Salem Chapel	Bronze figure on Pavonazzo marble slab	Designed W. Goscombe John
Cardiff, Clive Road Baptist Chapel	Staffordshire alabaster	
Cardiff, former Hancock's Brewery	Bronze tablet, Belgian Black marble frame	Designed by G. E. Halliday, tablet cast by Nash & Hull, now privately owned, frame presumed lost
Llandaff Cathedral, Bell Ringers	Hopton Wood Stone	In Bell Tower
Llandaff Cathedral, Cathedral School	Hopton Wood Stone	
Llandaff Cathedral, Ferdinand Franck William Arnold	White marble tablet, Irish green marble backing	
Cardiff, St John's church, City Battalion	Sicilian marble tablet, Irish black marble backing	
Cardiff, St John's church, Frank Hill Gaskill	White marble tablet, green Connemara marble backing	Designed G. E. Halliday
Cardiff, St John's church, Royal Glamorgan Artillery	Hopton Wood Stone	In a normally locked area
Tongwynlais St Michael and All Angels' church	White marble tablet, Portland stone frame	
Cardiff, Wareing tablet, St Dyfrigs church	Hopton Wood Stone	Church demolished

Table 2 Summary of Indoor Memorials – Cardiff Area

Pyle (Statham 2017), dedicated to Ivor Morgan. Penarth alabaster was also used in memorials in the Tabernacle Chapel, the Hayes, Cardiff; St Catherines church, Pontypridd; Trelewis church (now moved to St Mary's church Treharris); Michaelston-y-Fedw church and the Tabor chapel, Maesycwmmer (Statham 2017). The only other Welsh stone used in any of this group of memorials was slate eg the cill of the Trelewis tablet and the backing of the tablets in Treharris and Goytre churches. Of the other stones used, Sicilian marble unsurprisingly features as the material of choice for the inscriptions, though Hopton Wood Stone from Derbyshire has also commonly been used for this purpose e.g. Royal Glamorgan Artillery tablet in St John's church, Cardiff; Iwerene Minster church, Dorset; St Mary's Church in Douglas, Isle of Man and both Llandaff Bell ringers and Cathedral School memorials in Llandaff Cathedral, Cardiff. Other materials used to frame or mount the inscription panels include Portland Stone, Belgian Black marble, Hopton Wood Stone, Connemara marble from Ireland and Pavanazzo marble from Carrara in Italy. An unusual design by Giles Gilbert Scott is to be found in Trefnant church. Denbighshire, where he specified polished Belgian Black marble for the tablet and Hopton Wood Stone for the surround (Fig.8). Of passing interest is the memorial for Hancock's Brewery, designed by G. E. Halliday, which comprises a bronze plaque bearing the names of the fallen cast by Nash and Hull in a Belgian Black marble frame made by W Clarke. A 1921 photograph of the original in Clarke's workshop is shown in Figure 9. In 1926 the bronze plaque was sent back to Nash and Hull to be enlarged so that new names could be added. The frame was enlarged by Clarkes and the item re-erected in the brewery. Hancock's Brewery was taken over by Bass Charrington in 1968 and sold to Brains Brewery in 1999. Consequently, the memorial has been moved around a few times and now only the bronze plaque, which is in private hands, has survived. A photograph of it has been posted online (Imperial War Museum web site), from which it can be seen that four names were added.

Fig. 7. Basil Webb Memorial, Hereford Cathedral Crypt. © Kate Andrew.

Although the smallest of memorials, the one in the Salem Chapel in Canton, Cardiff, which comprises a bronze figure by W. Goscombe John on a Pavonazzo marble backing made by W Clarke is possibly the most exceptional (Fig. 10).



Fig. 8 Trefnant Church Memorial. © Michael Statham. Fig. 9 Hancock's Brewery Memorial. © W Clarke, Llandaff. Fig.10 Salem Chapel Memorial, Canton, Cardiff. © Michael Statham.

Memorial	Materials	Notes
Bangor Cathedral, Gwynedd	Portland Stone	Designed G. G. Scott
Crickhowell, St Edmund's church	Statuary marble tablet, Irish green marble frame	
Cwm, Blainau Gwent, Tallistown Congregational church	White marble in timber frame	
Goetre, Monmouthshire, St Peter's church	Sicilian marble tablet, slate backing and cill	
Douglas, Isle of Man, St Mary's RC Church	Hopton Wood Stone	Designed G. G. Scott
Hereford Cathedral, Basil Webb	Bath Stone	W. Goscombe John, in crypt
Iwerene Minster, Dorset, St Mary's church	Hopton Wood Stone	Designed G. G. Scott
Llantwit Major, Vale of Glamorgan, St Illtyd's church, Frank Hill Gaskill	White marble tablet, green Connemara Marble backing	Designed G. E. Halliday, also commemorates restoration of the churchyard cross
Michaelston-y-Fedw, Newport City, St Michael's church	Sicilian marble tablet, Penarth alabaster frame	
Newport, St Mark's church	Sicilian marble tablet, Belgian Black marble backing and corbels	
Pentre, Rhondda Borough, St Peter's church	White marble tablet, Hopton Wood Stone frame	
Pontyclun Institute, Rhondda Cynon Taff Borough	White marble tablet, Portland Stone frame	Former WW1 Hospital
Pontypridd, St Catherine's church	White marble tablet, Penarth alabaster frame	R. J. Newberry
Pyle, Bridgend Borough, St James church pulpit, in memory of Ivor Morgan	Mostly Penarth alabaster, Bath Stone handrail, Caen Stone figure of St James	Original base retained
St George super Ely, Vale of Glamorgan, St George's church	Sicilian marble	
Trefnant, Denbighshire, Holy Trinity church	Tablet Belgian Black marble, Hopton Wood Stone frame	Designed G. G. Scott
Treharris, Merthyr Borough, St Thomas' church	White marble tablet, slate sides and cill	
Treharris, Merthyr Borough, St Thomas' church	White marble tablet, Penarth alabaster surround, slate cill	Formerly in St Mary's church Trelewis

Table 3. Summary of Indoor Memorials – Outside Cardiff

References

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Acknowledgments

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Dismantling, Conservation and Re-building of the Prichard Reredos, St Margaret's Church, Roath, Cardiff

Kieran Elliott

With St Anne's church facing imminent redundancy, having fallen into disrepair, the future of the building was unclear and the degraded reredos, that had originally been erected in St Margaret's church, needed to be carefully removed at short-notice (Fig.1). Elliott Ryder Conservation were commissioned to undertake the dismantling/removal and conservation of the structure, whilst a new home within the Diocese was found.

Sequence of Works

A measured survey of the reredos was carried out, as far as was possible given the limited access. The structure (mostly Penarth alabaster along with other imported marbles) was then dismantled in a numbered sequence to facilitate re-building (Fig.2). Once the decision had been taken to return the reredos back to St Margaret's, albeit in a new location within the church, it was moved to our workshop for detailed conservation, before being re-built on a pair of load-bearing 'T' shaped, steel brackets, designed, procured and installed by others (Fig.3).

Reredos Condition

The reredos was recorded as leaning backwards (significantly in places) into the random rubble wall, where it had direct contact with the damp wall-core (Fig.4). Given the nature of the load-bearing fixing arrangement and the need for a small air-gap between the rear of the blocks and brickwork of the adjacent wall, it was re-built plumb, such that the thrust of the 'whole' was transferred uniformly and individual units were supported fully with no point-loading.

During dismantling a design flaw was noted. The green marble inlays between the raised alabaster quatrefoils spanned over the more numerous joints behind. This had caused some misalignment with several elements fractured and loose on the plinth. The green marble, which ranged in thickness between 14 and 6mm, had suffered significantly from the insidious effects of soluble-salt damage. Once conserved the weakened, green-marble inlays had cardboard templates made. These were used to achieve the exact dimensions between the alabaster blocks so that the resin-bonds on some of the very-thin marble repairs were not compromised.

Conservation

Individual blocks were removed of degraded plaster and cement, which had been used to re-build the Reredos (badly) in St Anne's. Excess plaster was removed from either side of joint lines where it had been applied clumsily when 'green'.

Fig. 1. (top left). The reredos in St Anne's church prior to dismantling. ©Elliott Ryder Conservation. Fig. 2. (botton left). The dismantled upper section of the reredos. ©Elliott Ryder Conservation. Fig. 3. (top right) New stainless-steel restraint-fixings securing the reredos back to the brick wall. ©Elliott Ryder Conservation. Fig. 4. (botton right). The core of the reredos built into the damp building fabric. ©Elliott Ryder Conservation.

Penarth alabaster visually is more akin to coconut-ice as opposed to the creamy Parma Ham of the Midlands alabasters. Alabaster is effectively water soluble and the high ambient humidity in churches often causes chromatic-alteration and subsequent loss of the original surface polish. The material responds well to cleaning with the appropriate techniques and materials, if neutralised properly. Lightly soiled alabaster was cleaned with a solvent mixture using a surfactant to make it miscible, applied on cotton-wool pads until the pads were clean. Areas displaying more stubborn, in-grained dirt were polished with a mild, proprietary abrasive-paste applied on cotton-wool or stencil brushes. Given the ammonia content this was neutralised immediately after cleaning/ polishing has finished.

Because environmental conditions in St Margaret's were much more favourable than St Anne's, the decision was taken not to apply a protective wax-coating after cleaning. The application of such a protective coating requires a maintenance regime, with the coating needing to be removed/re-applied every 8 – 10 years as it will inevitably degrade. Such a coating is usually only applied to protect surfaces from the affects of an overly damp building or corrosive bat-urine/droppings. In the case of the marble, such a coating would effectively trap soluble-salts and likely exacerbate deterioration as the salts would be unable to crystallise on the surface.

It was noted during dismantling that the rear of the green marble was in a much better condition than the front (the drying surface where efflorescence was concentrated). However, the idea of reversing the inlays was quickly discounted when it became clear the inlays were not mirror-image profiles and re-building the raised alabaster course required the decorated blocks beneath to be millimetre perfect for the inlays to fit.

The central 'Lamb panel' has an appearance of solidity but is in fact a relatively thin veneer of different marbles bonded to a thick sandstone backing panel. The scene consists of Connemara marble with white and red Sienna marbles. The joints are so fine between the different materials (indicating exceptional workmanship) that some of the joins in the lamb are difficult to ascertain, even at close quarters.

Many of the individual alabaster blocks appeared to have powdery, grey historic fills or 'stopping' (repairs applied in the workshop at time of carving due to geological faults) over the carved surfaces (Fig.5). These are an inherent geological inclusion in the form of 'chicken-wire' gypsum according to a University Geology Lecturer, whom visited site during re-building. No attempt was made to disguise or fill these 'faults,' that often extended across carved detail, which must have been frustrating for the carvers having started work on what would have appeared to be an outwardly solid, uniform block.

Re-building

The reredos was re-built using Polyfilla. This was selected as it is inert/stable, chemically similar to the host stone (gypsum) and retains a degree of flexibility, unlike modern casting-plasters which can be very brittle and often hygroscopic (attract moisture). The material sets quickly and uses minimal water. Traditional lime/hydraulic-lime mortars were discounted due to the ambient (warm) conditions within the church. Under these conditions such mortars would dry too quickly and be much weaker as a result, plus they have no adhesive properties, unlike Polyfilla.

The joints were left slightly shallow so that they could be pointed when building was complete and after any settling/ movement had taken place. Pointing was executed using a mixture of Tetrion® and Gilders' Whiting. This remains slightly flexible, with Calcium Carbonate added to make the mixture weaker still. It also makes for a sound surface on which to apply acrylic paints, which are compatible with the PVAc component. It is readily reversible if needs be.

Once all the joints were dry, they were tinctured with Cryla Colour acrylic paints, mixed to blend in with adjacent alabaster and its tonal variations, such that the reredos reads visually as a homogenous piece and not a number of component pieces (Fig.6).

Fig. 5. (left) Chicken-wire Gypsum visible on the cleaned block in the foreground. ©Elliott Ryder Conservation.
Fig. 6. (right) The conserved reredos back in St Margaret's Church. . ©Elliott Ryder Conservation.

Foot and Mouth

Richard Renshaw

It was a cold, drear December day as I stood in the car park of Gelligaer quarry contemplating a massive slab of Pennant sandstone. I had taken on a commission to carve a memorial to Catrin Glyndwr, daughter of Owain, who had been imprisoned in the Tower of London and had died there in 1409, along with two of her children. Records showed that she had been buried in St. Swithins churchyard in the heart of London, just off Cannon Street, where the sculpture was to be sited. This commission was fraught with problems as the design had been submitted by an artist/designer who had intended to take on the whole enterprise but lacked the necessary skills. The project was then offered to another sculptor who saw it as too problematic and passed it on to me. It wasn't just the weather that contributed to my despondency, as the 12/18-inch thick stone lacked the thickness required for the proposed design.

All the other problems suddenly crowded in on me: I had never attempted anything on this scale before and I knew of no suitable premises in which to undertake such a huge task. I needed to find someone to help me in the initial stages and, most worryingly, the date for the opening ceremony had already been set for 16th September 2001, just nine months away. There was to be an unveiling by a Welsh celebrity, singing with the London Welsh male voice choir, and it was planned that Cannon Street would be closed during the ceremony. However, the challenge and the thought of earning a decent wage for the first time in my life proved irresistible!

A conversation with the quarry manager revealed that there wasn't another suitable stone available and I would have to try another Hanson quarry. This also drew a blank. One of the requirements of the project was the stone had to be from Wales, and as far as I knew the only stone available in such large blocks – weighing around ten tons, eight foot in height and four in girth – was Pennant Sandstone. I had worked with it before on high-relief carvings and it was not my favourite stone, being extremely hard, aggressive on the tools and, as it was extracted using explosives, made it prone to micro-fractures. Forest of Dean Pennant Sandstone would have been a much better alternative, being both more attractive and certainly easier to carve, but this would not have been fitting to the Welsh theme and was only be used as a last resort.

However, on returning to Gelligaer a couple of weeks later the manager took me to a corner of the quarry to show me a block that he had found. Puzzled at seeing nothing on the ground, I asked him where it was and he pointed to the highest point of the quarry face at a bed of a suitable thickness. He said it would be ready in two weeks, and so it was. Finding a mason with a saw big enough to cut the base off square wasn't easy, but the block was eventually transported to Abbey Masonry, near Carmarthen, where the work was carried out with remarkable speed and efficiency.

Although the months had slipped by this had given me time to redesign the sculpture, find someone to help with the roughing-out to get the basic shape and also to find a suitable work place. The original design didn't look workable: the centre of gravity was too high and the base too slender, a design suitable for bronze but not stone. As the top of the carving tapered to a point, it was decided to use bronze for the top three feet. Some wag suggested that it looked like a penguin disguised as a member of the Ku Klux Klan, an image which was hard to dispel. After a lot of preparatory drawings, I came up with a design which looked more stable and kept elements of the original, whilst also embodying the personal style that I had developed over the years.

David Taylor, a local entrepreneur, was willing to let us use a large agricultural barn a few miles from my home in the Black Mountains at a peppercorn rent. He also owned a couple of lorries, so when I asked his advice on how to get the cut stone from Carmarthen into his barn and stand it upright, he just told me to leave it to him. The plan was to drive the lorry into the barn with the stone horizontal and then slowly slide it off as the back of the lorry lifted. David was confident that it would work, but I wasn't totally convinced, watching apprehensively as the lorry drove into the barn to the designated area, where I had raked the earth floor to get a horizontal surface. As the bed of the lorry lifted to its maximum height the stone remained immobile, perched at a crazy angle. The driver then dropped the back with a slight jolt and it slid off gracefully, landing with a satisfying thud, one edge on the earth floor. Then the lorry inched backwards, nudging it sweetly onto its base – a virtuoso performance done with such skill and precision – and it was exciting to see it upright for the first time.

I had persuaded a local sculptor, Panico Theodosiou, to help me for twelve weeks. As he had done a degree in masonry and stone carving, he had mastered the theory of masonry techniques and I was a willing pupil. This was to be a completely different way of working for me as normally whilst sculpting I trusted my intuition and remained open to changes. However, in this case, the carving had to be worked with precision from detailed drawings, similar to the way you would approach an architectural carving. Using a mason's square, spirit level, tape measure and pencil, we marked off the centre of each side and from the detailed drawings I'd made transferred the measurements to the stone. I had also cut to scale the outline of the front and side in MDF. The plan was to work on opposite sides, making deep horizontal cuts with our 9-inch angle grinders, leaving 1½ inches between each cut, then knocking off the unsupported stone with a 2-inch pitcher. This produced a huge amount of dust,

so we would periodically stagger outside to let the dust settle.

By the time Pan left, after twelve weeks, the stone had been roughed out and squared (Fig.1). The next two months were spent taking the corners off, reducing it to an octagon, and from that point there wasn't too much stone to remove to get it into the round. As work progressed towards the finishing stages, hand tools were used more than power tools and so, with less dust and noise. At the same time the work became more enjoyable, particularly knowing that I would meet the deadline and feeling the relief of not having come across any flaws in the stone, which would have meant having to abandon it and starting all over again. Fitting the bronze was the final stage (Fig.2), working the stone to make a perfect fit.

The installation of a completed sculpture is for me the

Fig.1 (top left) The roughed-out block. Fig.2 (bottom left) Fitting the bronze cap. Fig 3. (top right). Lifting the sculpture into its final position. Fig.4. (bottom right) The finished sculpture in situ.

most nerve-wracking part of a commission, no matter how many times I do it. This one was even more so as I had to delegate the entire process. Now reduced to seven tons, it was still a mammoth task to move and transport the sculpture and required the biggest crane available from a local firm. To get it out of the barn I had anticipated taking off the roof and lifting it out but Jeff, the driver, had other ideas. He extended the telescopic jib of the crane through the door, to just above the sculpture, where he put on two five-ton strops. As the jib lifted, the strops tightened and bit, and the sculpture hovered just an inch or so above the ground, the arm of the crane almost caressing the top of the door frame as it withdrew. It was then loaded upright onto the crane bed and secured. He certainly knew his trade, which I found very reassuring, but knew that unloading it at the other end would be even trickier (Fig.3). It was only after it had been installed in London, on its specially prepared concrete pad (Fig.4), that Jeff told me that the crane had been at its absolute limit, given the weight and the length of the reach.

The unveiling ceremony was an anticlimax. Sian Phillips and weather forecaster Sian Lloyd gave their speeches, the choir sang to the thronged Welsh diaspora and the designer took the accolades as I silently watched from the back of the crowded square.

Anglesey Marbles – Trefnant Church, Denbighshire

Michael Statham

Those members who came to the meeting in North Wales, in May 2008, will have seen how Penmon Marble was still being extracted and polished by Anglesey Masonry Ltd as well as observing its historical use in Penrhyn Castle (Shipton 2009). During the Forum's later trip to North Wales, in September 2018, this material was also seen in the interior of John Gibson's St Margaret's church, Bodelwyddan, which was completed in 1860 (Shipton 2019).

A few kms south east of Bodelwyddan lies the village of Trefnant. Here, Holy Trinity church, which was completed in 1855, was designed by Gilbert Scott. Scott used Penmon Marble to good effect in various parts of the interior, including the columns of the nave and chancel arch, and the main material for construction of both the font and the pulpit (Fig.1). According to a contemporary newspaper account (Anon 1855), the material was described as "Anglesey marble". However, in this account the shafts of the font and pulpit were stated to be made from "mottled marble from the Marquis of Anglesey's quarries at Llaniestyn". This description tallies with the appearance of Penmon Marble but not with the appearance of the shafts, which are veined rather than mottled. Also, as a source Llaniestyn does not tally with the geology of the Marquis's properties in that locality. However, the Marquis also had extensive properties on Holy Island

Fig. 1. Trefnant Church Pulpit © Michael Statham

where Mona Marble (serpentinite) can be found. Although this is a more likely location for the origin of the material in the shafts, they are noticeably red in colour and the serpentinite on Holy Island is predominately of the green variety, the red variety having only been recorded on the main island at Maes Mawr, near Llanfechnell. However, there is clearly a link as Gilbert Scott used a serpentinite from Anglesey for shafts of his pulpit in Worcester Cathedral (Horák 2002).

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Dolomitic Conglomerate In Monmouthshire: Recognition And Sources - A Work In Progress

Jana Horak & Graham Oliver

Introduction

Dolomitic Conglomerate is a little-known Triassic building stone of restricted use in south-east Wales. Little is published on the use of this stone, with most information provided by Allen (2005). Following the Welsh Stone Forum field meeting to the Gwent Levels in late 2019, we continued to investigate the building stones of this area. Our attention was first drawn to this stone during a survey of the building stones of St Thomas the Apostle Church, Redwick. As Allen (2005) describes variation in the Dolomitic Conglomerate, but does not provide detailed images, we have attempted to compare and characterise Dolomitic Conglomerate in various buildings to create a visual guide to aid its identification. We also hope that characterisation will allow us to identify the source of the stone, although from the published literature there appear to be very few exposures (Welch & Trotter, 1961).

Dolomitic Conglomerate is an obsolete stratigraphic term (Howard *et al*, 2008) and the lithology is now referred to formally as the Mercia Mudstone Group Marginal Facies (Howard *et. al*, 2008) in south Wales. However, the term Dolomitic Conglomerate differentiates these rocks from other marginal facies lithologies, such as Radyr Stone, found to the west, around Cardiff, so is useful as an informal term. Allen (2005) describes the Dolomitic Conglomerate as highly variable, ranging from a very coarse breccio-conglomerate containing pebbles and cobbles, to a coarse sand-grade deposit composed of detrital limestone and fossil fragments. The colour of the matrix is equally variable, ranging from very pale brown [Munsell-10YR8/3] to reddish yellow [Munsell-7.5YR7/6]. In south Wales the deposit is of limited lateral continuity, occurring as lens-shaped units, fringing the Carboniferous Limestone outcrop. It is interpreted as having formed under arid conditions, from the erosion of Upper Palaeozoic strata in upland areas, with subsequent deposition over the lower slopes usually of Carboniferous Limestone, but less commonly Upper Carboniferous sandstones (Welch & Trotter, 1961).

Dolomitic conglomerate as a building stone

Allen (2005) recorded Dolomitic Conglomerate from thirteen sites east of the Usk, dominantly between Caldicot and Christchurch, Newport. To date we have examined five of these occurrences, selecting those with the greatest use of the stone, and the following descriptions provide examples of the range of variations to be found.

St Thomas's, Redwick (ST41218 84133)

The main fabric of this church is of reddened Carboniferous Limestone with quoins, window, and door dressings in a variety of stones. Some original dressings have been replaced during Victorian renovation with Bath Stone. Dolomitic Conglomerate is best seen in the west wall and in particular the door (Fig. 1A, B); also as quoins in the east wall (Fig. 1D, E), scattered blocks (Figs A,D white arrows) and in dressings on the north door. In all places the Dolomitic Conglomerate occurs as highly weathered, buff coloured stone consisting of a fine dolomitic matrix containing small angular fragments of grey limestone (Fig. 1C). When less weathered the stone appears to be smoother with the fragments more obscured by the matrix (Fig. 1E). The limestone fragments are mostly from 2mm to 5mm in diameter with occasional larger pieces up to 18 mm. The stone is most recognisable in the dressings of the west door where the limestone fragments stand proud of the weathered surface. The original medieval dressings are of Dolomitic Conglomerate, Sudbrook Stone (sandstone) and Dundry Stone (limestone) which can be seen juxtaposed in the north door. The Sudbrook Stone is medium-grained with scattered larger quartz clasts (up to 10mm), and the Dundry Stone shows typical weathering to a rasp-like surface.

St John's the Baptist, Penhow (ST42408 90814)

As at Undy, Dolomitic Conglomerate is present as dressings and as ashlars, although the latter only in a single buttress. Again, the window dressings comprise buff-coloured matrix with small angular grey limestone fragments (Fig. 1F–H). Vugs were not seen in the ashlars, the surface texture appearing rather fine. Bath Stone, Dundry Stone and Tintern Sandstone are also present in the window dressings while the major component of the fabric is Carboniferous Limestone.

St. Mary's Undy (ST 43993 86925)

At St. Mary's Undy, Dolomitic Conglomerate is used as dressings in the window in the west wall (Fig. 2A, B) and the door at the east end of the south wall (Fig. 2C, D). Here, the stone is very similar to that at Redwick; buff in colour with angular limestone fragments mostly less than 5mm but some up to 25 mm. It has also been used in the porch, built in 1790, but as ashlar blocks with relatively smooth faces (Fig. 2E). This is the latest date for the use of the stone that we have recorded in Monmouthshire. A notable feature of this stone is the presence of cavities (vugs). typically up to 10 mm in diameter, lined with white crystals of calcite (Fig. 2F, white arrows). Some larger lithic fragments up to 40 mm are also present (Fig. 2F, yellow arrow).

Caldicot Castle (ST48688851)

Allen (2005) tells us that Dolomitic Conglomerate blocks are scattered throughout the walls of Caldicot Castle, which is made primarily of Sudbrook Stone (Mercia Mudstone Group). At the type locality for Sudbrook Stone (Sudbrook Point, near Chepstow) it occurs as a uniform, fine to medium grained, buff to yellowish, sandstone. At Caldicot Castle the textures are coarser grained (Fig. 3)

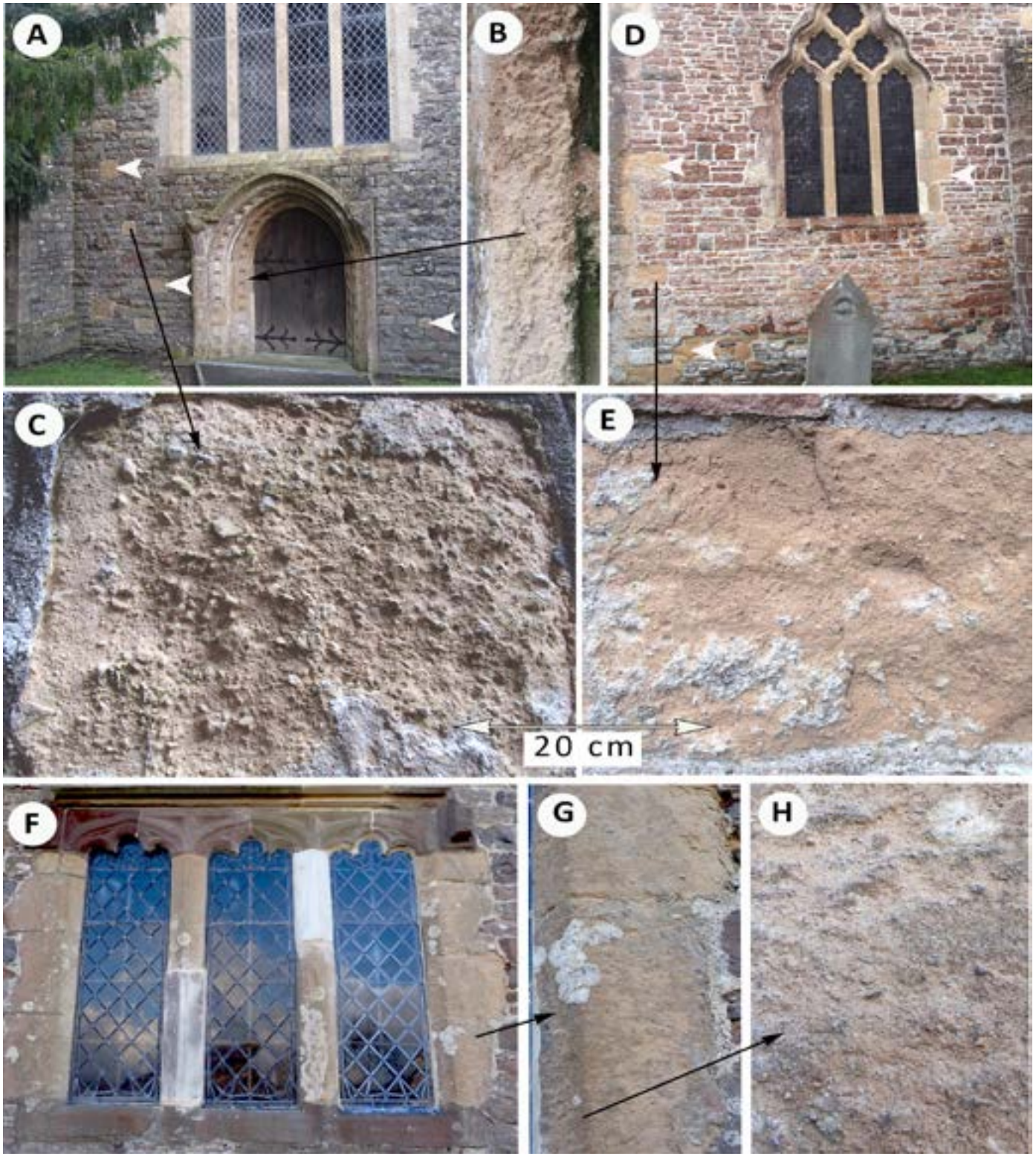

Fig. 1A–E. St Thomas the Apostle Church, Redwick, Dolomitic Conglomerate. A, west door. B, highly weather part of west door. C, weathered single block from west wall. D, east wall with Dolomitic Conglomerate quoins. E, texture of a weathered quoin. White arrows indicate examples. Figure 1F–H. St John's the Baptist Church, Penhow, Dolomitic Conglomerate. F, in the right side of the north window, G, H progressive magnification of arrowed stone to show texture.

and some blocks can be classed as a breccia (Fig. 2H). The block in Figure 3 has many rounded quartz grains along with a single large lithic fragment about 7 cm in length. The rounded quartz particles, and the finer grained reddened band at the top of the block, are typical of the Sudbrook sandstone but the larger lithic is not recorded in descriptions. The blocks in Figure 2H have numerous large (< 5mm) lithics embedded in a finer buff to pinkish matrix. A very small fragment of this matrix, from its reaction with acid and Alizaran stain, is shown to be dolomitic. Permission to sample a number of the varieties of stone will be required to adequately distinguish dolomitic from grain supported textures. Below it will be shown that there is an exposure of Dolomitic Conglomerate adjacent to the castle.

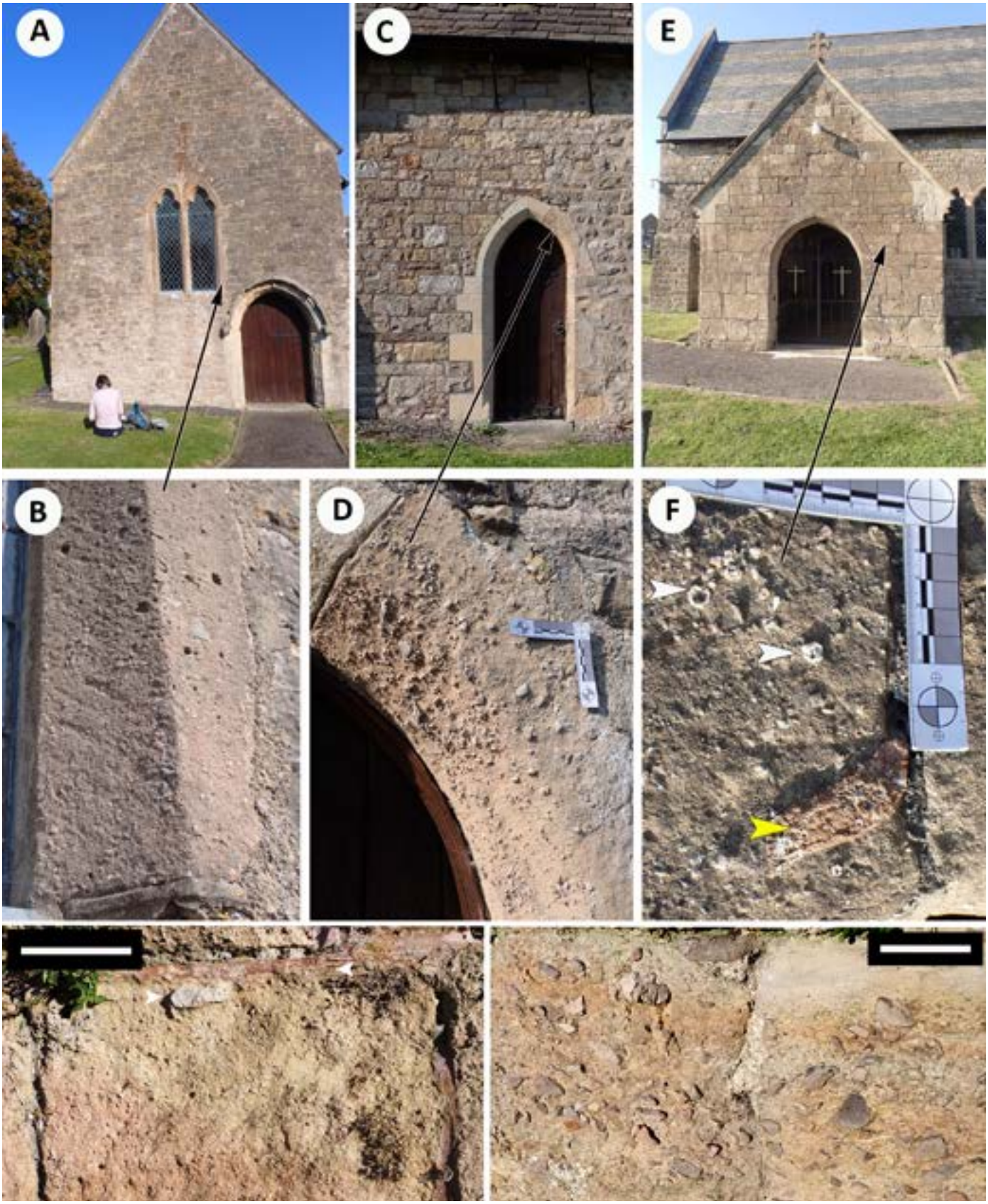

Fig. 2A–F. St Mary's Church, Undy, Dolomitic Conglomerate. A, B, mullion of west wall window. C, D, arch of door to the east of the south wall. E, F Porch dating from 1790. white arrows indicate vugs, yellow arrow a large lithic. Figure 2G–H. Caldicot Castle. G, Sudbrook sandstone in east wall, large lithic and fine reddened band arrowed. H, coarse brecciated stone in south wall. Scale bars 100 mm.

Sources

Exposures, both natural and quarries, showing a grain-size and texture comparable to those seen in the buildings examined, are rare. In most of the exposures examined so far the Dolomitic Conglomerate contains far larger limestone fragments, often at a greater density, than those used as a building stone. The exposure at Black Rock, on the Severn Estuary (ST 51483 88054), is composed

Fig. 3. (bottom left).Single pebble and matrix from dolomitic conglomerate exposure at Caldicot Castle, scale bar 2 cm.

of a very coarse breccio-conglomerate with cobbles and pebbles (up to 30 cm) resting directly on Coal Measures sandstones. At Mounton, WSW of Chepstow (ST 51211 92972), the Dolomitic Conglomerate forms a cliff some 30m in height overlying Carboniferous Limestone. The cliff is difficult to access and sample, but loose blocks below are composed of a coarse conglomerate with fragments and cobbles up to 10 cm (Fig. 4A). A similar outcrop was found at Caldicot Castle (ST 48609 88510), but although resembling Dolomitic Conglomerate, this is marked on the BGS geological map (Welch et al, 1958) as the sandstone unit within the Mercia Mudstone Group (i.e. Sudbrook Stone). The cut section (Fig. 3) suggests this lithology is closer to Dolomitic Conglomerate than sandstone.

A quarry near Penhow, (ST 42689 91168) shows exposures of moderately coarse conglomerate with pebbles up to 15cm and finer-grained bands, but not as fine as those found used as building stone (Fig. 4B,). At Farthing Hill, north of Portskewett (ST 49425 89030), the rock retrieved from a small roadside exposure is composed entirely of dolomite and appears to lack any fragments (Fig. 4C). Welch and Trotter (1961) mention the quarry at this site, which we have yet to gain permission to access. Quoting Welch and Trotter (1961) '*Dolomitic Conglomerate is either absent or represented as a thin crust of porcellaneous inorganic dolomite at the junction of the Trias and the Carboniferous. Occasionally this type of rock is as much as 6 ft in thickness as in the old quarry (ST/495891)*'. The rock we collected is not that used as a building stone as it lacks any limestone fragments.

Only at Beachley Point (Fig. 5A), close to the first Severn Bridge, did we find a rock similar to that used in the churches we have examined. Here, the Dolomitic Conglomerate occurs as a thin layer overlying Carboniferous Limestone (Fig. 5B, to the right of the orange line). Close to the limestone, dolomitic matrix can be seen between fractured limestone bedrock (Fig. 5C) which then gives way to a brecciated conglomerate with a pinkish-buff matrix and cobbles (Fig. 5D). At the head of the exposure there are thin beds, up to 20cm thick, (Fig. 5E) of a much finer textured rock. This rock has an attractive pinkish-buff hew with numerous small angular fragments, less than 5mm in size, with an occasionally larger fragment (Fig. 5F). However, although the rock at this locality is quite a close match to the building stone lithology, the location and small volume of the exposure makes it unlikely that this site was ever a source of building stone. It does illustrate how the texture changes over short distances, both vertically and horizontally, and leads us to conclude that the supply of building quality stone can be quickly depleted. Considering the locations of the churches where Dolomitic Conglomerate is used, it is more logical to assume that the stone was sourced more locally, such as from the Undy-Penhow area where the rock is widespread. It is possible that Dolomitic Conglomerate extraction was a by-product of the many limestone quarries, representing the overburden as is seen in the Pike Road, Penhow Quarry.

Texture

Dolomitic Conglomerate, as used as a building stone in Monmouthshire, has a fine buff to pinkish-buff dolomite matrix containing angular fragments, almost exclusively of limestone. On cut surfaces (Fig. 6) the matrix is seen to have a saccharoidal texture, the lack of reaction with 5% HCl, and lack of colour-change with application of Alizarin Red S (Dickson, 1965) confirms this. The angular fragments are mostly of grey Carboniferous Limestone, variable in size but rarely larger than 10mm and generally smaller than 5mm.

Fig. 4A. Coarse dolomitic conglomerate at Mounton, scale bar 15cm. Fig. 4B.Pike Road Quarry Penhow, scale bar 2cm. Fig 4C. Hand specimen of dolomitic conglomerate from Farthing Hill, scale bar 2 cm.

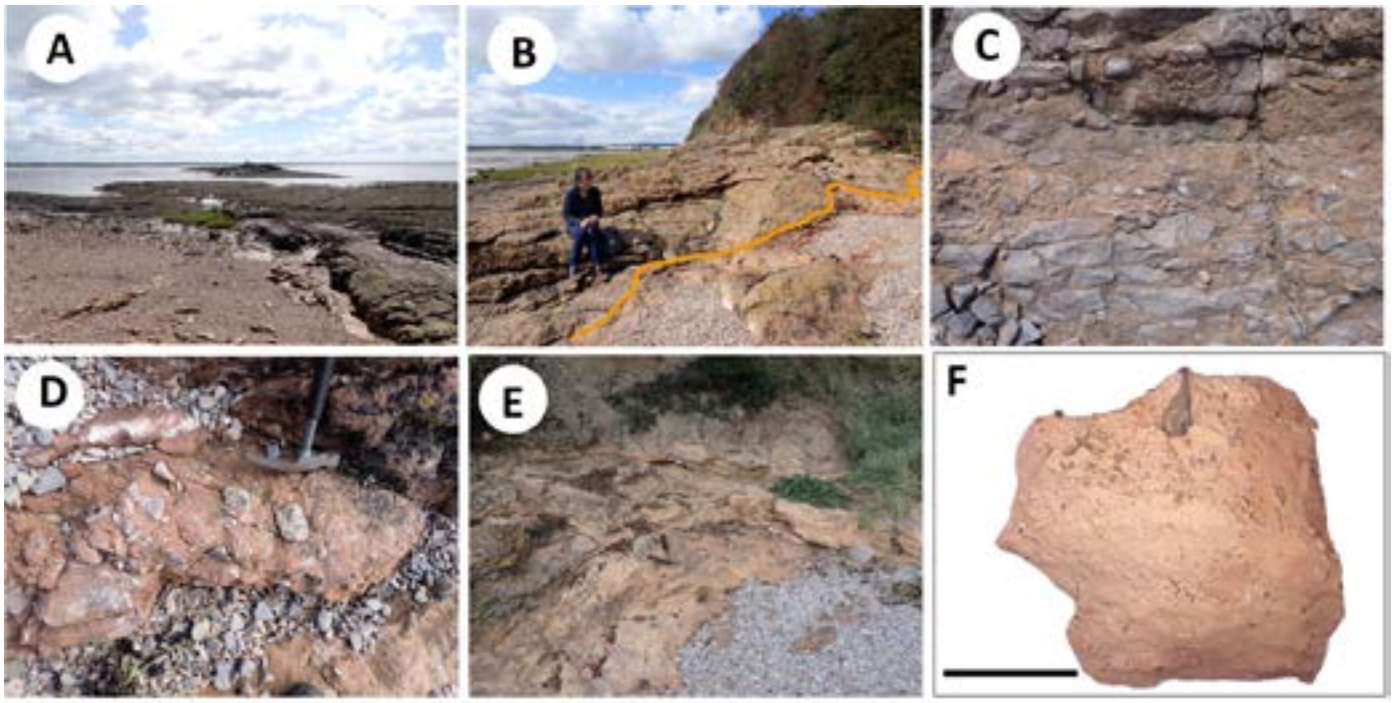

Fig. 5 Dolomitic Conglomerate (DC) exposure at Beachley Point. A, Looking towards St Twrog's island, DC poorly exposed below the gravel beach. B, DC (to right of orange line) overlying Carboniferous Limestone. C, Dolomitic matrix between fractured limestone. D, brecciated conglomerate. E, finer grained at head of exposure. F, hand specimen showing relatively smooth weathered surface (facing) and jagged fractured surface (top), scale bar 2 cm.

Remarks

This project is on-going, being interrupted by another phase of lockdown. We aim to categorise Dolomitic Conglomerate in all the buildings where it was used and attempt to gain access to another disused quarry near Penhow, where some 10 feet of rock was said to be visible (Welch and Trotter, 1961).

Further investigation of the building stones of Caldicot Castle is also required. The dominant stone used is recorded as being Sudbrook Stone (*see* WSF Newsletter No.8, 2011) but which has a rather different appearance to that found at Sudbrook itself. Our observations at Caldicot are leading us to reappraise the relationship between Sudbrook Stone and Dolomitic Conglomerate in the two areas.

Dolomitic Conglomerate is not limited to the Monmouthshire area and is widely exposed on the eastern side of the Severn in south Gloucestershire and environs of Bristol. We have yet to visit any sites in this area but a comparison with Monmouthshire stone is warranted, although it is unlikely that any stone was transported from England for use in medieval Welsh ecclesiastical buildings.

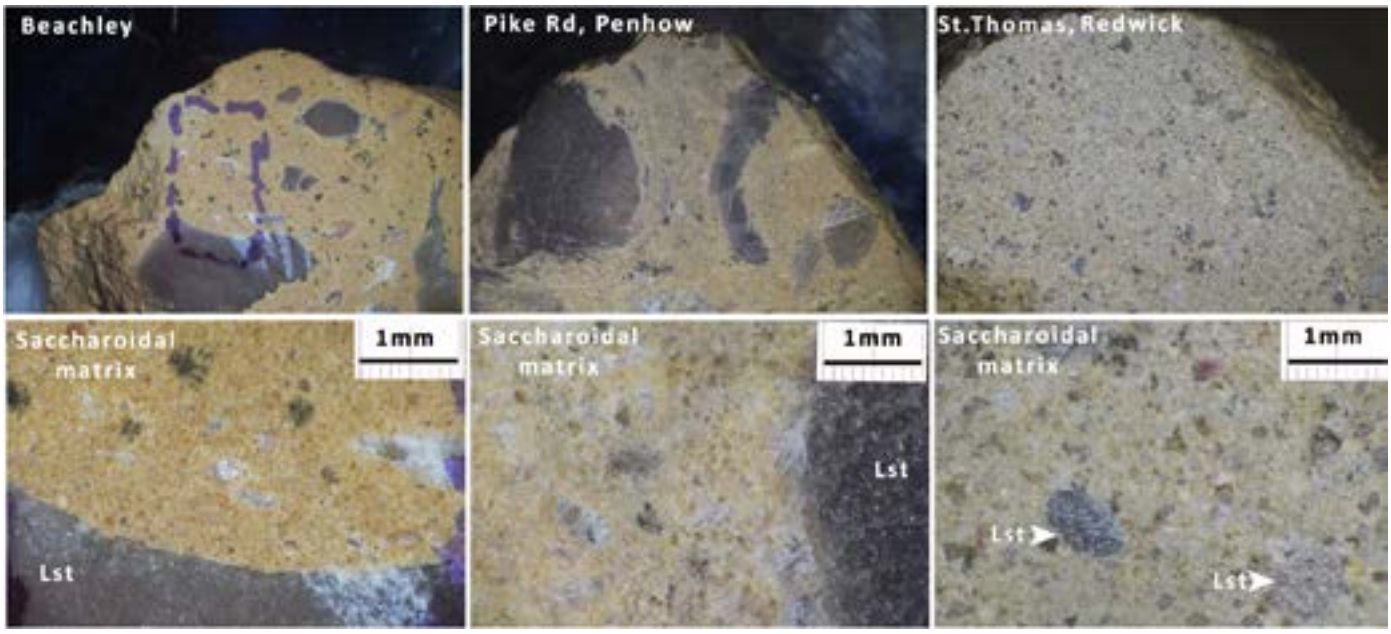

Fig. 6. Cut and partly polished examples of Dolomitic Conglomerate from three locations. Lst = Limestone.

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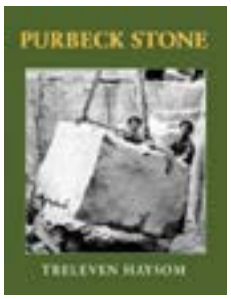
NEW PUBLICATIONS

SPAB Guide to Slate and Stone Roofing in Wales and the Marches published by Terry Hughes

The Society for the Protection of Ancient Buildings has published a guide to roofing with slates and stones in Wales and the border counties. Primarily providing advice on the conservation repair of historic roofs it includes a section on the geological sources of slates and stone slates. Written by Terry Hughes and Richard Jordan it covers previously unrecorded slating techniques which have been revealed in research carried out over several decades. It is the third in an SPAB series which includes Slating in South-West England and Slating in the East Midlands. They are available as free downloads from https://www.spab.org.uk/advice/technical-advice-notes .

BOOK REVIEWS

Purbeck Stone by Trelevan Haysom



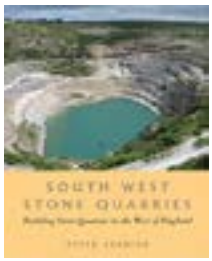
The Dovecote Press, Stanbridge, Wimborne Minster, 2020
ISBN: 978-0-995563-6-4
Casebound and Jacketed
Large format: 297 x 230 mm
312 pages, 360 illustrations
£35.00

The author is the foremost living authority on Purbeck Stone his family having been quarrying on Purbeck since the 17th century. His practical experience gained from a lifetime of quarrying and masonry work transforms the bare bones of the industry's history into one enriched by oral and working traditions handed down from one generation to the next.

Although the book opens with the chapter Stone this is not a geology book but a history of quarrying, quarriers and masons. In chapters specific to Marble, Inland Free Stone, Durlston Bay and Cliff Stone he integrates the history of the quarries and the buildings that each stone was used for. In the chapter on Uses he traces Purbeck in paving, walling and headstones. In Technology he details the tools and machines and ends with a chapter on Trade Organisations.

As a history of a single building stone I cannot imagine a more complete and intimate history. The book has 360 illustrations, many historical, giving an insight into the manual labours associated with this industry. At £35.00 this seems not an unreasonable price for the quality and length of content.

South West Stone Quarries by Peter Stainer



Twelveheads Press, Truro, 2015
ISBN 978 0 906294 833
216 pages, 241 illustrations, full colour
Dimensions: 247 x 170 mm
Softback. £18.00

Peter Stanier has written a number of books about stone, quarries and mines from South West of England and he is a noted expert on Cornish granite. His latest, South West Stone Quarries, looks at the processes involved in the extraction and conversion of building stone from mines and quarries in that part of the country. The book is written in the format of a tour revisiting that of the Victorian geologist George Harris and recording current extraction and processing at the quarries visited.

Some of the stones covered are Bath, Purbeck, Portland, Ham Hill, Doulting, Forest Pennant as well as some from Cornwall and Devon. This is a useful source of information on active quarries of stones that have been and still are used in Wales. Other books by Peter Stanier include Stone Quarry Landscapes , 2000: South West Granite: A History of the Granite Industry in Cornwall and Devon, 1999.Quarries of England and Wales: An Historic Photographic Record, 1995. Quarries and Quarrying: No. 134 (Shire Library), 1985:

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