

Cymdeithas Daeareg Gogledd Cymru
North Wales Geology Association

NEWSLETTER

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Inside this issue:

Chairman's Message	3
Articles	5
Porth Tocyn, Llŷn	
2017 Year of Risk	
WAG Consultation	
Discussion	8
Reports	8
Abstracts	9
Dates for Your Diary	12
Web Site and Social Media	13
Committee Contacts	13

Front Cover Image:

View looking south westwards toward Cardigan Bay from the top of Snowdon, looking over the Ordovician intrusive and extrusive volcanic rocks, and mostly Llanvirn sedimentary rocks, associated with the Snowdon caldera.

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Chairman's Message

Before we get properly started, I just wanted to mention that this piece for the Chairman's Waffle column represents a small milestone. It is the first piece that I have submitted for publication that did not involve Microsoft software in its preparation. Having spent much of last summer desperately trying to prevent the Evil Empire, oops, sorry, Microsoft Corporation from wrecking the systems that we run at work by stealthily installing Windows 10 as an operating base for proprietary software that we know will NOT run on the new operating system, I decided that in the medium term it would be an objective to move my personal computer to an open-source operating system. So, greetings from the land of Linux, and I must say I have been happy since I moved in. Since I started this piece, however, the increasingly flakey Windows XP system upon which I relied for communication and utilities has suffered a total failure and the planned migration has become a data-recovery exercise. You will be pleased to know that all the NWGA data is safe and that all my stored data are accessible on my new Linux system as a result of mounting the old disc drive in a USB cradle and attaching it as an external drive when necessary. I know this isn't geology, but in the end everything we do as an association is underpinned by electronic activity, and increasingly, by electronic communication.

I also touched another milestone during a week's holiday in May, revisiting an area that I am sure has shaped my world-view and first brought rocks and geology to my attention. Although I have visited the Morvern district since I was a small baby, I do remember at a later age the predominantly metamorphic and granitic rocks and how difficult they are to get a grip on when you are trying to understand geology without any tuition and only an

Observer's Book of Geology to work from as a field guide. Forty years after I last looked at the geology of the Ardgour district, and a good few more since I travelled the area widely, and with a lot of geological learning under my belt, I looked again and was again at a loss, though this time because I knew what I was looking at and it made no sense when compared with accessible, contemporary references e.g. the BGS Geology of Britain Viewer. There has to be a standardised way of describing rock units on such a tool, which is only a 'first-look' data source, but the descriptions can be fairly misleading sometimes – and to my mind this description of part of the Moine Schist is both unintelligible and potentially misleading: "Psammite. Metamorphic Bedrock formed approximately 542 to 1000 million years ago Originally sedimentary rocks. Later altered by low-grade metamorphism." Work to do there, I think – and while I am on the subject, there is still a gaping hole stretching from Criccieth to Dinas Dinlle nearly two years after the paper map at 1:50,000 was published after its long gestation, and a lot longer since the geological data was put together.

Fortunately, we are still able to enjoy non-electronic communication, and by coincidence there was a quorum of your committee at the recent meeting of Geoscience Wales in Conwy, so after the proceedings we retired to the Liverpool Arms to take refreshment in the evening sunshine (and wind) beside Conwy Quay, where we set out our position on the forward programme of meetings and tried to 'brainstorm' contacts which might prove fruitful for organising lectures. It's very obvious that there is not much work being done on the geology of northern Wales at present, which without being exclusive, I have tried to make the basis of our programme. Needless to say, we continue to work hard on this issue, and you will see the summer programme of

meetings inside. One possible exception is the petrological examination of dyke rocks by Professor Marian Holness from Cambridge University. In our last edition I explained how her interest had been aroused in the Anglesey occurrences, and this led to my spending two days in the field. The first was a reconnaissance to establish which of the famous examples cited by Henslow and Harker were still accessible, and then at Easter time Marian and her long-suffering family spent part of their holiday on Holy Island to give opportunities for collecting from the identified locations.

We had a brilliant day out together, spending time at Plas Menai and Plas Newydd and establishing some good measured sections of the intrusions and collecting a sensible number of samples at stations spread across the thickness.

The exposure at Plas Newydd is much more complex than its description by Henslow suggests, and Marian will be investigating the effect on her crystallisation models of the fact that a substantial part of the modern beach platform appears to be the top of a sill-like body with a vertical extension forming the famous dyke.

The second day Marian spent on her own, working at Porth Dafarch, and returned to her laboratory well-satisfied. I set quickly to work on making my own thin-section of a spare piece of one sample, and I am delighted to say it is a wonderful example of its type. I hope that we might receive some feedback from Marian in the fullness of time.



Fig 1. Professor Holness at work / play

If we have an email contact for you, you should have received about month ago an invitation from Lesley Lawson, Countryside Warden for Conwy County Borough to a geologically inspired event at the Mynydd Marian nature reserve at Llysfaen, near Old Colwyn. The event was quite well-attended according to Lesley's reckoning, with a number of family groups and a few members of our Association, in addition of course to Vic Hitchings who was the leader for the event, which started with tea, cakes and a resumé of North Wales geology.



Fig.2 Mynydd Marian field visit

We then had a walk out on the wonderful meadows with their abundant orchids and rock-roses. It is a most interesting area with a view from the summit which includes Anglesey, Snowdonia, the Denbigh Moors, the coastal range and (almost) the Vale of Clwyd which comprise rocks from the Precambrian to

the Triassic, and illustrate a goodly slice of Earth history. My own fascination is with the low-lying area centred upon Dolwen and Betws-yn-rhos which is a significant catchment escaping to the sea through a narrow valley at Llanddulas. If there was any fault with the event it might be that we didn't spend enough time looking at rocks, but that was very likely because some of the younger members were neither particularly well behaved nor supervised adequately by their parents and risk attends close approach to the limestone crags resulting from a long history of quarrying in the area. This is an issue that we don't tend to encounter with our own events, but that wasn't the end of the day. As is often the case the most valuable discovery for me was that Lesley and her colleagues at the council have been contemplating how the area's rich geological story can be woven into their organised events programme in a similar fashion. We have long sought a way that we can reach a less conventional audience, but frankly we lack the organisational clout and means of publicity to promote geological events to the general public, whereas the council already promotes events based upon guided walks and discovery days. We will try to work up a series of three or four locations within the borough where geology-based events could be held next year, so if you have any particular sites in mind, or would like to participate, please let me know. Before I finish, I have to commend the tasty cakes that Lesley had laid on, though I don't know if they were her own handiwork. Another small incentive for attendees.....

We hope that you will take part in the outdoor events that we are organising over the summer, but regardless of that please have a good summer and take in some interesting rocks along the way.

Jonathan Wilkins

Articles:

Porth Tocyn, Llŷn

Spring arrived a few months ago, so like Jonathan I was out in the field! My outing was to Porth Tocyn on the Llŷn peninsula to look at some old mine workings.

The car was parked in the layby at Sarn crossroads from where I walked along a track and lane that runs roughly on an old tram-way that was built by the St Tudwall's Iron Ore Company to bring iron ore from the Hen-dy-capel mine in Llanengan to a wharf at Penrhyn Du. From here it was shipped to South Wales for smelting. As I walked along I could see evidence of several old mine shafts, drainage adits and probable exploratory excavations; there was also a bright rust red and black deposit that look as though it could have been an area used to smelt some of the ore, but it was not large enough to be the main smelting point^[1].

On reaching the sea I turned west along the cliff-top path to a point where an adit from the West Assheton mine drains water into the sea. The tide was in, and I suspect the entrance has been closed off, so I was not able to see much, other than a lot of surprisingly clean water being discharged. I then turned inland, following a track

struck by the very different types of mineralisation; some veins are 20mm thick pure lead (galena) in sharp contact with the quartz, but others are either small lead crystals scattered randomly in the quartz or even smaller lead crystals that are layered with the concentration increasing in one direction. One can only guess what



Figure 1: Galena et al

where the surface was made up mainly of spoil, collecting the odd sample as I walked, of course! Then to my left I could see the Penrhyn Mines' Cornish engine house (used for pumping water out of the mine), which appeared to be in remarkably good condition although, as one would expect, the machinery has long since gone. There are two visible shafts (of the original 6 or more) nearby, but these are fenced off and the land owner is not keen for members of the public to go there, so back to the footpath and on up to the headland, with magnificent views of the St Tudwal's islands and over north Cardigan Bay to the mountains of mid Wales. Having had my fill of the views I hunted around for some more samples then settled down with my lunch to do a bit of therapeutic hammering; the results of which can be seen in the accompanying photo. I was

processes were involved in creating these very different types of mineralisation. I await with interest the comments from other members!

These mines were in operation from the mid to late 1800s and were very productive. 1895 tonnes of lead ore and 864 tonnes of zinc ore were extracted from the West Assheton (map ref. 3178,2633) mine between 1876 and 1881 and for the Assheton (map ref. 3198,2624) mine 3120 tonnes of lead ore and 1020 tonnes of zinc ore between 1870 and 1889. There are records of the Penrhyn mine (map ref. 3228,2625) as far back as the mid-18th century. It was reopened in 1751 to extract copper ore as well as lead ore. By the 19th century the mine was operated by Cornish men who built the engine house as well as a Cornish language school and a row of

cottages that are still called “Cornish Row”. The Penrhyn mine produced 17 tonnes of lead ore in 1851, 20 tonnes in 1855, 10 tonnes in 1856 and 17 tonnes in 1871 (figures from the British Geological Survey, 1993).

Lyn Relph

Reference:

Gibbons, W. and D McCarrol (1993). “Geology of the country around Aberdaron, including Bardsey Island”, Memoir for 1:50,000 geological sheet 133 (England and Wales), British Geological Survey.

Editor’s Note:

[1] Perhaps “sintering”, in advance of shipping, to get rid of some of the easier to remove volatiles and therefore minimise weight being transported?

2017 Year of Risk

Themed years are at the heart of the Geological Society of London’s science strategy, and throughout 2017 they are exploring the concept of risk in the context of the geosciences, through research conferences, lectures, our education programme and other activities.

As Earth’s population grows, the risks associated with a range of geohazards have intensified dramatically, particularly in the developing world. An increasing number of people are living in major earthquake zones and on the flanks of explosive volcanoes. Groundwater aquifers all over the world have been depleted or contaminated, endangering water supplies. The environmental risks associated with extracting resources and fossil fuels must be weighed against the needs of growing economies. These issues fall within the remit of the geoscientist, and are likely to affect future generations to an even greater

degree than ours; do we have the tools and mechanisms to tackle them?

The Society has a number of forthcoming risk related conferences which given the rapt attention with which Mark Easton’s talk of the Kaikora earthquake received, members may wish to consider attending. Unfortunately call for abstract deadlines for all but the flooding event have now passed.

For further details about each conference please go to the relevant conference web page as shown below:

“Managing Risks across the Mining and Oil and Gas Lifecycle”
10 - 12 July 2017

Abstract deadline: 10 April 17
www.geolsoc.org.uk/mogrisk17

“Sharing an Uncertain World: Lessons in Managing Risk”
13 - 14 July 2017

Abstract deadline: 1 May 2017
www.geolsoc.org.uk/uncertainworld17

“Building Resilience to Geohazards in the Face of Uncertainty”
7 - 8 September 2017

Abstract deadline: 31 May 2017
www.geolsoc.org.uk/buildingresilience17

“The evolution of flooding and flood risk: past, present and future”
4-15 September 2017

Abstract deadline: 16 June 2017
www.geolsoc.org.uk/flooding17

“Ground Related Risks to Transportation Infrastructure”
26 - 27 October 2017

Abstract deadline: 26 May 2017
www.geolsoc.org.uk/infrastructure17

KHN

WAG Consultation

The Welsh Assembly Government is consulting on the question of “*Taking forward Wales’ sustainable management of natural resources*”. The document is available for review here:

<https://consultations.gov.wales/consultations/taking-forward-wales-sustainable-management-natural-resources>

with a closing date for submissions of 13th September 2017.

KHN

Discussion on “Content of the Coal Measures”

Lyn Relph writes:

The Treuddyn fossils are interesting. Figure 8 (below) looks more like a bit of *Stigmaria* (than *Lepidodendron*) because of the raised circular bit in the centre of each depression. Leaf scars are never like this, and they are also too far apart unless there are expansion ridges, in which case the scars are not neatly aligned.



Figure 8: Close up of water worn “*Lepidodendron*” fragment (or *Stigmaria*, as now seems more likely)

Reports:

NWGA Evening Meeting

“*A Tale of Two Quakes*” – comparing the impacts of the 2010 Darfield 7.1 (M_w) and the 2016 Kaikoura 7.8 (M_w) earthquakes and associated aftershock sequences

Mark Easton – Opus International Consultants

Mark offered us a fantastic personalised impression of his recent work dealing with earthquake triggered landslides on the south Island of New Zealand. The relatively recent Kaikoura event is rapidly gaining traction in the engineering community as being the most intensively characterised major earthquake, with all the post Christchurch instrumentation (pre Wellington?) in place and functioning when the event occurred.

Mark’s talk was a little longer than he planned, but despite running to two hours with questions no one left, and the audience was attentive throughout. We eventually had to close the questions down in order to make sure that our guest was fed and watered. Something of a personal highlight for me this – one of our more “off topic” talks - representative of my day job – so I was delighted that it was so well attended, and so well received, and so well fitting to the GSoL’s “Year of Risk” currently being promoted.

For those interested in some of the detail of the Kaikoura instrumentation and monitoring there is a host of interesting data being made available through the GNS web portal here:

<https://www.gns.cri.nz/Home/Our-Science/Natural-Hazards/Recent-Events/Kaikoura->

KHN

Abstracts:

Penrhyn Quarry. Saturday 15th July,

The visit will be led by David Jameson of GWP Consultants who is a geotechnical specialist with a long history of involvement with the site. We will start with a 30 minute introductory briefing in the canteen/workshop area giving a brief history, geological background and structural setting with respect to quarry stability and production. In the quarry we will look at the detailed stratigraphic sequence within the slates and cross cutting dykes and the major faults which delimit the productive slate strata. High visibility jackets, hard hats and solid boots are mandatory for all participants because this is a working site. It is an exposed, upland area and participants must be prepared for the conditions.

Please contact Gary Eisenhauer to register your interest. There is a short technical paper which can be distributed to anybody with a wish to read a bit more about the site before the visit.

Fossil Garden, Llanberis, August 6th

The visit to the fossil plants garden in Llanberis is confirmed for 10am on Sunday August 6th. Please note there is a maximum of 10 per visit to the garden so we may need to split into two groups if necessary.

Perhaps, if interested parties could let me know in advance of their attendance then we can gauge interest and get an idea of whether there will be one or two groups? If two, then perhaps some might want to arrive later for a second viewing instead of hanging around? Either way, I propose we

meet at 9.45AM outside “Pete's Eats” on the High Street, Llanberis for the 'first' group.

In the afternoon we can regroup for an informal visit to the Llanberis Slate Museum <https://museum.wales/slate/>

Gary Eisenhauer

The Carboniferous of Flintshire, September 10th

The geology of the Carboniferous has had huge economic influence on the social history of the north east corner of the Principality. Whilst the details of the itinerary have yet to be worked up in full, but we will see at least two potential new RIGS sites being brought forward by NEWRIGS, one an outstanding exposure of the Carboniferous sandstone facies that we see in so many of the areas' building stones, and a rather different “stone” comprising a fragile tufa deposit, forming from in a slope wash deposit, one the worlds' youngest rocks. The minerals forming the tufa are a consequence of the detailed stratigraphy of the junction between the Holywell Shales and the underlying “Mountain” or Carboniferous Limestone.

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Dates for Your Diary:

NWGA:

Summer Field Meetings

Saturday July 15th

“Penrhyn Quarry” – see Abstract

Leader: David Jameson; GWP Consultants

Sunday August 6th 2017,

“Field trip to the Fossil Garden in Llanberis” - see Abstract

Sunday September 10th 2017

“Aspects of the Carboniferous of Flintshire” - see Abstract

Leader: Keith Nicholls

NWGA:

Autumn Evening Meetings

“Fossil plants, the evolution of a garden and it’s plants” Wednesday 27th September.

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

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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