



**Cwmdeithas Daeareg Gogledd Cymru**

**North Wales Geology Association**

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**Issue No 66**

**NEWSLETTER**

**January 2012**

## **Chairman's Message:**

As I write, the rapid approach of Christmas signals the arrival of the AGM and the turn of another year in the geological calendar.

I have to report the success of the last year, during which the Association was rejuvenated by the injection of a host of new committee members. With their enthusiasm and assistance we have managed to put on five indoor meetings and three field meetings. The indoor meetings were well attended, the field meetings were greatly appreciated (although better weather could have attended us) and we have seen a number of new faces as well as the re-appearance of some that we thought were lost.

The Newsletter, has blossomed into a weighty publication which now has so much content that our Editor has to push out extra issues in order to keep them within bounds and still timely. Our finances remain well able to cope with the demands put upon them, and speakers are being lined-up for next Spring, so there is every reason to view 2012 in a very positive light.

If you will bear with me, there appears to be a problem with subscribers to certain Internet Service Provider companies blocking, or at least not enabling access to the servers on which the NWGA web site is hosted. No, it is not full of pornography. If this is something you have encountered, please get in touch with the Chairman on the email or telephone contact listed at the back of this copy. It does seem to be a

minority problem, but it is extremely undemocratic.

We look forward to seeing you at our meetings, and wish you all the very best seasonal greetings and a happy and prosperous new year.

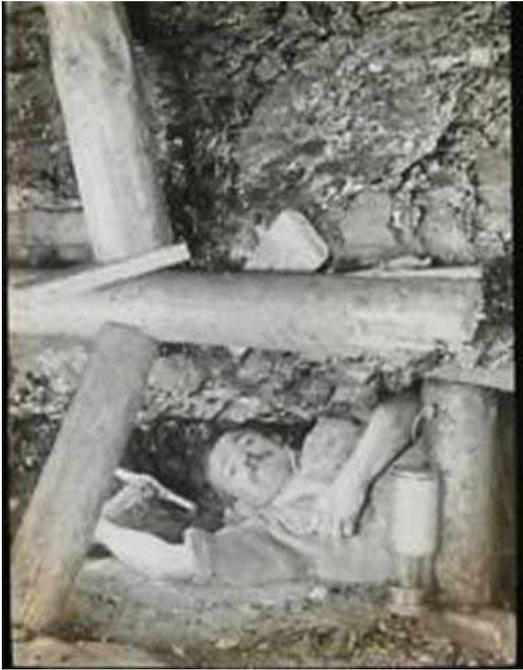
## ***Jonathan Wilkins***

### **An insight into 19<sup>th</sup> Century Coal Mining (Part 1 – The Collier at work)**

The following photographs are taken from a late 19<sup>th</sup> Century set of lantern slides illustrating the art of coal mine working in the days before longwall shearers, when development work and extraction was still mostly carried out by hand. The first image (below) shows a collier lying on his side starting off an “undercut” at the base of seam which appears to be about 1.25m thick..



To the left of the picture is a standard pit prop, offering support to the roof of the “stall”, spanning between floor and roof. The shorter temporary timber supports that the collier is working behind are called “sprags”.



In this case the collier is hewing an undercut no more than 18 inches high, with a complicated arrangement of his spragging required, to allow this difficult undercut to proceed in a relatively “safe” manner.



As the hewing nears completion the coal that is on the brink of collapse is termed as being “ripe”.



Removal of the temporary sprags allows the undercut face to collapse, breaking up the rock along the coal’s cleat into manageable blocks of coal. The next issue of this Newsletter will show some slides relating to underground transport and haulage.

(KHN)

### **Carboniferous fossils from Anglesey**

When, whilst dog walking, I saw a pile of loose fill material that looked like mine spoil I couldn’t resist....The spoil in question is thought to be derived from Pwll Glo in the Cefni valley.

Although much of the siltstone and coals materials were highly pyritized and weathered, a few of the slab faces yielded surprisingly good fossil content. Several slabs of stone were selected from the pile (circa 5 litres selected from

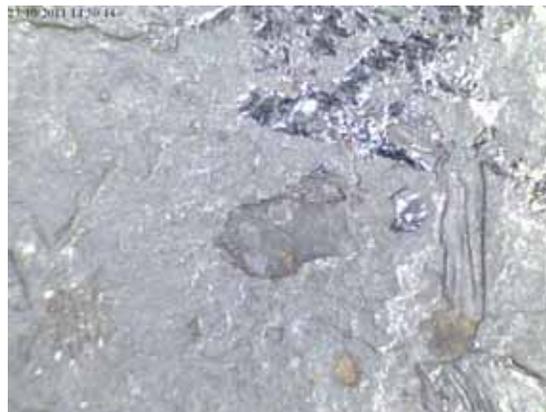
4 cu m) and cleaned. They were then inspected at medium magnification for fossil content using the Veho Discovery VMS-001usb microscope, with image capture software. This gives a resolution of 1 pixel to 7 microns. The images here (although some are larger composites) are typically about 7mm across. They are a selection from hundreds taken from this rich resource.

Plant material was found, as well as fish debris and some arthropod material, with articulated limbs and plates, a possible euthycarcinoid, and trilobite parts. There was some evidence of insect presence, as a shading and a fossil; both seem to be exuviae. Very few shells were in evidence, and those that were, pyritized to a point where they were almost unidentifiable.

Some coprolite material rich in pharyngeal teeth fragments was found and also probable stomach content residue, containing vegetation and possible insect fragments. There was sparse plant material, ranging from algal filaments and lepidodendron covered surfaces. Traces of burrowing were found in one sample.

Of course, and frustratingly, there is no way of placing any of this material more accurately in the sedimentary record, but that is the unavoidable nature of spoil tip searching.

The following photographs illustrate the nature of some of the specimens encountered. More work is being undertaken on these samples and will hopefully provide further material in the next edition of this newsletter.



*Arthropod jointed limb. To the right of the image, two sections of exoskeleton remain in articulation.*



*A cheliped, an arthropod feeding./ grasping limb.*



*Euthycarcinoid: a possible example of this extinct genus*



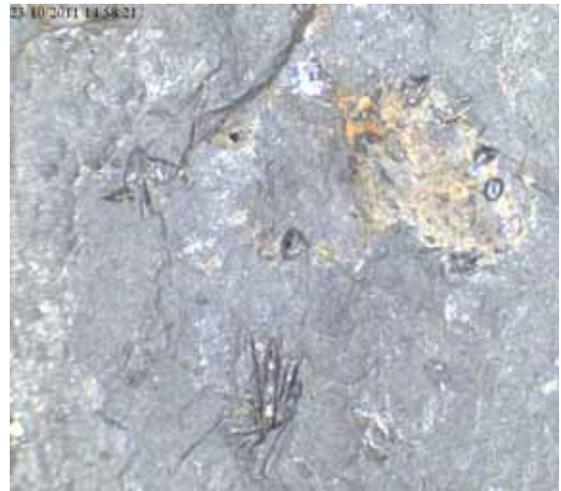
*A trilobite fragment: the pygidium*



*Possible exuvium: A grey shadow suggests the larval form of an insect.*



*Crustacean leg structures. Needing a 3 image composite*



*Coprolite: A yellow splodge with black teeth, bones, and scale fragments.*



*Exuvium: Discard of a larval insect*



*Gut contents: A collection of plant matter, including a bud scale, and arthropods.*



*An algal strand. The lower left quadrant shows a white segmented strand, an algal filament or maybe a part of a charophyte.*



*This slab shows burrows as circular markings in the edge.*



*Lepidodendron.*



*Possible Conodont With the fine structure at the limit for resolution, the brown splodge appears to be a platform type conodont*

Barry Wrightson

### **Fossil Plot 2.0 – coming soon**

Whilst the K-T boundary, with its Iridium layer, and the (seemingly?) concurrent demise of the dinosaurs, always seems to attract the attention of the television production teams, most of us will be aware that the extinction episode at the end of the Cretaceous Period, is one of a total of 5 (known as “the Big 5”) Phanerozoic mass extinctions. It is also by no means the largest – that accolade being awarded to the end Permian event. This went largely unrecorded in the rocks of Wales and

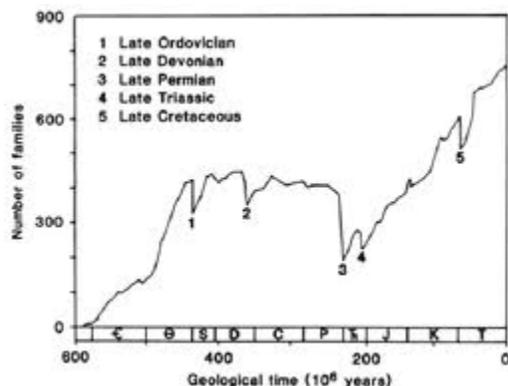


*A fragment of a sphenopsid (horsetail).*

Western England, buried somewhere in the post Hercynian molasse that is represented by the Permo-Trias and the largely terrestrial rocks associated with the New Red Sandstone and associated rocks.



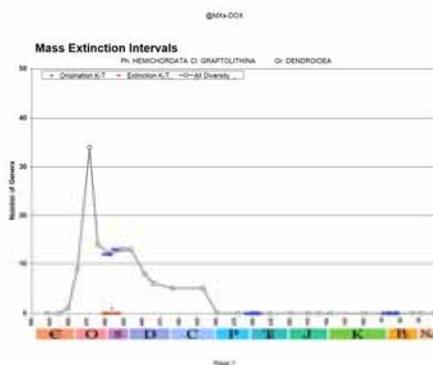
The evidence for these extinctions, and their implication, what now has become an accepted part of the neo-Darwinian paradigm, is largely a result of the work of one man J.S. “Jack” Sepkowski, working from the University of Chicago. His work was published in Sepkowski, J.S., (2002), *Bulletins of American Paleontology*, v. 363), and allows us to generate graphs such as that shown below which describe the tortuous route that life, or more correctly, diversity has taken, at least with regard to marine invertebrate fauna.



Idaho State University have taken Sepkowski’s data and turned it into a

user friendly Excel based spreadsheet (FossilPlot 1.1) available on line at: <http://geology.isu.edu/FossilPlot/>

To illustrate the use of the tool, and in keeping (albeit rather tenuously) with the Coal Measures theme of this newsletter, the graph below shows the standing diversity curve for the dendroid graptolites. This family of hemichordates reached their acme in the Lower Palaeozoic but suffered a major collapse in standing diversity in the Upper Carboniferous.



Fossilplot 1.1 is an excellent teaching tool for students, and can provide real insight into evolutionary processes. It illustrates particularly well how standing diversity in the fossil record is a function of not just extinction, but also speciation, rates. If both parameters change in a coupled manner, overall diversity will remain static (as many species are being created as are being destroyed). It is when these parameters are decoupled that diversity changes become apparent, with the fossil record recording either diversification events, or extinction episodes.

The current Fossil Plot Version 1.1 is in the process of being updated, and in the Autumn (or Fall in Amerenglish!) it is

intended to replace it with Fossil Plot 2.0. Keep an eye out for that.

(KHN)

### **Mine site in watercolour – where is this?**



This watercolour has been circulated on the jiscmail – mining history web pages. It is unattributed, and its location is unknown. Debate has centred on whether it is Cornish or not. Some have pointed out that the building looks like a typical Cornish tin mine set up, but the geography looks far more like Wales, Ireland or the Lake District. It may of course be an artistic construct, a Cornish mine on a Welsh landscape. If you know where it is you should contact the mining history group at:

<https://www.jiscmail.ac.uk>

(KHN)

### **Reports:**

#### **NWGA Meeting**

#### **Coleg Llandrillo, Colyn Bay**

**D Schofield, British Geological Survey**

9<sup>th</sup> November 2011

Wales, Geology and Landscapes

David took all 28 audience members on a *tour de force* through the many different aspects of the British Geological Survey and the geology of Anglesey. Dr Schofield is Chief Geologist of the British Geological Survey in Wales, and specialises in tectonic control on basin evolution, late Neoproterozoic and Lower Palaeozoic evolution of the peri-Gondwanan terranes. David's specialist areas are North West Africa, Newfoundland and Wales.

In 2000, there were many areas of Wales, predominantly in Mid Wales where there were no recent 1:50,000 map sheets. The BGS have been beavering over the last decade to complete the coverage. Currently, only the Knighton sheet is left. The general cost of completing a survey which can take 4 to 5 years is in the order of £4m. It was determined that in the current financial situation it was unlikely that this remaining map sheet will be commissioned imminently. Nefyn and Conwy are currently in the pipeline and can be reviewed digitally for organisations with current BGS licences, with the maps in print anticipated for release in approximately 2 years. It is proposed not to continue with traditional mapping, rather to complete 'responsive mapping' which will be digitally updated.

The protocol for updating or commencing geological maps is initially to review the in depth academic studies which have been completed to date on the area of concern. These can be numerous depending upon the area being studied. Additionally ground investigation information by commercial bodies and public infrastructure is also utilised. This baseline data of works by others is supplemented by intensive fieldwork by a number of experienced geologists.

Due to the economic climate the BGS have been redefining their role. The principal role at the moment for the BGS is to provide regulatory guidance to drive policies and provide advice/guidance for local authority planners, with key sectors including identifying sources of energy, the re-engagement of coal field geology (for coal bed methane extraction) as well as for construction. There is currently a rebuilding programme of the knowledge base for the coal sector, as all the specialists in the industry have been retired with much information lost during the breakup of the coal industry. The predominant body commissioning work within the Welsh region of the BGS is the Welsh Assembly.

Additional roles of the BGS comprise the traditional role of the survey (compilation and production of geological maps), production of information for the general public to further the understanding of geology (ie Eppynt Ranges and the Fforest Fawr Geopark) and the compilation of datasets for planners (ie. Britpit, aquifer data) as well as production of specialist large projects such as the recent 3D modelling

of the South Wales Coal Field. The BGS are also active in large scale energy projects such as SEREN (Carbon sequestration to determine methods of storing carbon dioxide).

#### Nefyn District

The geological map sheet for this area has recently been completed and incorporates the Conwy District. The maps cover both superficial and bedrock strata. One aspect of the Nefyn District map which received extra attention was the Llwyd Mawr Caldera. It was determined that this area contained very active volcanism and was considered a 'piece meal caldera'. Welded breccias were recorded which indicated relatively rapid tectonic activity. This area is very complex due to the tectonic activity and may require the volcanics of the Snowdonia area to be reconsidered.

The basin evolution of the Nefyn area was compared to the sequence stratigraphy of the Harlech Dome Basin, with particular consideration given to the presence of jasper clasts within the turbidite sequences. This had been summarised within a paper by Dr Schofield

[http://nora.nerc.ac.uk/5468/1/Twt\\_Hill10.pdf](http://nora.nerc.ac.uk/5468/1/Twt_Hill10.pdf).

Correlations are being made between the sedimentary basins within the Harlech Dome and Nova Scotia, Canada (Meguma Group). Both areas were familiar to Dr Schofield. It is considered that Harlech Dome sedimentary sequences and the Meguma Group were formerly situated within a similar area of Gondwanaland and were conjectured to have been fed by the West African Craton (via analysis of zircon crystals).

This has been summarised within a paper 'Cambrian successions of the Meguma Terrane, Nova Scotia, and Harlech Dome, North Wales: dispersed fragments of a peri-Gondwanan basin?' co-written by Dr Schofield and published in the January edition of the Journal of the Geological Society 2011. The link to download this paper is <http://jgs.lyellcollection.org/content/168/1/83.full.pdf+html> (free to upload for all current subscribers to the Journal of the Geological Society).

#### Anglesey

The history of geological mapping in Anglesey initially comprised work completed by Edward Greenly (<http://www.geolsoc.org.uk/gsl/geoscientist/people/page7350.html>) in 1909 (however unfortunately no field slips remain), as well as the work by Dennis Bates during his PhD works in the mid 1960's. Much of the dating of these works was via paleontological dating using graptolites (Greenly) and brachiopods (Bates). It was noted that the number of both graptolites and brachiopods were low on Anglesey (circa 60 total specimens for both phylum).

It was determined by the BGS that the existing map required resurveying in detail as well as updating with regard to the format of the data production. As part of the map up dates, previous published studies and boreholes held on the BGS database were reviewed and used to supplement the survey data. A standard walkover mapping surveying was undertaken using 80 working days were a team of BGS surveyors, using Ordovician acritarchs for biostratification (circa 300 samples).

The analysis undertaken by the BGS within the Ordovician strata determined that the basin axis had been developed by faulting running south to east and was asymmetric with sedimentary facies spreading from the south. This feature was considered to be controlled by active thrusting rather than a half graben. The basin was noted to have very anoxic high density mass flow events which had been destratified with chert inclusions. In the east, the basin was determined to have oxygenated zones amongst predominantly anoxic zones with the western areas being entirely anoxic. The periods of oxygenation were noted to fluctuate (by evidence of bioturbation) and were determined as being episodic periods of either reduced sea levels or where the general basin subsidence periodically ceased. The deeper water strata were noted to comprise green slates. In the northern area of the basin coarse clastic strata containing Meguma material were recorded.

There was no Ashgill Formation (latest in Ordovician succession) encountered on Anglesey, hence it had been determined that this period is likely to have been associated with glaciations (erosional period rather than depositional period).

The revised field mapping project has agreed to a point, regarding the Gwna Group, with the mapping initially undertaken by Greenleigh; however it should be noted that this group has been encountered both within and below thrusting encountered on site, and overlying the New Harbour Group (younger than the Gwna Group). It had been determined that significant deformation of the northern area of Anglesey has occurred due to thrusting and non coaxial shortening. Anglesey

has been considered to be an early site of continuous deformation and accretion. Using the information gained through the highly detailed field surveying of Anglesey, as well as the additional mapping undertaken in North West Wales, the survey are considering a reappraisal into the tectonics and volcanism of the area. It is generally agreed that the southern area of Anglesey was situated within the area of a subduction zone with the northern area of Anglesey being situated on the 'non-subducting' oceanic plate.

During the resurveying of Anglesey, additional forms of low level (56m) aerial remote sensing (ie electromagnetic survey, radiological survey, resistivity survey, digital terrain modelling) were added to the arsenal of data for assisting with the interpretation of field data. The end result of this additional remote mapping was a detailed mapping project of the whole island which has also been utilised to assess saline intrusions (as well as contamination leachate migration), radiological hotspots (high in Ordovician argillaceous strata and localised drift strata), magnetic strata (Tertiary dike swarms) with the generation of a spectacular 3D model which can be reviewed on the Surveys website.

<http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/anglesey/cymraeg.html>

<http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/anglesey/english.html>

The production of the map has enabled the Survey to assess the Tertiary dike

swarm which run across the island and is enabling geologists to determine whether the swarms have been impacted by faulting and whether or not the migration of dikes has been restricted by fault off sets.

An assessment had also been made on the Malltreat Salt Marsh regarding the extent of the saline intrusion within this site of special scientific interest, and confirmation that groundwater feeds the marsh from the Carboniferous limestone via faulting.

Further information regarding the 3D geological map of Anglesey is contained on the above websites with the opportunity to purchase an informative wall chart.

#### New Project in the Pipeline

Dr Schofield concluded his talk with his idea on the direction of BGS (both Welsh and UK). This included:-

#### Tectonic map of the UK

Reverting to digital mapping with sheet mapping being ceased.

BGS concentrating on methods to assist regeneration.

Full reappraisal of the 'Energy Basin' (South Wales Coal Field) – recovery of coal, coal bed methane as well as shale gas.

Improving the urban geosciences (for engineering and opening out geology to the general public).

Become more responsive to changes in priorities with industry.

Greater emphasis on the Quaternary and Anthropocene (effects of human activity).

Consideration is being made to reopen the Aberystwyth branch of the BGS.

Questions:

What is the organic content of the Ordovician Shales?

DS: *To date no total organic content (TOC) has been completed on the anoxic formations, however the aerobic facies have been assessed to have TOC of between 6% and 8% (obtained to assess the potential for shale gas reserves).*

When is the Nefyn Sheet to be published?

DS: *The digital sheet is available to review to a selected number of people (with the Environment Agency included), however the printed sheet may be in the order of 2yrs away.*

How far has movement been determined in the tectonics which have occurred in Anglesey?

DS: *This has not been calibrated to dated, and it would be very difficult if not impossible to measure considering the degree of metamorphism and tectonic activity that has occurred in the area.*

What has caused the limestone on Anglesey as shelled marine animals were not alive at this time?

DS: *The limestone is a stromatolite (algal formation).*

### **LGS Meeting**

**Jan Zalasiewicz – The Planet in a Pebble: Liverpool John Moores University**

15<sup>th</sup> November 2011.

To an audience of nearly 100 Dr Zalasiewicz gave those present a tour of planetary history, as can be derived from

a single pebble, using ever increasingly imaginative methods, and ever more



accurate instruments. The talk was made all the more relevant and interesting for our North Wales Members by his choice of

pebble, a very typical rounded grey Silurian mudstone of seemingly Lower Llandovery origin, found amongst innumerable others on Aberystwyth beach.

First of all we were reminded that all terrestrial pebbles will contain much hydrogen, and rather less helium and lithium, all of which formed in the early history of the universe soon after the Big Bang, some 13.7 billion years BP. All the heavier elements present in the pebble are derived from stellar fusion reactions, and some 4.5 billion years BP, were part of an accreting disc of matter

that, under the influence of gravity, formed our sun and its solar system. There is evidence that early on in the earth's history a collision between Earth and a planetary body which has been called Theia which resulted in our peculiar Earth / Moon double planetary system.



Theia / Earth impact

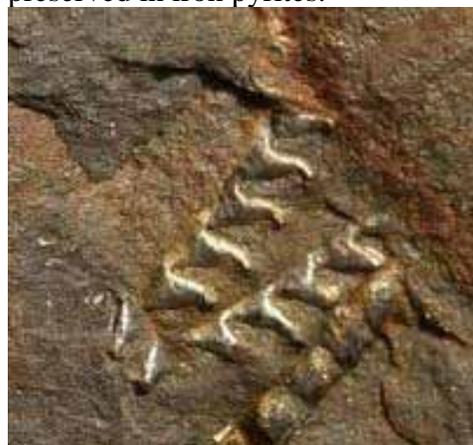
With the onset of mantle / crustal differentiation plate tectonics began, and some 600 million years BP the constituent minerals of our pebble would have been erupted onto the earth's surface as a result of island arc subduction associated with a land mass known as Avalonia which lay on the northern edge of the southern hemisphere super continent known as Gondwana. Avalonia so formed was weathered and eroded, and the igneous rocks at its core became feedstock for sedimentary processes in fluvial, near shore and oceanic systems, governed by wind, tide, wave and currents. Nevertheless the original date of the origin of the Avalonian crust can be estimated by Uranium / Lead dating of detrital zircons present in the sedimentary rocks.

Approximately 420 My BP a turbidity current swept westward down the continental slope off Avalonia in a series of submarine canyons and was deposited on the ocean bottom. Where turbidity currents were absent the background sedimentation was of hemi-pelagite type, recording the absence of bioturbation, associated with oxygen poor ocean bottom sediments. This is analogous with modern coastal "dead zones" where enrichment of coastal waters by land run off cause algal blooms which, when they decay, cause oxygen depletion and mass killing of marine benthic organisms. There is evidence of life in many of the rocks however with preserved acritarchs and chitinozoa as well as sometimes wonderfully preserved graptolites. Chemical markers are also present in the form of organic compounds preserving

evidence of soft bodied and thin shelled fauna.

Paleomagnetic evidence suggests that when they were being deposited Avalonia lay at about 30° South.

Early diagenesis occurs with shallow burial, within a few years of sedimentation bacteria get to work and produce spectacular fossils (graptolites and Orthoceras type cephalopods) preserved in iron pyrites.



Graptolite thecae preserved in pyrite

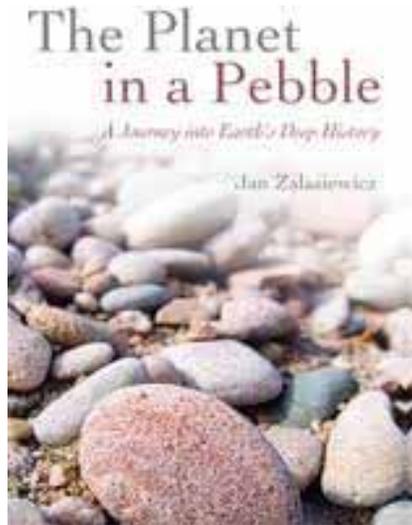
Late stage diagenesis, through thermal maturation of carbon, results in the expulsion of hydro-carbons in the form of oil and gas, and also the generation of phosphate minerals frequently associated with rare earth elements. Subsequent plate tectonic events including the collisions of Laurentia with Avalonia, Laurentia with Baltica, and most importantly the closure of the Rheic Ocean to the south in Devonian times. This collision is recorded in K / Ar dating of pressure shadow minerals surrounding fossils (a date of 396.1 +/- 1.4Ma has been obtained in this manner).

The pebble contains evidence of Carboniferous / Permian tectonics associated with quartz veining and metal mineralisation. Eventual emergence leads again to the onset of weathering processes. Fossils are destroyed and the rock broken down into mud and sand and reworked, relatively quickly in geological terms.

The long term future of the pebble is tied to the future of plate tectonics, and it is possible that far into the future, plate tectonics will grind (quite literally) to a halt as the expanding red giant star Sol boils off surface waters from Earth, and the lubrication in subduction zone afforded by water is lost. Earth may well be caught up in Sol's final red giant phase and the constituent atoms of the pebble again reworked in further stages of the stelliferous era, before entropy finally grips the universe in its cold dead hand.

A somewhat shell shocked audience could only muster one question, with Dr Zaliasevic confirming that typical Early Silurian strata were 415- 420 My BP where as the mica mineral fills associated with the late stage diagenesis gave dates of typically 396Ma.

The vote of thanks was offered with a comment that this talk had given a wholly new perspective on the rock cycle, and the audience showed their appreciation with warm applause. Dr Zalasiewicz's book "The Planet in a Pebble" is published by Oxford University Press, although the coarse red sandstone chosen for the front cover is a bit of a let down for the pedants amongst us.



### **Discussions:**

#### **Issue 63 July 2011 – The Beast of Gamlan**



#### **Peter Ellwood writes:**

This resembles the siphuncle of an actinocerid nautiloid. Look up *actinocerida* on Wikipedia for example

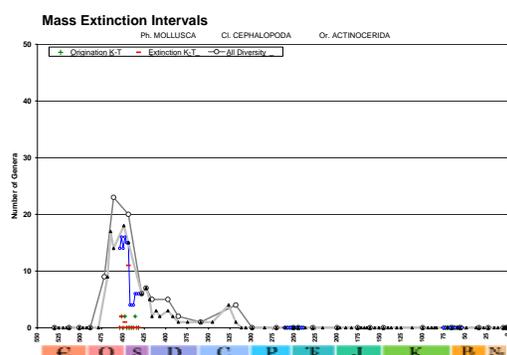
and compare it to illustrations of fossils like *Huronia*. In this group the siphuncle is relatively wide and tends to be mineralised. The rest of the shell, being made of aragonite presumably, may not be preserved.

**Keith Nicholls writes:**

I struggle to conceive of anything of this size in the Cambrian, judging by the size of the boot and hammer, the “beast” is over 1m long. *Anomolacaris* is the only Cambrian macro-fauna of that size that I am aware of.

A FossilPlot graph for the Actinocerid Cephalopods throws up a further problem, as the family only appeared during the Great Ordovician Biodiversification Event. If there are Cambrian cephalopods over 1m in length waiting to be described someone has some serious work to do...

Alternatively of course it may be the case that the rocks in question are much later than the Cambrian, and it is the maps that are incorrect – which suggests that the people with work to do are the BGS!



Incidentally....compare this graph with the previous plot for the dendroid graptolites – does the similarity indicate a predator / prey relationship? or merely

similar diversity changes related to changing environmental conditions?

**Issue 65 July 2011 – The Mermaid’s Smile**



**Peter Ellwood writes:**

The "*Mermaids’ Smiles*" resemble the shear planes that develop during seasonal churning in soils called vertisols. Basically what happens is that the soil shrinks and cracks during the dry season, then soil falls down into the desiccation cracks, then during the wet season the soil expands thus causing wholesale churning with repetition over time. At the land surface hummocks several metres across (aka pseudoanticlines or gilgai) can develop. The poorly sorted texture of these sediments is also typical of palaeosols.

**Reply by Barry Wrightson**

I have not encountered vertisols. Perhaps there is some way of checking for hummocking in the section available. There is little to suggest dunes. I am open to any suggestions, or even a visit at some stage to apply more eyes and expertise.

**Keith Nicholls writes:**

The Geological Map published with the recent Wales BGS Guide (MF Howells

2007) seems, to my reading at least, to be equivocal regarding the age of these rocks, with the boundary between the Westphalian and what they record as “?Stephanian” not properly defined on the published column sections. The rocks are coloured up as the Halesowen Formation which in keeping with all the “Red Measures” are considered to represent a highly diachronous facies. In discussing sections from nearby Malltraeth the following comments are made in the text of the guide (pg 147):

*“ ...overlain by some 200m of red beds (Warwickshire Group)” and “The Warwickshire Group consisting of red mottled and grey mudstone and red , locally conglomeratic sandstone may rest conformably on the grey measures, but the evidence is inconclusive.”*

It seems probable therefore that these rocks must be younger than the *Carbonicola communis* zone and *Gastrioceras listerii* marine band which, it is suggested, lie in the grey measures beneath. Beyond this maximum age, the dating of these rocks is entirely circumstantial. The recorded occurrence of Permian rocks off the western coast of Ynys Mon (MF Howells 2007, pg 158, Fig 55A) seems to leave open the possibility that these rocks represent the furthest west onshore outcrop in Wales of the Permian Kinnerton Sandstone Formation, or at least the transition from fluvial / deltaic sedimentation to the succeeding largely terrestrial modes of deposition associated with the New Red Sandstone.

#### **Reply by Barry Wrightson**

I have compared the Red Beds on the Malltraeth with the Mermaids, and they

are quite dissimilar. The Malltraeth beds are stratigraphically in situ, and barring strange events are very likely representative of the local Stephanian, with rounded quartz fluvial pebbly sands etc. I think they may well be misplaced in the stratigraphic column.

#### **Dates for your Diary:**

#### **NWGA - Meetings**

#### **NWGA – Annual General Meeting**

The 2012 Annual General Meeting of the North Wales Geology Association will be held at the Pensychnant Conservation Centre at 10:00 AM on Saturday 21st January. The venue is easy to find, but only cyclists (motorised or pedalled) can make the turn into the drive from the Penmaenmawr direction. The full address is: Pensychnant, Sychnant Pass, Conwy. LL32 8BJ

After the business meeting at about 11:30 AM there will be refreshments, conversation and a talk by Jacqui Malpas who will talk about the Geoconservation, RIGS & Brymbo Fossil Forest. There will also be a charity sale of books from the library of the late Dennis Wintsch.

We do hope that you will be able to come along and join in with an event that has become something of a tradition in recent years.

## **Other Groups' Meetings**

### **Liverpool Geological Society**

Tue 17th Jan – Dr Jeff Harris – ‘The Geology of Ardnamurchan’.

Tue 7th Feb - The Distinguished Member's Address by Professor Tony Harris –The Enigmatic Geology of the Southern West Highlands of Scotland.

Sat 18th Feb - Herdman Symposium.

Tue 21st Feb - Practical Session on Brachiopods with Joe Crossley.  
- further details from the LGS web site at:  
<http://liverpoolgeologicalsociety.org.uk/index.php>

### **Manchester Geological Association**

Saturday 14 January 2012 - The Fossil Hunters

Mary Anning (1799-1847) and Thomas Hawkins (1810-1889): two very different 'monster' fossil hunters - Professor Hugh Torrens, University of Keele and James Powrie - Bob Davidson, University of Aberdeen

James Frederick Jackson (1894-1966): Boy Genius and Extraordinary Geologist - Dr. Cindy Howells, National Museum of Wales

Wednesday 7 March 2012 (to be confirmed) at 18:30 - Joint Meeting with the Geographical Association  
Natural Hazards in the Caribbean: Causes and Impacts - Dr. Servel Miller, University of Chester  
- further details from the MGA web site at:

<http://www.mangeolassoc.org.uk/indoormeetings.htm>

### **Geological Society – North West Regional Group**

Thursday 26th January 2012 6.30pm  
Sarah Scott (Senior Technical Specialist, Hydrogeology - Environment Agency)  
“Ground Water Dependant Terrestrial Ecosystems”  
The Swan, Winwick

Thursday 23rd February 2012 6.30pm  
Prof. Jon Lloyd (Professor of Geomicrobiology, University of Manchester)  
“Hot Topics in Earth Sciences: The Geomicrobiology of the Nuclear Fuel Cycle”  
University of Manchester  
- further details from the GSoL web site at:

<http://www.geolsoc.org.uk/webdav/site/GSL/shared/pdfs/specialist%20and%20Regional%20groups/nwrg/2011-2012%20NWRG%20Programme.pdf>

### **Web News:**

This issues' recommendations relate to on line image libraries that have content associated with geology and mining. These were distributed amongst the Jiscmail mining history group by Chris Jones.

“The Science Museum's lovely stores blog has just added an entry mentioning some on mining art if anyone is interested”:

<http://sciencemuseumdiscovery.com/blogs/collections/art-at-the-coalface-2/>

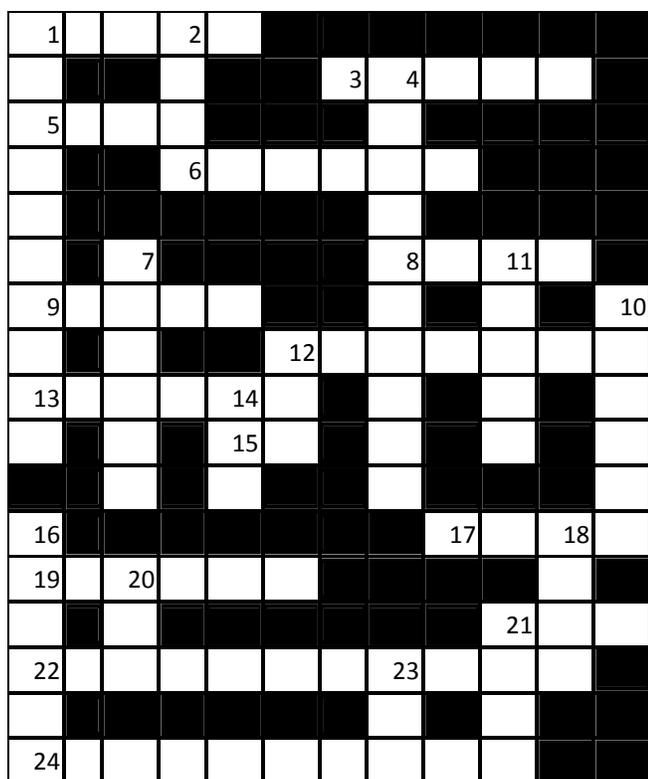
“The Collections Online catalogue probably includes references to others and many mining artefacts:”

<http://collectionsonline.nmsi.ac.uk/>

“and certainly there's a selection in the Science and Society image library:”

<http://www.scienceandsociety.co.uk/>

### New Year Geo-Crossword



#### ACROSS

1. Together with the “Trias” represents the totality of the New Red Sandstone
3. Burlesque inspired form of mining?
5. Christian name of Gould’s equilibrium collaborator
6. Where, in the manner of Darwin, species begin
8. Brachiopod beak

9. Trilobite made most famous by the NWGA perhaps

12. Murchison and Sedgwick dispute over this ancient borderland

13. Palaeocene, ....., Oligocene

15. ..31 or ..34, geophysical tools used in resistivity surveys

17. Stage of geoconservation status below SSSI

19. Icelandic engine crunching aerial dust

20. Aggregate of soil particles

21. Long chain hydro-carbon compounds, sometimes associated with coal combustion

22. Eponymous conodont found at the top of the Ordovician

24. Glaciation, extinction, isotope excursion, this Bala based stage has it all

#### DOWN

1. Form of equilibrium postulated by Eldredge and Gould

2. ‘lithic or ‘zoic the same, it all feels rather middling

4. Family of blind trilobites, pitted rims and all

7. Indigenous peoples of the painted desert and surrounds

10. Sand en Francais

11. Commercial name for a salt of boric acid

12. Not quite optical instrument of choice for those with an interest in the very small and even smaller

14. ‘lithic or ‘gene the same, it’s all new to me

16. ....omenid – family of brachiopods

18. Cefn ....., Blue Ridge mountains of South Wales?

21. Runt of the litter metamorphosing into something else

23. Originally UK (and empire) based chemical industry conglomerate

