Cymdeithas Daeareg Gogledd Cymru

North Wales Geology Association

NEWSLETTER

Issue 94 December 2016

Inside this issue:

Front Cover Image:

Llyn Gafr in foreground with the back scarp of the Pen y Gadair Volcanic Formation behind. Cadair Idris, Gwynedd

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OPUS

Chairman's Message

I realised, when I looked to see what I had written at this time last year, that one theme was constant: the conference season. Does it really exist? May be not; but conferences are prominent in my calendar at this time of year, and this year a couple have been noteworthy.

A month or so ago I was at the Extractive Industries Geology Conference at Birmingham, where we were lucky to be accommodated in the Great Hall of this very fine, red-brick university. Some of the papers were concerned with matters relating to the analysis of materials, nuisance dusts for example; or how to cope with derelict open-cast mines that remained as a crumbling legacy once the body responsible for operating them has passed into bankruptcy and the market for the product (coal or metal ores) has disappeared. The answer for one abandoned coal mine was to turn it into a teaching and research resource, since the open cut exposes strata very little known at outcrop in the wider context of the Midland Valley of Scotland. "Three cheers", I hear you say, and quite right too! But as ever the issue of safety is uppermost, and the costly engineering of slopes that will remain stable over a much longer term than the operating life of the mine and their subsequent re-burial.

Other papers were concerned with regulations for which I could summon no enthusiasm, so I slipped away to that nearby gem of a location, the Lapworth Museum for a fleeting half-hour. An official tour was on the timetable, but 'after-hours' and too late for our urgent return to North Wales. The museum has been closed for a couple of years while the building has been refurbished and the collections reviewed, and re-opened in the Summer after £2.7 million has been spent to improve the visitor experience and the ability to deliver a wider and more attractive programme of events and exhibitions. Was it worth it? Well, I was impressed, even after my flying preview visit.

The obligatory dinosaur greets you on entry and displays of local fossils in well-constructed displays lead you through the story of life in the West Midlands, while carefully-focused sound-effects show whether the context is marine, delta or desert. The Rock Wall is a delight for petrologists with a host of rock specimens of almost every description imaginable; certainly enough to convince a sceptic that rocks are not all the same. There are galleries with fantastic and important collections of fossils and minerals that go back all the way to the foundation of the museum in 1880, so if your timetable permits, you really should find an opportunity for a proper visit. I am sure that you will not be disappointed. Don't forget that Arriva Trains Wales will take you direct to Birmingham via Shrewsbury from the North Wales coast or Chester.

More recently, I had the pleasure of visiting Dublin and the Atlantic Ireland conference, which is the focus for discussion on the small, but significant, Irish petroleum business. For many years gas has flowed from the Kindsale Head reservoirs in the Celtic Sea to Cork, but depletion is already evident and it was timely that on December 30th 2015 gas started to flow to homes and businesses from the Corrib field, situated 83km off the Mayo coast. This project has been beset by delay and environmental protest, but the success of bringing exceptionally high-quality gas ashore at last is expected to fulfill 42% of the total gas demand across the island over the next 2 years, with a projected life of up to 20 years. However, Corrib is not the only game in town, and the major petroleum companies of the world have their eye on the Porcupine Basin, a huge sag in the

continental crust that was pulled apart during the opening of the North Atlantic Ocean from Jurassic times and filled with sediments pouring in during the Cretaceous and Tertiary periods. However, the fact that the prospective area is 150km from land and beneath 350 to 2500m of very stormy water is a challenge, while the continuing, crippling collapse in the oil price means that money is tight for exploration, and especially for drilling.

Now, as the World is rejoicing that a carbon-emissions treaty has finally been signed (despite Mr. D. Trump's insistence that it will be shredded with extreme prejudice just as soon as he occupies the Oval Office) to limit potential temperature rises in future, we should perhaps question whether all those juicy hydrocarbons should stay deep in the Porcupine Basin after all? To which I say, are you ready to turn your lights and central-heating off? The Irish in particular will be able to cast their minds back to the Emergency (aka World War II) when they were in a desperate condition due to the loss of their traditional fuel supplies, which generated immortal lines from John Betjeman, the British press attaché in Dublin, who reported "No coal. No petrol. No gas. No electric. No paraffin. Guinness good." Older NWGA members will remember the Three-day Week of 1972 and the rationing of electrical supplies due to a shortage of coal through industrial action. We still need heat and power to cover the transition to a zero-carbon economy and kerosene is the only fuel which has sufficient energy-density to fuel the world-wide aviation upon which we rely for holidays from our jobs in factories making solar-voltaic cells and wind-turbines. Hundreds of train-driving jobs have been lost as a consequence of the drop in coal-carrying now that several of our power stations have been turned off, but I was intrigued by special workings recently that carried fuel-ash to Longannet power station in Fife because the supply which it used to provide to a thriving manufacturer of concrete blocks had run out since close-down. Meanwhile, closer to home, the operators of Fiddler's Ferry power station near Widnes have been paid £66 million by National Grid to ensure readiness for generation on one of its turbines (480 MW) if cold weather brings an unsustainable demand for electricity. So, pray for strong and steady winds this Winter, because the solar generators won't be doing much in our abundantly cloudy

part of Brexit Land, and don't forget that 35% of Europe's gas is imported from Russia, who needs our cash but is playing a destabilising game on our borders. What price fracking?

GOOD news came from an unexpected quarter recently. Repeated requests over recent years regarding progress on the new 1:50,000 scale geological map entitled "Nefyn and part of Caernarfon" have drawn a blank from the Wales office of BGS, who cite editing and production delays. I wondered if it would ever really happen, but I wanted to give it a launch party since it is the first appearance of any re-surveyed publication for this area. Reading the most recent Geology Today magazine brought news in an article that it had at last been published, at the end of last year in fact. So, off to the BGS web site's online shop, only to discover that the index map has still not been updated and shows a blank - which is a shocking advert and suggests that sales are deprecated. Fortunately, searching for sheet 118 brings it up in the text index, and I purchased a copy for £12 plus postage. I'll bring it along to the next meeting so that we can take a look at those lovely intrusions, pillow lavas and mélange.

The AGM and Spring programme are beginning to come together, so I hope that we will see you at our Christmas Members' Evening and all the other meetings which we put on for your benefit.

Jonathan Wilkins

Articles:

Obituary: Norman Dean

Many of you will remember a presentation given at our AGM many years ago by members Norman and Betty Dean which illustrated their travels in search of volcanoes around the world. I was saddened to hear recently that Norman had passed away, and that Betty is chronically ill and cared for in a local nursing home.

I was first introduced to Norman when he was a participant in a field trip to North Wales by the Harrow & Hillingdon local group of the Geologists' Association, but I had no idea that he had local connections. I was therefore surprised when they retired from the London area to Rhos-on-Sea and joined our Association, but although still enthusiastic for geology their increasing difficulty with mobility made participation in our meetings more difficult.

Norman's background was in chemistry, with a PhD in the subject and he worked as a patents examiner with a particular focus upon applications relating to chemical techniques. However, he was always interested in the outdoors, was widely-travelled and a long-standing member of the GA, whose lecture and field meetings informed their amateur geological leanings. The particular enthusiasm for volcanoes was shared by Betty, and it must be recalled that she was the skilled photographer on their excursions. Norman was also an avid book collector, and did a lot of his own book-binding to repair soft-covered volumes, or preserve reprints and pamphlets.

I owe much of this knowledge to his eldest daughter, Frances Durkin for whom it is a sad task to disperse the significant library that he had built up, of which geology and related disciplines are just a small part. Some books which have an enduring value because of their place in the geological firmament are going to be sold through specialist auctions, but the great majority of them are of no value to a non-specialist, and a large number are technical "coffee-table" publications, old textbooks and BGS Regional Geology guides, volumes on caves and caving, photographic guides to scenic areas and other guidebooks. Frances is very reluctant to take these to a charity shop ***en-masse*** and has helped me to select a box full of the most promising titles in the hope that they will be well-received by members of the NWGA. I shall be bringing them to the forthcoming meetings, where they can be inspected, and fought over if necessary. If recipients are willing to make a small donation to the Parkinson's UK society then it shall be collected and forwarded as requested.

Please contact the Chairman, Jonathan Wilkins if you have any special requests or interest in these books.

Jonathan Wilkins

Parys Mountain, Ynys Môn

Parys Mountain is a spectacular location with brightly coloured heaps of mining waste and interesting geology. The history of mining at the site goes back to the Bronze Age and was originally an opencast mine, but tunnels were dug even in the Bronze Age.

The geology is complicated, but is mostly Ordovician (aged 480 Ma) rhyolite intruded into late Ordovician and Silurian shale (mud) in what today would be called a black smoker; situated on a mid-ocean ridge. These deposits were subsequently folded into a syncline trending north-east to south-west. The folding is thought to have remobilized the minerals.

On entering the site from the car park are some ponds, with a pH as low as two, into which water from the mine was pumped. Iron bars (or any iron waste) were thrown into these ponds so that the copper dissolved in the water would be deposited onto the iron and thus recovered.

Following the track round to the viewing platform; on the left can be seen part of the Rhyolite intrusion with beautiful swirls which are produced when the minerals line up and then weather differently.

From the viewing platform one can look down into the main pit with the central boss and across to the engine house. To the right can be seen the Silurian shale dipping steeply to the south-east while to the left and at the far end of the pit the rocks are multi coloured with a variety of sulfide minerals. Before the main pit was drained people used it to dispose of old tractors and cars, and as a testament to the acidity of the water, all that can be seen of these vehicles today are the tyres!

View from the observation platform

It is possible to follow the track round and descend into the pit to examine the central boss, however, it should be stressed that visitors should keep to the tracks because it is not certain that all the old shafts have been located and capped; the backfill has been known to suddenly collapse! The central boss is covered in veins, tens of mm wide that are filled with iron pyrites (FeS2). Other minerals found elsewhere on the site are Chalcopyrite (CuFeS2), sphalerite (ZnS), jarosite (KFe(SO4)(OH)and Galena (PbS).

Sulphide Mineralisation

The acid water from the mine is today drained through a reed bed to reduce the acidity to a level where it can safely be released into the river that runs out through Amlwch. This was the port through which the copper ore was transported to be smelted in South Wales during the 18th century. During this period the water running through the harbour was so toxic that ships would pay to berth there because it killed all the growth on the ship's hull.

Lyn Relph

What's this then?

In response to Guy Moody's query in the last newsletter I'm tempted to offer the following comment / suggestion as to what the objects are, or may be at least.

Somewhere in the Llanvirn – somewhere near Blaenau Ffestiniog…is perhaps not as much as you would like to go on, but it does at least narrow it down to the mid Ordovician, and the implication that there may be a volcanic origin. One of the images (see below) looks like a spheroidal volcanic bomb with a cooled rim. Without a real close up, I may be stretching my "observations" to suggest that this might be a quenched volcanic bomb, that has fallen into water, hence a microcrystalline shell, and a gas fractured interior. Something in the Aran Volcanic Group perhaps? Moelwyn or Rhiw Bach Volcanic Formations?

Keith Nicholls

Abstracts:

Members Evening:

Oslofjord - Keith Nicholls

A brief introduction to the Lower Palaeozoic (specifically - you guessed it – the O/S boundary section) of the Oslofjord Islands and Oslo City hinterland. Illustrated by some of the most joyfully coloured geological maps you will ever hope to see.

I will also have on display two posters I presented at IGCP 591 – Nicholls, Buckley & Wilkins on the Hirnant Limestone, and Nicholls, Appleton and Roberts on the Llyn Geirionydd Graptolites.

Kimmeridgian of Portugal - Peter Ellwood

Details on the night

Fossil lagerstaten of Southern Germany - Gary Eisenhauer (or what I did last summer).

A quick tour through three fossil lagerstatten in Southern Germany: Grube Messel, Posidonia Shale and the Plattenkalk. Whilst also taking in some of the museums and other places of geological interest on the way.

Talk following the AGM:

Dr. Thomas Knott (Leicester University)

Yellowstone Super-Eruptions

Super-eruptions are amongst the most catastrophic events at the Earth's surface, with devastating regional environmental consequences and likely effects on global climate. It is well-known that Yellowstone, USA, has erupted catastrophically in recent times, but possibly less widely appreciated that these were just the latest in a protracted history of numerous catastrophic super-eruptions that left a trail of destruction along the Snake River from Oregon (16 Million years ago) to Yellowstone (most recent). New, previously undiscovered, records of super-eruptions are now being revealed in the volcanic record of the central Snake River Plain of Idaho. Characterisation and wide-area correlation of these immense deposits, from one mountain range to another, is hindered by the monotonous nature of the volcanic units, which has limited the use of conventional field-based techniques. Trace-element geochemical analysis has enabled the fingerprinting of individual ash layers. Combined with other techniques (e.g. mineral chemistry and palaeomagnetism) this data can be used to trace individual layers for hundreds of kilometres and to deduce the size of individual eruptions. One such is the newly-defined Castleford Crossing eruption that effectively enamelled an area greater than 14,000 square kilometres with searing-hot volcanic glass around 8 million years ago. The volume of this vast deposit is estimated to have exceeded 1,900 cubic kilometres, with a maximum depth of 1.3 km in the concealed caldera of the super-volcano. The magnitude of this eruption is similar to or greater than better-known eruptions at Yellowstone, and is the first of an emerging record of additional super-eruptions from a period of intense magmatic activity between 12 and 8 million years ago. Tom will be giving a fine account of this project which was conducted in association with the Universities of California and Idaho, USA, and describing field work in a very challenging and scenically fascinating area.

Reports:

NWGA Evening Meetings

"Debris flows"

Steve Parry

This was the fifth annual joint meeting of the NWGA, the GSoL (NW Group) and the University of Chester. Steve's talk followed previous talks on the End-Ordovician Extinction, the Burgess Shale, the Brymbo Fossil Forest and Deep Crustal Structure. So something of a digression, from "real" geology, and very much an engineering geology talk, from a real engineering geologist.

The talk was very well unattended, but by mostly the geotechnical community associated with the GSoL membership. Food for thought for us in our planning for next year perhaps.

Steve's talk itself was fascinating – detailing the response to a storm in 2008 which caused a number of serious landslips and catastrophic flooding.

KHN

Other Organisation's Events

Saturday November 5th 2016
GA Festival of Geology
University College London

The Festival of Geology is held annually by the Geologists' Association and hosted at University College, London. This was my first visit to the festival and an opportunity to revisit the place in which I undertook my MSc in Micropalaeontology.

On arrival there was a large marquee in the quad, hosting the Rockwatch activities for the 'junior geologists' in the making! There were specimens to find and handle, and opportunities to make plaster casts. There was also a display of all the entrants to this year's GA Photographic competition (including those chosen to front the 2017 GA calendar).

On to the central, main UCL building behind the neoclassical facia, and both the north and south cloisters were packed full of stands and displays. Many local groups had posters and samples from their 'patch' or geological excursions undertaken by their members. There were also dealer stands selling rocks, minerals and fossils (some of which appeared very similar to those I'd seen earlier this year on a trip to Southern Germany), together with book dealers selling second hand copies at some bargain prices. I bagged myself a book on North Wales Geology for £2 and another about searching for dinosaurs for £1. In addition, there was also the BGS and GA offering their maps and guide books for purchase. In fact, the GA had a number of old journals and guides going for free. Alas, I already had copies or they didn't take my fancy. Not to mention the thought of having to carry them all home.The day also hosted a series of lectures throughout the morning and afternoon:

Dr Howard Falcon Lang talked about Dr Marie Stopes, the birth control pioneer and the fact that she previously had a successful career as a palaeontologist, or to be more precise a palaeobotanist and coal geologist during her 20s and 30s. Apparently she took British Geology by storm. She gained a joint honours in Botany (1st) and Geology (3rd) from UCL, undertook post grad research in coal and a completed PhD in Munich in just 9 months! Later becoming the youngest DSc in Britain, working at Manchester studying coal balls (carbonate nodules with plant fossils). The presentation also mentioned her book of 1910 (Ancient Plants) and contact with Robert Falcon Scott (of Antarctica fame), whom she told to look for fossils to get funding for his trip to Antarctica. In fact, 50kg of rock (with remains of ***Glossopteris***) from the Beardmore Glacier was found at his encampment in 1913. The talk continued in regards her later life beyond geology and the lighthouse she bought on Portland, and her work on the Portland Neanderthals.

Sarah Butterworth and Professor Joe Cain talked about the Crystal Palace Dinosaurs, their history back to 1853 and the work of the sculpture Benjamin Waterhouse Hawkins. Touching on how he consulted with palaeontologists but had to fill in the dots (due to the incomplete fossil record) to complete his specimens. One specimen in the park that was only known from a skull is shown breaching out of water given the lack of knowledge of the body at the time. Other times, he sculptured two versions when different scientists reconstructed things separately. He also revealed that the famous New Year's Eve Dinner in the Dinosaur was actually in the mould, not the specimen on the hill. The second part of the talk revolved around Horace the Pliosaur, an interactive street-show which has been touring for 4 years with its internal cinema screen providing educational films about the coast and its inhabitants. Similarly, a second project 'Iggy the ***Iguanodon*** Restaurant' is another partnership of science and art whereby the context of fossils to evolution and extinction is used to connect science with history. The company (Emerald Ant) also talked about other projects they run at schools in the southwest, related to the Jurassic coast and geology/archaeology of the South Dorset ridgeway.

After lunch there was the prize giving for the best photographs entered in the GA calendar/photographic competition, followed by **Jim Richards** and his talk about Gold. This was essentially the same talk recently given to our own local group in North Wales. For the benefit of those unable to attend, he talked about the history of prospecting and how he became interested in gold. He took us through his career path from the Welsh Dolaucothi gold mine to Australia, via a degree in Geology, time in the parachute regiment and the gold and diamond fields of Guyana. Showing us what life and work was like in the jungles and mines where he searched for these treasures. In illustrating these situations and the history that went before, Jim was able to talk about the ethics and right/wrong ways to look for gold and diamonds. His current project in Australia involves working with and alongside the aboriginal community. Should you wish to learn more he has a book out, Gold Rush published by September Publishing, which expands on this presentation with greater detail and useful appendices such as that listing the largest nuggets ever found.

The final talk was provided by **Prof. Iain Stewart** on 'Sustainable Geology' and discussing how geology fitted into the key global goals and challenges. His statements being that:

1) Geologists' were well placed to make critical contributions to contemporary sustainable issues

2) Geologists' offer a planetary perspective (Earth System science)

3) Geologists' possess a valuable synoptic and temporal conceptual framework for evaluating life systems and relationships (Geologists' think differently)

4) Humans are now a geological force regards trends in socio-economic and earth systems.

Essentially, there has been a drive over the last 12-24 months regards the ethics of our geoscience actions and whether it is ethical to search for oil and gas when we know the consequences. Therefore, geologists could be both the problem (earth exploitation) and the solution (earth stewards). He used examples of his PhD students who are researching such diverse topics as geology and its relationship to anthropology, gaming and perspectives. For those interested, next year also sees the start of an MSc course in Sustainable Geology.

Other activities available at the festival included guided walks around the geology of University College London or further afield in the City of London, the newly conserved exposures Of Gilbert's Pit in Charlton or the Crystal Palace dinosaurs. Unfortunately, I was unable to participate in any of these. Other university departments such as the Institute of Making opened up allowing people to learn about flint knapping, soft material carving or even make your own comet, fake gems and faux rocks (which you could even name!). Something for everyone, at the Festival of Geology.

Gary Eisenhauer

Geological Society – North West Regional Group, 20th October 2016
"***The BVG as a potential host rock beneath West Cumbria"***
John Black
Manchester University

There has been a long history of research into the hydro-geological regime of West Cumbria influenced by the presence of Sellafield of course, and the probability of an eventual decision to house any future high level radioactive storage facility in the Borrowdale Volcanic Group. Leaving aside the politics of the decision making, and the cost of building it, or the implications of not building it – the research has provided some genuine new understanding of the geological and hydro-geological regime. Key to this is the presence of relatively high ground water tables in locations along the western perimeter of Cumbria.

The big take away for me from this talk was a convincing argument that the high water pressures represent a delayed draining of confined water after the deglaciation which has seen glaciers retreat from the Lake District over the last 15 or so thousand years.

KHN

Liverpool Geological Society
"Member's Evening"
LJM University

A very well attended, entertaining and eclectic evening meeting with talks by our own Fred Owen on his supposed non-geological holiday in Austria – "Oh look there's a geological museum…What a coincidence!" as well as introductions to some current archive research being done at Liverpool City Council Archive, into the Society's own history, a fascinating introduction to deep crustal research being undertaken in Japan, a review of plateau

glacial features in upland Norway, and a short introduction to the geology of Hilbre Island.

KHN

Publications related to the Geology of Wales:

A.J. Miles, N.H. Woodcock, C.J. Hawkesworth, ***Tectonic controls on post-subduction granite genesis and emplacement: The late Caledonian suite of Britain and Ireland***, Gondwana Research, **39**, November 2016, Pages 250-260, ISSN 1342-937X, (http://www.sciencedirect.com/science/article/pii/S1342937X16300090)

Dates for Your Diary:

NWGA:

Winter / Spring Evening Meetings

All meetings 7:00PM for 7:30PM start, at Pensychnant, Conwy, unless otherwise noted.

Saturday January 21st 2017
"Annual General Meeting"

See Notice at rear of this Newsletter, and Abstract for details of the talk

Other Groups Events:

GeoScience Wales

(meetings generally held at Royal Cambrian Academy, Conwy)

December 15th: Tim Needham:
"Reservoir Scale Deformation and Advances in Fault Seal Analysis"

Please confirm attendance in advance by e-mail to: admin@geoscience-wales.co.uk

GSOL – North West Regional Group

8th December 2016
"Control the Drainage: the Gospel according to Sinkholes"
Dr Tony Waltham
Manchester University

Mid Wales Geology Club

14th May 2017
Field Visit - "Llangranog"
Led by Keith Nicholls – NWGA members are very welcome to attend – contact Keith for joining instructions.

Web Site and Social Media:

Up to date information on our activities is posted regularly on the Association web site at:
http://www.ampyx.org.uk/cdgc/index.html

A much more informal way of keeping in touch with an eclectic mix of NWGA events, and other geological News items is available on the NWGA Facebook page at:
https://www.facebook.com/groups/northwalesga/

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Saturday 21st January 2017 at 10:00AM

Pensychnant, Conwy

Agenda:

Apologies for Absence

Minutes of the previous AGM (January 2016)

Chairman's Report (& Membership)

Treasurer's Report

Elections for the posts of:

Chairman: (incumbent Jonathan Wilkins)

Treasurer: (incumbent Cathy O'Brien)

Secretary: (incumbent Judith Jenkins)

Meetings Secretary: (incumbent Gary Eisenhauer)

Newsletter Editor: (incumbent Keith Nicholls)

Ordinary Committee Members: (All Positions vacant)

All current members have indicated their willingness to serve for at least one more year.

Any Other Business

Tea / coffee refreshments at 11:00AM

Following the AGM there will be a talk on a geological topic (starts at 11:30AM), by Dr Thomas Knott of Leicester University (see Abstract elsewhere in this Newsletter)

Weather permitting it is intended to have a short geological walk to a site of interest to the speaker – so please bring appropriate footwear for a yomp up presumably, Conwy Mountain