Fforwm Cerrig Cymru Welsh Stone Forum

# NEWSLETTER

**Number 4 February 2007** **Price £2.50**

Hopefully this Newsletter will reach you by early February otherwise yet another New Year's resolution will have been broken within the first month of the New Year! Once again I am grateful to all those who have provided material and would like to put out an appeal to those of you who haven't written something for a newsletter to date to consider doing so this year. I would be especially grateful for field meeting reports, which will allow those who didn't attend to see what delights they missed and will hopefully encourage even more participants in what are becoming a very well supported activity. Photographs are welcome and it would be nice to have more of members of the Forum participating on field excursions and other activities.

In this issue the debate about the use of ballast continues with Robert Protheroe Jones suggesting that all is not what it may seem in Swansea Bay. Eric Robinson provides an up-date on what activities the Forum has been undertaking through the year, while Tim Palmer updates us on a number of issues that were published in previous *Newsletters*. There are field meeting reports for the Newport and Gower church meetings, a number of short reports on items of interest, including one from Graham Lott on things of interest from the British Geological Survey and of course the full programme of events for the coming year. Hopefully, there is something of interest to you all.

**AGM 2007**

This year's AGM will take place at the National Woollen Museum in Drefach Felindre, Carmarthenshire. After the formalities of the meeting Julian Orbach (principal author of the recently published Pevsner guide to Ceredigion and Carmarthen) will give a talk on *Stone Building in the southwest counties of Wales.* After lunch Dyfed Elis Grufydd will lead an excursion around the village looking at the local building stones. At the recent Council Meeting it was reported that all except one of the current officers were agreeable to continuing in post, and that four additional members would be voted on at the AGM (see the enclosed Agenda for this meeting). New blood is always welcome so please consider putting yourselves forward, if only as a member of Council. All nominations should be sent to the Secretary – Tim Palmer – to arrive no later than 14 days prior to the AGM.

Your current Council is:
*President:* John Davies;
*Vice President*: Jonathan Adams;
*Secretary*: Tim Palmer;
*Treasurer*: Jana Horak;
*Newsletter Editor:* Stephen Howe;
*Meetings Secretary* Steve Gray;
*Council Members*: Kieran Elliott, Edward Holland, Peter Kendall, Judi Loach, Graham Lott, Geralt Nash, Eric Robinson, Ian Thomas, David Thompson and Dai Willie.

Council is proposing the following for election at the AGM:

Judith Alfrey,
Dyfed Elis-Gruffydd,
John Shipton
Ray Roberts.

## 2007 Programme

**Saturday 31st March:** ***Kidwelly***
Leader: Graham Lott.
Meet at 11.00am at the castle car park (SO 408 070)

**Saturday 14th April:** ***AGM, lecture and field meeting at Drefach***
This year's AGM will be held at the National Woollen Museum, Drefach Felindre, SA44 5UP, (tel. 01559 370929) near Newcastle Emlyn. The AGM begins at 11.00am and will be followed by a lecture by Julian Orbach on *Stone Building in the southwest counties of Wales*. After lunch (please confirm with Tim Palmer if you wish to have lunch at the Museum) Dyfed Elis Gruffydd will lead an excursion around the village.

**Saturday 28th April:** ***Chepstow and Piercefield.***
Leader: Edward Holland.
Meet at 11.00am in the car park at Chepstow Castle (ST 536 942 )

**Saturday 9th June:** ***Anglesey***
Leaders: Jana Horak and John Davies.
Meet at 11.00am on the north side of the Menai Bridge (SH 555 716). Please confirm details with the organisers if you are interested in this trip (jana.horak@museumwales.ac.uk).

**Saturday 30th June:** ***Powis Castle and Welshpool***
Leader: Tim Palmer.
Meet at 11.00am at the castle car park

**Saturday 8th September** ***Ewenny and Ogmore-by-Sea***
Leaders: Dai Willie, Jana Horak and Stephen Howe
Meet at 11.00am at the Black Rocks car park, Ogmore-by-Sea (SS 869 744)

## Forum Progress 2006
***Eric Robinson***

In contrast to the active foraging in north and mid Wales by the 'active' group of the Forum, the senescent branch who don't travel too well have been content to consolidate business in south Wales that can be reached by First Great Western. In some ways, this could lead to more work in 2007.

In Swansea, Richard Porch is well on the way to completing a very imaginative street trail from the station to the castle, ending with a triumphant conclusion down Wind Street. This is ranging a shot for further trails and explanatory leaflets for the city centre, the potential of which was demonstrated in 2005 to John, Dyfed and I to good effect. Richard's trail uses colour photographs and a not too-wordy script to whet the appetite of a public not well-versed in geology, and a City Corporation not quite sure of how to appreciate Victorian and Edwardian architecture, which here is stunning. Funding is more or less in hand, with a grant from the Curry Fund of the Geologists' Association allowing the final product to be distributed free of charge to schools and civic groups.

A further street trail is in hand for the district to the north of the station which has the scope to link some splendid in Pennant Sandstone chapels with actual outcrops running along the steep hillside of Heathfield, which even exhibit channels scooping out great bites from the beds. This trail could be offered to the Geologists' Association, South Wales Group to produce if they care to extend their city trails in the style established for Cardiff in 2004. A job for John, Dyfed and me.

The coming of the National Eisteddfod to Swansea in September allowed Dyfed to exploit our discoveries for the faithful at the same time as bemoaning any resolve to us those plastic Gorsedd stones, even if they were green.

Finally, Ron Austin has managed to get approval for another street trail based upon Swansea Museum and surrounding area from Victoria Road, including the Guildhall. This neatly dovetails with the other work with the widest range of treatments likely to meet the needs of all clients.

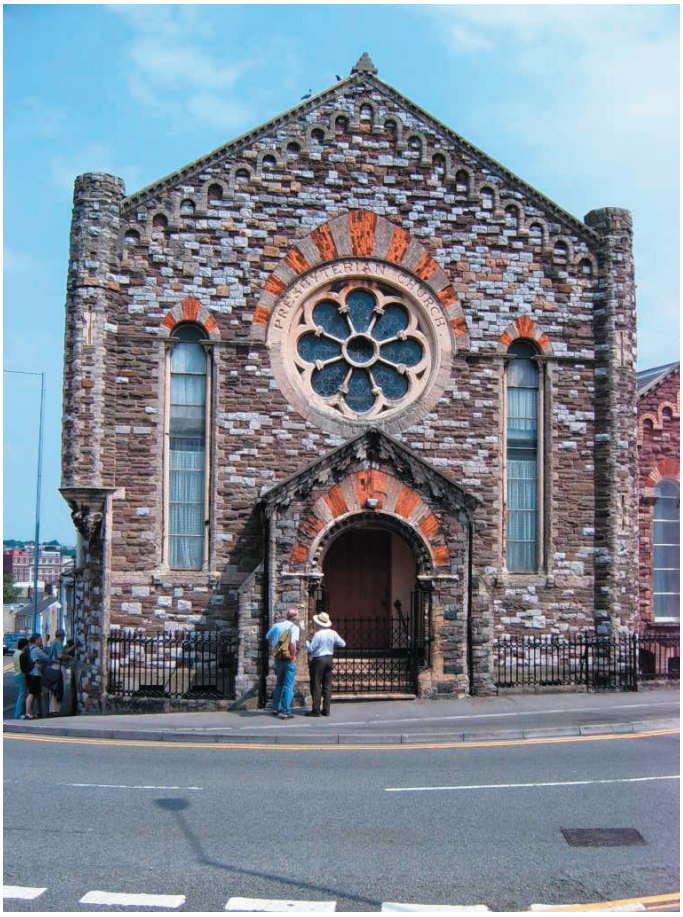
If Swansea is well in hand, it remains for the Forum to do justice to Newport as the third City of Wales. After another opportunity to sample Newport's contrasting range of rock types and historic styles was made on July 1st what remains is to build a relationship with St Woolos Cathedral and its congregation and guides. There must be a local Civic Society who at present supply 'blue plaques' covering the building's history but make no comment upon the stones or their provenance. The stories behind these could be fascinating to those already proud of their past, if we can reach them. Here, we need more information about the stone from Sudbrook and possibly Sutton Stone, although the 'edible' Beer Stone and the Old Red Sandstone drilled by *Pholas* from the tidal Usk, are already well in hand. I feel that this could be a fitting campaign for the Forum, in 2007.

A final note. The expedition to Dundry Hill in foul weather gave us contact with the enthusiastic Arthur Price who is no mean amateur in the field of the Inferior Oolite building stones of the Cotswold scarplands. I'm sure that in collaboration with Tim, he could produce a valuable foray into land beyond the Severn. Arthur has produced a very well crafted summary of the geology of the Cotswolds in the revision of Pevsner's Buildings of England series. As President of the Gloucestershire Geoconservation Trust for the coming year(s), I will awaken their commitment as suppliers of stone to Wales, if only to swell the numbers we should seek an excursion.

# The Building Stones of Newport, Gwent.
## 1st July 2006.
***Stephen Howe***

Located just beyond the southeastern edge of the South Wales Coalfield Newport exhibits a wide range of building stones, both local and from further afield. The central part of the city consists of two distinct districys; the older around the hill surrounding St Woolos Cathedral and the younger around Clarence Bridge over the River Usk adjacent to the castle. Under Eric Robinson's leadership we undertook a circular walk from the railway station, along High Street and up Stow Hill to St Woolos Cathedral and then back to the station. Being a port many of the 'foreign' building stones relate to past trading relationships, a feature that Eric picked up on as the day progressed.

Examples of the local Old Red sandstones are relatively rare along High Street. Here the buildings exhibit a wide range of 'foreign' material commonly seen in many other town centres; Bath Stones (Yates Wine Bar), Portland Stone (Anglia Buildings), St John's Travertine (McDonalds), Swedish Granite and Larvikite (the Travel Centre) and Cornish Granite (Railway Station and National Westminster Bank). However, leaving High Street and beginning the climb up the back of Stow Hill things change dramatically.




**The Welsh Chapel, Havelock Street**

Havelock Street contains an extraordinary Welsh Chapel and side hall, which is undoubtedly one of the most remarkable buildings in Newport. It was built in 1864 and its random mixed stone walling produces an amazing polychromatic effect. Closer examination reveals a mix of Bath Stone, Pennant Sandstone, Old Red Sandstone, Devonian limestones, granite, augen gneiss and gabbro. The pieces of Devonian limestone are fossiliferous and exhibit algal structures and even sheared pieces of crinoid and are probably derived from the Plymouth area. The exotic nature of many of the stones would appear to indicate that much originated as ship's ballast. This contrasts with the slightly later church hall alongside which is composed of Old Red Sandstone (Brownstones) and brick.

Continuing up Stow Hill the old St Woolos County Primary School, built in 1904-5, is an imposing three-storey building. Its frontage is of rustic dressed Pennant sandstones on the lower storey, with brick and Portland Stone ashlar for the two upper storeys.

St Woolos Cathedral dominates the summit of the hill. The church has a Saxon foundation and was granted to Gloucester Abbey in 1093. It became a pro-cathedral in the newly created diocese of Monmouth in1921 and was raised to full cathedral in 1949. The bulk of the walling is composed of various locally-derived Old Red sandstones, but with some interesting additions. At the west end of the church the buttresses supporting the impressive Perpendicular tower are faced in ashlar blocks of Bath Stone and Old Red Sandstone. Many of the Bath Stone blocks exhibit calcite-filled 'snail-creep' veins, a feature very distinctive of Bath Stone, while some of the Old Red Sandstone blocks show blistering due to the weathering of their constituent pyrite. Closer examination of some of the Old Red ashlar reveals that all is not as it seems and in fact some of the blocks are artificial replacements.

***Pholas* borings in Old Red Sandstone, St Woolos Cathedral**

On the north side the walls of the oldest part of the church, St Mary's Chapel, are again of locally derived Old Red sandstones, many of which are peppered with small, circular holes. Eric and John tried to convince those present that these were the result of borings by the common piddock (*Pholas*) indicating that the stone had been extracted from a location alongside the tidal river or estuary. Amongst the Old Red sandstone are blocks of

infraformational conglomerates. The modern renewals are of bright pink/red Wilderness Sandstone from the Forest of Dean, which visually stand out very harshly from the older stone. Sudbrook Stone, a bright, yellow sandstone with white quartz pebbles, which is part of the local Triassic succession, is also found. The renewed chapel windows are of Ham Hill Stone, while close to the walls is the base of an old preaching cross, composed of one of the Cotswold Jurassic limestones, which might date to the time when the church was tied to Gloucester Abbey.

The full glories of this chapel, probably built in the 1140s, are on the inside where a superb decorated Norman archway separates the Chapel from the nave. It is built of blocks of white, chalky, Beer Stone (Upper Cretaceous from southeast Devon) and tufa, the latter probably being reworked from the Roman site at Caerleon. Within the chapel Eric pointed out the memorial to the 1939/45 war which is of Jurassic Doulting Stone and exhibits the characteristic tiny crinoid ossicles rather than ooliths that help to identify this stone. In the nave the rounded Norman piers are of yellow Sudbrook Stone and Bath Stone and the arcading between them of Bath Stone and tufa.

**Sudbrook and Bath Stone piers, St Woolos Cathedral**

The choir and chancel, floored with Pennant Sandstone, date from the 1960s while at the east end is an abstract, multimedia piece by John Piper and Patrick Reyntiens that, to say the least, is in sharp contrast to anything else in the church!

Returning to the station down the east side of Stow Hill time was spent admiring the late Georgian splendour of Victoria Place and the splendid United Reform Church at its east end. This church, built in 1858-9 for the Congregationalists, is of Bath Stone and richly carved with vine scrolls and foliage. Lower down Stow Hill, St Mary's Presbytery provides a good example of the extensive use of deep-yellow coloured, highly cross-bedded Ham Hill Stone, here in association with Pennant Sandstone.

At the bottom of the hill, facing onto Commercial Street, is the imposing former Westgate Hotel (now *Baltica*). Built in 1884-6, this large building is of Pennant Sandstone with a large amount of Beer Stone dressings. The entrance porch has Balmoral Red granite (Precambrian age) from Finland at its base in which can be seen crystals of black quartz that is so typical of this stone. Above is typical Shap Granite with large, pinky-coloured feldspar phenocrysts. Close by, on the corner of Bridge Street and Stow Hill, the HSBC bank building has a brown matrix Cornish Granite base with brown-coloured Carboniferous sandstones, probably from Derbyshire, above. Detailed examination will reveal that within the granite base blocks of white Cornish Granite, red Brazilian granite has been inserted to accommodate the cash point machine. Once spotted, these replacements look totally out of place.

This was an excellent excursion, undertaken in brilliant sunshine and soaring temperatures – not what one usually expects! Although Eric was the main leader many others partook in the general distribution of knowledge, especially our President John Davies. Eric certainly achieved his aim of making us all aware of the richness of Newport's stone heritage. In the relatively small area visited it is apparent that the city, often seen as the poor relation amongst the cities of Wales, has a lot to offer. To rectify this impression Eric is in the process of writing a guide to the building stones of the city centre that will be produced by the Geologists' Association South Wales Group, hopefully later this year.

## THE GEOLOGY OF SOME GOWER CHURCHES, 7th October 2006

***Stephen Howe***

The last field meeting of the year, a joint excursion with the South Wales Group of the Geologists' Association , was to look at the geology of a number of churches within the Gower peninsula, beginning at Llangennith in the far west and gradually working eastwards. Due to the large number of participants and the lengthy discussions that occurred at many locations time inevitably ran out and a couple of churches had to be left for another day. Thanks to John's excellent preparations access had been arranged to Llangennith, Llanrhidian, Nicholaston, Penrice and Reynoldston churches, most if not all of which are usually closed to the public outside of church service times.

Generally, the outside appearance of the churches reflects the underlying geology with sandstones and conglomerates of Old Red Sandstone age or Carboniferous limestones, dominating. However, closer examination does reveal stone derived from other sources both close to Gower and farther afield. Inside the buildings a range of more exotic stones can be found that pose questions as to their source and why they were used in the first place.

The outer walls of St Cenydd's, Llangennith are composed of coarse Old Red Sandstone conglomerates and Carboniferous limestones. The conglomerates probably originate from the outcrop on Llanmadoc Hill, opposite the church but a few appear more reminiscent of those from the Millstone Grit, which could be derived from the local Drift. The windows are of Dundry Stone with later replacements of Bath Stone while the coping stones on the churchyard retaining wall are of white Cornish Granite. Due to the extensive plastering of the internal walls it is the monuments and other items that are of particular interest. The font and C14th broken effigy of a recumbent knight (probably a member of the local de la Mere family) are of Dundry Stone and show its characteristic lack of ooliths. On the west wall is a C9th carved monument that may well be the remains of the shaft of cross. The swirling design is carved into a yellow sandstone, presumably of Carboniferous age, that is certainly not of local origin.

**C14th Dundry Stone effigy of a knight, Llangennith**

Lying on the flanks of the Carboniferous Limestone outcrop the church of St Rhidian and Illtyd at Llanrhidian is, as one would expect, dominantly of Carboniferous limestones with a lesser amount of Old Red sandstones. The stone used in the chancel windows is a puzzle. Some pieces are almost certainly Sutton Stone but others look suspiciously like Quarella Sandstone. Inside, Sutton Stone has been used in the wall buttresses and in the original windows with later Bath Stone replacements and repairs. Like Llanrhidian the font is of Dundry Stone. Inside the porch is a C9th-C10th carved block of Carboniferous Limestone, which depicts two exceedingly stylised figures (thought to be St Paul and St Anthony). Tim Palmer pointed out solution holes caused by both weathering and from the fruiting bodies of lichens, which shows that at some time it must have stood outside. Against the south nave wall is a large slate slab monument. A lengthy debate ensued as to its whether its source was Pembrokeshire or North Wales. The jury is still out.

The church of St Nicholas at Nicholaston, lies on the southern flanks of the Old Red Sandstone ridge of Cefn Bryn. This tiny jewel of a church, part hidden beside the main south Gower road, was built in 1892-94 through the wealthy patronage of Miss Olive Talbot of Penrice Castle. Parts of the original church were incorporated into the build but most of what you see dates from the late 1800s. The west wall, composed of Old Red sandstones and Carboniferous limestones, here pale grey reef limestones with ooliths, gives no indication of what is to come inside. The ashlar quoins are of Sutton Stone, an unusual choice for a church of this age, while the spectacular multi-arched entrance porch, is made of beautifully carved Quarella Sandstone with bright red sandstone pillars. Again, these are almost certainly of Old Red age but probably from the Forest of Dean rather than Gower.

**Quarella Sandstone carvings, Nicholaston**

Inside, the church is an eye-opener. The range of stone used and the quality of the carving is amazing. The nave floor is of polished black local limestones, white Italian marble and red and black Devonshire marble, while the steps up to the altar are of red Numidium Marble, probably from Syria. The windows are of pink alabaster, reminiscent of that attributed to Penarth interspersed with columns of green Connemara Marble and red crinoidal limestone, probably from either Devon or Cork. The base of the crossing arch is of Sutton Stone while beautifully and intricately carved Quarella Sandstone occurs in many places. The large black limestone wall monument on the west wall, made by P Rogers of Swansea, is supported on blocks of Mumbles Marble. Ron Austin remarked that monuments made by this company are always mounted on blocks of Mumbles Marble. Interestingly the circular font was not of Dundry Stone but of travertine or tufa that it was speculated might have come from a local cave.

**Pink alabaster and green Connemara Marble in the windows, Nicholaston.**

Unlike St Nicholas' the church of St Andrew at Penrice is very much back to basics. Standing on the Carboniferous Limestone outcrop the main wall fabric is of these limestones. They also contain random blocks of differing rock types that are probably derived from the local Drift. Of note was the tower, the top 25% of which contains a far greater amount of Old Red sandstone than anywhere else in the buioding. Tim Palmer pointed out the use of different 'Bath Stones' in the window to the east of the porch. The bulk of the window is of Box Ground Stone and exhibits the long 'snail-trails' and weathered-out shell layers which is so typical of this stone. However, examination of the central spar shows it to be of Stoke Ground Stone.

The church dates from the C12th and the entrance archway is of conglomeratic Sutton Stone but the Norman arch forming the crossing is of a strange, very porous sandy rock, rather reminiscent of what a natural breeze-block would look like. After much examination and discussion the tentative conclusion reached was that it may be derived from one of the local Pleistocene raised beaches.

The final brief stop of a very busy day was the church of St George, Reynoldston. Lying on the flanks of Cefn Bryn it is almost entirely built of sandstones from the local Brownstones (Old Red Sandstone). A Norman window in the chancel survives from the original church but the present building dates from 1866-7. Amongst a number of interesting items inside was the font, which like Nicholaston is of travertine but this time of a stalactitic origin, and the pulpit which has been carved from a very fine-grained Portland Stone Base Bed.

This excursion showed that a wealth of interesting stone can be found in Gower's churches even though from the outside they all appear to be dominantly of locally derived rocks. The church of St Nicholas' at Nicholaston is certainly one of Gower's jewels and if you have never seen this amazing church then you are certainly missing out. The trip left us all wanting to continue the journey eastwards so perhaps John can be tempted to undertaking 'Part 2'at a later date. Our thanks go to John for all of his planning and leadership and to Tim and Ron for their considerable input and also to all of the church wardens who opened their buildings for us.

## Ballast and Beach Pebbles – some observations

***Robert Protheroe Jones***

Eric Robinson's note on ballast and beach pebble wall-cappings observed at Swansea [1] prompts some observations on the nature of ballast, not least because my previous home in Cardiff, a late 1890s terraced house in the Roath area, boasted gneiss ballast wall-cappings, which first set me thinking about this subject.

Welsh ports, and more especially the ports of the coalfields, were overwhelmingly concerned with exports rather than imports and hence a sizeable majority of incoming vessels arrived in ballast. Ballast was often disposed of in a very ad hoc manner – as early as the mid C16th Swansea Corporation passed a resolution forbidding the throwing of ballast in the River Tawe or in places where ships customarily laid. The disposal of ballast was a problem of long standing and the Corporation's accounts from the C16th to the C19th contain many references to the disposal of ballast and to fines imposed. The mid C16th resolution is of interest in that it enumerates a variety of materials that were carried as ballast: '*lymestons, myllstons or eny hother kynde of stons or sand or clay or any hother kyngde of balast*' [3].

The first documented mention of ballast being useful - undoubtedly for building stone - that I have encountered is an order by Swansea Corporation of 1585. This forbids the populace from taking away ballast stone from the quay without payment of 6d per 'carfull' or 3/6 per ton, split equally between the Corporation and the Lord, and forbidding ships from selling their ballast directly to the populace [2]. A more definite reference to the use of ballast for building appeared in 1792 when a Swansea alderman observed '*some good building stones brought here as ballast from Waterford…sometime black of a blueish colour, some very large*' [4].

Ships tended however to discharge ballast whilst awaiting to enter port and recognition of, and attempts to regulate, this practice also appear. In 1750 Swansea Corporation order *'immediately provide stakes for the marking out proper places for the throwing out of ballast*' [5] - i.e. in Swansea Bay. By the mid C19th , ballast was forbidden to be thrown out within two leagues of Mumbles Head [6], suggesting that so much had previously been thrown out closer to the shore that it was causing navigation problems. The mid C19th Cardiff Docks by-laws are typical: *'...the masters of vessels selling or disposing of such ballast, shall for every quantity so disposed of, be liable to pay the usual rates of tonnage for the same. Every vessel shall discharge her ballast at her own expence, and at such place as shall be appointed by the Dock-master, his agent, or assistant*' [7].

The C16th quotation above indicates that ballast could take many forms. The reference to 'myllstons' probably indicates a 'paying ballast', as may 'lymestons' - lime is easily spoilt by moisture and hence limestone was usually shipped to a kiln near to where the lime was needed. The prerequisite quality of non-paying ballast was that it should be as inexpensive as possible and hence much ballast was unusable for building. In 1938 at Belfast the *SS Moshulu* took on '*fifteen hundred tons of coarse dark sand used in the manufacture of pig iron, huge lumps of paving-stone, granite blocks, and the best part of small house*' [8] – plus, courtesy of dockers, two dead dogs which, 12 weeks later, the crew scraped up in 120 degree heat when throwing the ballast into the Spencer Gulf, South Australia before entering Port Victoria [9] – the disposal of ballast offshore was not confined to Europe.

In a Welsh context, passages in ballast predominated to the mineral exporting ports, especially those serving the south Wales coalfield, although growing imports gradually eroded the massive preponderance of inward vessels arriving in ballast. For example, at Llanelli at the start of the C19th over 80% of incoming vessels entered in ballast, but after the opening of a major copper smelting works the percentage of vessels entering laden with copper ore increased from zero to over 30% within two decades [10]. The decline in vessels entering in ballast came long before coal exports declined. Imports – of metalliferous ores (especially iron ore), timber and pitwood – accounted for a continually expanding proportion of shipping: at Cardiff's Bute Docks in the 1860s, import tonnages were the equivalent of around 10% of export tonnages; at Swansea in the 1900s, import tonnages were the equivalent of 20 to 25% of export tonnages [11]. However, it was the growing use of water ballast in iron and steel steamships from around 1860 that most markedly decreased the tonnages of ballast handled [12]. Steamships rapidly displaced sailing ships from most trades and the quantity of ballast landed at Welsh ports declined proportionately.

Thus the heyday for ballast in Welsh ports was short lived – it commenced in the early coal exporting ports of west Wales in the C18th, and commenced in the great coal exporting ports of south east Wales in the C19th , and terminated in the third quarter of the C19th .

Many harbours possess ballast banks and ballast tips. Examination of 'Tip y Ballast' at Llanelli [13] revealed a conspicuous lack of useful stone, strongly suggesting that it had been separated out when ballast was discharged. The exotic make up of ballast tips encourages locally unusual flora, a phenomenon enhanced by the presence of seeds inadvertently imported with the ballast [14].

A complication in establishing the likely origins of ballast is vessels in the tramp trade (i.e. not operating on a regular 'liner' service between specific ports) which typically carried a number of cargoes between different ports before returning to a south Wales coal exporting port. Further, a vessel might discharge its cargo at one British port before sailing a relatively short distance to a south Wales coal exporting port to load an outward cargo. The following two voyages of the *SS Amelia* in the 1850s illustrate this pattern on a very local scale [15]:

- Sailed from Devoran (on the River Fal, south Cornwall) to Spitty Bank (On the Carmarthenshire bank of the River Loughor, opposite Loughor town) with copper ore, then empty to Penclawdd to load coal for Wadebridge (north Cornwall).

- Sailed from Devoran to Spitty Bank with copper ore, then empty to Llanelli to load pig lead for Le Havre, France.

A vessel frequently unloaded its Welsh coal at one port, loaded a cargo for an intermediate port and returned in ballast from that second port. This practice was prevalent for vessels sailing with coal for Mediterranean and Black Sea ports – they not infrequently loaded grain, salt fish, iron ore or lead ore at a second port before returning to a Welsh port (e.g. iron ore for Cardiff or Newport; lead ore for Llanelli) or, depending on the cargo, via another port (e.g. grain to Bristol). Such practices enabled optimal utilisation of ships and minimised ballast (i.e. non-paying) passages [16]. Some vessels found cargoes of paying ballast – for example a vessel that discharged copper or lead ore at the smelting works at Penclawdd may have loaded Gower limestone for kilns at Llanelli or elsewhere [17].

The relevance of the foregoing to ballast unloaded at Welsh ports is twofold. Firstly, records of shipping arrivals and sailings, and ports' annual statistics to which coal and other cargoes were exported might at first sight suggest the prevalent sources of ballast with a degree of exactitude; however, the ports listed will not infrequently be different to the ports at which ballast was loaded. Secondly, vessels probably often loaded second hand ballast, for a ballast-quay master would not send all incoming ballast to be tipped if the port's regular trade saw vessels loading as

well as unloading ballast. The sources of second-hand ballast would reflect the detail of the trade of each port. Thus whilst knowledge of the prevalent trade of the various Welsh ports will assist the geologists in their examination of ballast tips and ballast stone used in buildings, it cannot be more than the most approximate guide. Greater reliance should be placed upon geological identification of the stone.

The quotations above well illustrate that some ballast was useful as building material from the early modern period and also illustrate that disposal into the sea once occurred on a large scale. Thus the possible use of ballast should be borne in mind when examining structures predating the late C19th - the most usually recognised period for the use of ballast for building. Further, beach pebbles - both in situ or utilised for building - may be of local derivation, glacial, or may have originated as ballast, with the degree of angularity/rounding depending upon a number of factors – their original form, their mineralogy and lithology, the hydraulic regime of the beach, and the rate of sedimentation as burial may have protected the stones [18].

The beach pebbles discussed [19] are mostly not 'pebbles' in geological terms. Properly, they are overwhelmingly cobbles with a few ranging into boulder size [20]. This divergence between general and geological use of the word 'pebble' is misleading. Personally I have always thought that the south Pembrokeshire dialect term 'pobble' for rounded clasts larger than what are generally termed 'pebbles' (i.e. small boulders in geological terms) had much to recommend it. Thus the title of this note should have been either 'Ballast and Beach Cobbles' or 'Ballast and Beach Pobbles'…

Despite the uncertainties of origins of ballast discussed in this note, the examination of ballast stone both in tips and in buildings is rewarding and interesting, not least for the marked variety it introduces to otherwise mundane structures. Ballast should also be borne in mind as a potential origin of exotic pebbles found on Welsh beaches. Ballast stone is an important and tangible reminder of the former scale and diversity of Welsh maritime trade.

References


1. Robinson More about 'ballast', Welsh Stone Forum Newsletter No.3, 2006, pp.8-10;
2. Quoted in W.H. Jones History of the Port of Swansea, Carmarthen, 1922, p .25.
3. E ibid, p.27
4. ibid, p.27, n.2
5. ibid, p.51
6. ibid, p.70
7. Bute Docks by-law no.10, reproduced in W.H. Smythe Nautical Observations on the Port and Maritime Vicinity of Cardiff, Cardiff, 1840, pp.[v-vi] of Appendix
8. E. Newby The Last Grain Race, London, 1988 edition, p.57; the 'coarse dark sand' would have been spent iron foundry moulding sand rather than blast furnace pig bed sand, for there were no blast furnaces in Ireland save for a brief period in the mid nineteenth century.
9. ibid, pp.163-166.
10. V. Symons Coal Mining in the Llanelli area – Years of Growth, 19800-64, pp.53-64 in C. Baber & 10. L.J. Williams (eds) Modern South Wales: Essays in Economic History, Cardiff, 1986.
11. R.S. Craig The Ports and Shipping 1750-1914, pp.465-518 in A.H. John & G. Williams (eds) Glamorgan County History Vol.5: Industrial Glamorgan from 1700 to 1970, Cardiff, 1980, pp.471, 476. These figures are for tonnages shipped both coastwise and foreign – port data are bedevilled by commodities being expressed as 'loads', or volume, or values or other measures, rather than by weight, and by a frequent - but not always stated - exclusion of coastwise shipments from export data.
12. R.S. Craig Aspects of Tramp Shipping and Ownership, pp.15-39 in Research in Maritime History No. 24, St. John's, Newfoundland, 1978, esp. pp.33-34; R.S. Craig The Ship: steam tramps and cargo liners, London, 1980, esp. pp.7-8.
13. A prominent mound topped by an electricity pylon, located at NGR SS 501/991; although now largely grassed over, formerly much soft chalk and sand was visible.
14. I.K. Morgan The Llanelli Levels, pp.4-32 in Bulletin of the Llanelli Naturalists, No.1, 1985, esp. p.23. Morgan also speculates that an unusual insect occurrence may also be attributable to inadvertent importation with ballast.
15. Cash book of Capt. W.R. Thomas, National Museum of Wales Department of Industry Acc.No 1994.80/1-2.
16. R.S. Craig Aspects of Tramp Shipping and Ownership, pp.15-39 in Research in Maritime History No.24, St. John's, Newfoundland, 1978 explores this, including copious references to south Wales contexts.
17. R.S. Craig, R. Protheroe Jones & M.V. Symons The Industrial and Maritime History of Llanelli and Burry Port, 1750 to 2000, Llanelli, 2002, pp. 342
18. Eric Robinson op.cit. pp.9-10 broached these possibilities; hopefully the present note provides a focus for further consideration.
19. ibid, illustrated on p.9
20. Different geological dictionaries provide variant definitions but broadly there is a logarithmic relationship between pebbles, cobbles and boulders, with the last being an open-ended term as regards size.


## Updates on articles in earlier Newsletters

***Tim Palmer***

Our previous three Newsletters have all carried accounts of little-known building stones that have either been quarried and used in Wales in past times, or else have been brought into the country from England in order to meet Welsh requirements for freestone. A couple of these articles have been followed up by further investigation and indeed the earlier descriptions exhorted readers to 'watch this space'.

Well, to faithful space-watchers we can tell you the following. The ?medieval sandstone quarry in the Rhinog Grits at Egryn, just north of Barmouth (*Newsletter* 1), has now been surveyed on the ground by archaeologists from the National Trust, and photographed from the air. The archaeologists have pointed out that the likely floor of the quarry cuts across earlier cultivation ridges, and also that it is covered by the outlines of many built structures and enclosures of probable medieval age. Money for a geophysical survey is probably going to be available, and the owner of the land has been very helpful and is interested

in the investigations. The question remains as to the route over which the stone was taken out of the area, but a level ancient track that runs westwards towards the coast has been identified. The site of the C12th trackway on the shore that was excavated in the late 1970s appears to be in an area that is known locally as Porth Egryn and which may well have been a site at which boats were landed on the beach until the C19th. Enquiries continue, but the peat at the back of the beach in this area (covered by the sea at high spring tide) has, at sometime in the past, been cut away perpendicular to the shoreline to provide possible wharves. The finest of the medieval buildings that contain Egryn Stone are Cymer Abbey and Egryn 'Abbey' (see the original article), and Llanaber church, just to the south of 'Porth Egryn'. Egryn Abbey itself, destined for up-market holiday accommodation by the National Trust, has currently been stripped out internally to reveal an exquisite early C16th Hall House (a date that is late for this type of construction). The addition of the dormer windows (with Egryn Stone mullions) is a bit later. According to Richard Suggett of the RCAHMW, the construction smacks of wealth and is unusual for this part of Wales, suggesting that the quarry may have been an important income generator within the immediate region

**The church door (13th C) at Llanaber, north of Barmouth, showing some of the variation in colour and texure seen in the Egryn Stone.**

A second possible source of similar stone has been located a few km to the north, at Byrdir. There is a local belief that this is the site that provided the stone for the mullions of the mansion and associated buildings at Cors-y-Geddol, one of the most important gentry houses in Merionedd and dating back to the late C16th. A large barn at this site carries a date plaque of 1688 and has sandstone slit-window jambs of the right type. In Dolgellau churchyard, and at the porch of the church of Llanddawe, there is evidence of this type of stone being used as late as the latter part of the C18th or into the C 19th, so nearly 800 years of use of this important local material are suggested by the surviving buildings. Even some of the churches that were completely rebuilt in Victorian times have odd bits of Egryn stone, presumably reused from the earlier fabric, incorporated into their walls. The identification of individual stone types may therefore prove to be one of the few sources of hard evidence about the appearance of these early structures.

**The Lion Font at Llanarth in Ceredigion, made of Dundry Stone imported from Bristol.**

Also in *Newsletter* 1 was a report of the Dundry Stone (originally from Dundry, south of Bristol), seen in the Cistercian Abbey of Whitland. Dundry is fortunately quite unmistakable once examined closely, and it is becoming clear that it was of huge importance in southern and south-western Welsh building from the C11th up to at least the early C15th. It is particularly widely met in churches and other ecclesiastical buildings, both for the fabric and for statues, monuments etc. Some of the uses are well-documented (St David's Cathedral; Llandaf Cathedral – see Dr Maddy Gray's article about Llandaf monuments in the *Newsletter* 3), but it is becoming clear that it can similarly be found in many smaller and hitherto unrecorded (stone-wise) churches, both internally and externally. Recent discoveries include Llanmadoc in western Gower (external dressings and crusader tomb); the iconic lion font at Llanarth in Ceredigion and the font at Llanrhain northwest of St Davids, where an attached note misleadingly says that the stone is unknown in Britain and probably was brought back from the Holy Land by returning knights. It is a relief to know that they were able to save themselves the excess baggage cost by taking a delivery from Bristol!

The remarkable thing about Dundry stone is its ability of withstand the weather even in the harshest environments. Few places are more exposed to the destructive effects of wind and sea-spray that the late 13th C. castle at Aberystwyth, where most of the freestone, known from records to have been imported from Bristol, has long since been robbed. But the north tower was repointed earlier this year (2006), and a scaffold allowed access to the high windows that are still dressed with the original limestone . Even better, the raking out of the old mortar had also raked out a lump of one of the jambs so the diagnosis of Dundry stone was confirmed by microscopic study. The Forum visited Dundry earlier in the year on a day whose wetness made us all feel thoroughly at home. The church tower

carries an exquisitely complicated array of pierced screens between the pinnacles, surely an example of medieval advertising as to what could be achieved with Dundry stone in the hands of a skilled mason, and a large lump of raw stone, doubtless a sample, sits in the churchyard. The medieval quarries have recently been filled in and flattened, and the surviving mine that the party entered (no bats were disturbed during the conduct of this field-trip…) is C19th.

**Original Dundry Stone dressings in upper window of the north-west mural tower, Aberystwyth Castle.**

A poorly-known stone from west Wales that was discussed in *Newsletter* 2 is the pale Ordovician sandstone of southern Ceredigion that dressed up to give good quality ashlar and walling in many C19th farms, chapels etc. Julian Orbach (principal author of the new Pevsner book on Ceredigion and Carmarthen and speaker at our 2007 AGM) has pointed us to architectural records in which such a stone was called Pwntan Stone. It was quarried near Pwntan Mawr Farm in Tanygroes, on the main road about 5 miles east northeast of Cardigan. The quarry is still there, overgrown and the subject of a planning application to build bungalows in it, on the hilltop just south of the main road (a communications mast is next to it). The chapel and adjoining house in the village show how tidy the results of using this stone can be in the hands of a skilled mason.

**Pwntan Stone at Tanygroes, ENE of Cardigan.**

The origin of the name of stone and farm are interesting. Which came first? Often stones are named after the places where they occur. My scholarly Welsh friends tell me that the name means literally 'fire pack' or 'fire load' and the first recorded use of the name is C17th. Could this be the name for a stone that was originally used for the hearths and chimneys of local houses, subsequently becoming attached to the farm adjacent to the quarry? Maybe some of our Welsh-speaking members can help out.

## Short Notes

### BGS activities in Wales

Graham Lott writes that primary geological mapping of the Welsh Basin has continued under the GeoCYMRU project and during 2006 the field survey of the Llanidloes 1:50,000 map sheet was completed. Work has also begun on upgrading pre-existing linework of the six geological map sheets (Swansea, Ammanford, Pontypridd, Merthyr Tydfil, Newport and Abergavenny) that cover the coalfield areas of south Wales. In particular the new maps will show improved detail in both the Superficial and Artificial layers and the first draft of the Swansea sheet is due to be digitised later in the year. The publication of the Lampeter, Llangranog and Newcastle Emlyn 1:50,000 maps, together with their accompanying Sheet Explanations, is scheduled for late 2006 and the Welshpool, Fishguard and Llandovery maps will be available in 2007.

The new British Regional Geology for Wales (combining and replacing the old North and South Wales editions) is well advanced and scheduled for publication in 2007.

The new BGS Office in Cardiff is now fully functional and office numbers look set to increase following the transfer of two Keyworth-based scientific staff earlier in the year.

### Building stones trails for Powis Castle and Swansea

Two new Welsh building stone trails have appeared since the last Newsletter. The first, hot off the press, is *Swansea: city centre heritage trail* by Richard Porch with geological input from John Davies, Dyfed Elis-Gruffydd, Eric Robinson, Geraint Owen and Ron Austin. This small format, full-colour 34 page booklet follows the usual convention with a numbered guide leading you from Swansea High Street Railway Station along High Street to Wind Street and Princess Way. The route encompasses much of the city's historic core and mixes details on the history of the buildings with their geological composition. There is a nice mix of images, some of the actual buildings and others close-ups of the stones. The large format of the images means that the composition of the stones is particularly well seen and obvious. In Swansea copies of this fully bilingual booklet are available free of charge

from Swansea Museum, the Glynn Vivian Art Gallery, the National Waterfront Museum, the Reference Library (on Alexandria Road) and the Tourist Information Centre on Singleton Street. I also have a number of copies at the National Museum of Wales in Cardiff.

The second publication, soon to be printed, is *The Building Stones of Powis Castle.* Written by Tim Palmer, Bill Fitches and Dick Cave, and produced by the West Wales Rigs Group (with grants from the National Trust and the Forum), this half A2, six-fold, full-colour leaflet is different to the usual stone trail in that it explains the different stones of the castle by their use rather than a numbered trail. After a general Introduction there follow four sections; stone for walling; stone for windows, door-dressings and mouldings; stone used for paving, floorings and steps and finally, stone used in the hard landscaping of the grounds and statues. There are also more detailed boxes covering the Powis Castle Conglomerate and the red sandstones used for dressings as well as a simplified geological map of the area around the castle. This colourful, fully bilingual leaflet will available free at Powis Castle .

## The Buildings of Wales

During the year a further volume in the Buildings of Wales series has been published. *Carmarthenshire and Ceredigion* by Thomas Lloyd, Julian Orbach and Robert Scourfield follows the usual series format and is priced at £29.95.

## Understanding Building with Natural Stone – past present and future

This 3 day CPD course will be held at Vaynol Conservation Centre, near Bangor, Gwynedd from 14th-16th May 2007. It is specifically designed for professionals such as Local Authority Planners and Building Control Officers, Conservation Officers, Architects, Managers and any others who wish to increase their knowledge of the use of building stone. The focus will be on Welsh stone with a mix of lectures, case studies, debates, workshops and demonstrations combined with site visits to quarries, stonemasonry works, the Stone Science Museum and building stone walks. Numbers are limited and all inquiries should be made to Dave Willie at dave@welshstonecentre.com

**And Finally…..**

Members get themselves into some strange and sometimes potentially embarrassing positions on the field meetings, usually in order to identify stone of a contentious nature. What Tim is up to is obvious but what about John photographed at St Woolos in Newport? Is this a demonstration of horizontal bedding or the crucifixtion? Answers on a postcard!

For further details of the Welsh Stone Forum please contact Dr Tim Palmer (Secretary), Institute of Earth Studies, University of Wales, Aberystwyth, SY23 3DB. E-mail, tjp@aber.ac.uk

***Please note that the views expressed in this newsletter are those of the individual contributors and not those of the Welsh Stone Forum***