Here are the reports from our Geology Trips and talks in 2016

Frank Nicholson

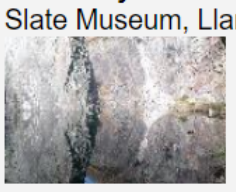
On Friday 29th January the Geology Group held its first meeting of the year. 30 members attended.
Frank Nicholson, a geologist gave a splendid presentation on 'What Glaciers Have Done For Us'.
I think everyone enjoyed both the slides and talk. After members had asked questions refreshments were served.
The Star of the day was Anita Roberts who had provided an enormous lemon drizzle cake and fairy cakes, enough for second helpings. Thanks Anita.
We now have our own internal geology library being organized by Mike Baines. The library is allowing us to use them to drop off/collect the books. They will be kept 'under the counter'.
I think we will be asking Frank to speak again this coming winter.
Richard Thomson is organizing T shirts for the group and trying to obtain more books.
Ruthin library is extremely helpful and they have already managed to increase the geology section of books and are happy to provide more.
So a great start for our geological year.
Isabel.

Ruthin Town Tour

A Geological Walk Around Ruthin.
On Friday 26th February Brian Hubble guided the U3A Ruthin and Corwen Geology Group around Ruthin. He explained how towns and villages in the past used local building materials. We would be seeing local Carboniferous Limestone, Permo-Trias Sandstone, and not so local Larvikite an igneous rock from S. Norway and Marble probably from Tuscany, Italy.
He pointed out the Yellow Sandstone used in the Bathafarn Chapel probably Cefn y Fedw Rock mined near Ruabon. Next we saw the County Hall pillars of Larvikite and the War Memorials three different rocks of Slate, Sandstone and Granite. We were shown Brachiopods and calcite veins in the Town Hall's Limestone and St. Peter's Square kerb stones full of Crinoid fossils. The large stone outside Barclay's bank 'Maeu Huaill' is a limestone erratic and the red sandstone rock along the Fford Llanrhydd known as The Kinnerton Formation, a registered site, was formed in the Permian-Triassic era in very arid conditions.
Station Road wall has one outstanding greenish boulder probably an igneous rock containing Olivine. The last thing we saw was the Marble steps outside the old picture house.
Ruthin rocks!

Llanberis Slate Mine

On **Friday 18th March** 16 members from the Berwyn & the Ruthin Geology Groups met in the cafe at the National Slate Museum, Llanberis.



After a welcome coffee we had time to see part of the museum before viewing our booked film on the Llanberis Mine followed by a slate splitting demonstration. There was still time for lunch and further exploration of the museum before our 1pm guided tour of Vivian's Quarry. Our guide' Pred' was extremely knowledgeable and amusing. Telling us the geology of the mine, all about the workers, owners, accidents and how the slate was mined and transported.
Before descending back down to the museum we visited the miners' hospital, complete with an operating theatre and a morgue. A few members decided to walk by the lake and the rest took a look around the well stocked shop.
The sun shone all day, the museum was a delight, entrance, film and slate splitting demonstration was free. The tour cost £30 and was worth 'every penny'. I think everyone one really enjoyed the visit.

Isabel.

Llechwedd Slate Mine

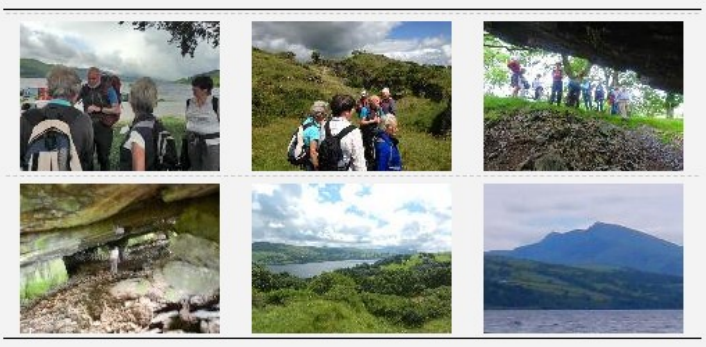
U3A Rocks Again.
On Friday 29th April 2016 nineteen members from the Ruthin & Berwyn District U3A's met at the Llechwedd Slate Mine for their latest monthly field trip. First stop was the cafe. A new member Karen was introduced and made welcome, fees were paid for the deep mine visit, £12.50, and a health & safety talk given.
Before descending down the mine we were provided with hard hats fitted with lights and these had to be worn throughout the deep mine visit. We were taken down the first section, 500ft, in a passenger cable railway, the steepest in the UK.
Our guide was excellent, his father and grandfather had worked all their lives down the mine and both suffered injuries. He took us along endless tunnels and enormous caverns. At times we were told to switch off our lights then he lit a candle to show the horrific conditions the miners worked in. We were shown the tools they worked with and how they detonated the gunpowder. At times audio visual displays appeared on the cavern walls telling tales of a father, uncle and son and how they spent their working day.
There are many floors in the mine this being possible due to large layers of igneous rock between the slate providing safe roofs between floors. Workers were poorly paid and had to pay for their candles, their primitive tools and gunpowder. They worked a 12 hour day with only 1/2 hour lunch break.
We ended our visit with a slate splitting demonstration, lunch then a visit around the workshops.
The slate is 500 million years old mud & clay formed on the sea bed. Compression and tectonic earth movement changed it into slate over millions of years.
The whole group enjoyed the visit the last of our winter programme. The next trip will be looking at volcanic rocks at Newborough.
Isabel.

Newborough, Anglesey

On Friday 27th May 15 members from the Berwyn & Ruthin U3A's Geology Groups met in the Marquess of Anglesey Column car park for our monthly field trip. Waiting to greet us was geologist Dr. Margaret Wood and her colleague Stewart Campbell.
At the foot of the column we were shown the rare rock blueshist. Formed in the Precambrian era 570 million years ago when two tectonic plates forced basalt pillow lava 35 km deep down. (subduction) Over millions of years, massive pressure and a small amount of heat changed the pillow lava's basalt into blue schist. Millions of years later it was pushed back up to the surface through fault lines by the earth's tectonic movements.
The pillow lavas on Newborough beach were formed around 560 MYA from black smokers on the sea bed. Sediments that were trapped on the sea floor became metamorphosed. Iron rich sand changed to Jasper (red) and mud to epidote (green) This can be seen in places around the pillows.
On a beach on Llanddwyn island we were shown the Mélange Rock Formation. A mixture of rocks that were scraped off a descending oceanic plate during tectonic activity MYA. These rocks vary in colour and are a delight to see. Black, blue, green, pink and more.
Suzanne, a group member found a rather interesting pebble. It was reddish/tan with dark spots. It may have originated from Ailsa Craig, a small 60 million year old volcanic island off Scotland where volcanic rock is used for curling stones. It would have traveled down from Scotland during the Ice Age stuck under the ice.
Margaret and Stewart told and showed us much more than I can report and everyone had a brilliant educational day with fantastic weather.
Isabel

Bala Rocks

On Friday 24th June members of the U3A Geology Groups from both Ruthin and Corwen met in Bala at the beautiful B&B home of Raymond Hind a well known mountaineer guide and our guide for the day.
After studying a geological map of the area we made our way down to the lake. Llyn Tegid is 3.7 mls long, 42 m deep. A terminal moraine blocked off the lake during the Ice Age. The Gwyniad, a rare salt water fish became trapped and over time adapted to the conditions of the freshwater lake.
We climbed farm land and tracks to reach Craig Y Fron, an old limestone quarry. The mining has left an area of caves 400m long. Supported by rock pillars. Limestone, mudstone, tuff (volcanic ash) and siltstone can be seen and small amounts of sulphur, iron and manganese. Part of the limestone roof has ripple marks from where it once formed the sea bed.



After a quick lunch we continued our climb carefully passing by a rather large inquisitive bull. Ray took us to see a manganese quarry. These deposits are rare, like the gold and silver. Having formed million of years ago from black smokers on the sea bed in the Ordovician times. The magma rising from the mantle at the Bala fault fraction zone.
From the summit of our walk Ray pointed out the mountain ranges, Berwyn, Aran, Arenig and Snowdonia and described how they were formed by volcanic action millions of years ago.
A very interesting field trip provided by Ray and the sunny weather was a bonus.
Isabel Stewart.

Minera, Bersham and Brymbo

Visit to Minera lead mines, Bersham ironworks and Brymbo heritage site
Click on any picture to view it full size.
On Friday 8th July, the U3A geology groups from Ruthin and Corwen (plus guests) – 20 people in all – visited 3 sites in the Wrexham area. These sites all relate to the extraction and/or processing of lead, zinc, coal, iron or steel – which fitted well with Richard Thompson's talk last winter when he explained how so much of modern life depends on products derived from the earth's geology.
Each person made a donation of £5.00 and the total was divided equally between the Brymbo Heritage Group and Wrexham Maelor museums service.

1. At 9.00 am we met Peter Appleton at Minera Lead Mines Country Park. Peter is a retired metallurgist and knows the Minera mines well, including underground from his caving days. Wrexham Maelor kindly opened up the visitor centre, now close to the public due to cut backs We were pleased to find most of the exhibition was still there.

Peter provided samples of various minerals, including galena (lead ore) and sphalerite (zinc ore). He explained the process of how these metals were extracted from the ore.

We were able to go into the restored Meadow (City) Engine House and enjoy the view of the site from the top. Nick Ward, who was involved in the reclamation of the site in the 1980's, encouraged members to return and explore the country park in their own time as there is more to see and it is a pleasant walk along the old railway line.

2. At 10.30 am, the group were met at Bersham Heritage Centre by Brian Gresty, a volunteer guide, and Eleri Farley of Wrexham Museums. Brian showed us around the nearby ironworks and foundry, with great knowledge and enthusiasm.

Iron working began here around 1640 but it was in the 18th century that it was developed by the famous ironmaster John 'Mad' Wilkinson. Local coal, limestone and iron ore were used in these works, located here because of the proximity of these essential materials and also the water power from the Clywedog River.

This was the first site in the world to make canons and steam engine cylinders using his innovative new process involving boring.

We also saw how more recently the foundry building had been converted into a water powered flour mill, which now contains an interesting exhibition.

3. After a lunch break at Brymbo Enterprise Centre, members were able to view a display about the Brymbo ironworks / steelworks site and also some amazing fossils found recently.

In 1792, when Wilkinson's business outgrew the Bersham site, he bought a house and estate at Brymbo and built a blast furnace there. The estate provided coal, iron ore and fireclay. Subsequently, this was the site of Brymbo Steelworks, which finally closed in 1990. During the process of reclaiming the site, unworked seams of coal were extracted by opencast mining and this uncovered the Brymbo Fossil Forest in 2005.

Peter Appleton took us to the area where the Brymbo Heritage Group are working to preserve and restore various buildings and machinery. There is an original blast furnace, still preserved because it was used for many years as a hopper for the sand used in casting iron. We were able to walk into the heart of the blast furnace.
Peter showed us some fossils that had been excavated. He explained that the best finds have been sent to the National Museum of Wales in Cardiff.
He then took us to the nearby area where the fossil forest had been discovered and showed us various fossils still in situ. Much of the excavation has been temporarily covered up to protect the remains. The aim of the Heritage Group is to build some sort of structure that will shelter and preserve the fossils and allow public viewing.

Though fossil trees are not uncommon in the coal strata of the Upper Carboniferous, to find an extensive stand of giant club-mosses along with dense thickets of smaller horsetails is truly exceptional – so much so that the site ranks as one of international importance. More information is provided in a leaflet provided by the Brymbo Heritage Group:
• **Coal Iron and a Fossil Forest**

The Brymbo Heritage Project (see www.brymboheritage.co.uk) aims to develop the site as an educational, research and visitor destination. Liz Mann, employed through the project, explained how they are seeking volunteers in all sorts of areas. If anyone is interested, they should contact her at Brymbo Heritage.
Nick Ward

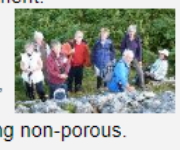
Bryn Alyn

Report on Field Trip to Eryrys & Bryn Alyn Limestone Pavement

On Friday 28th August at 2.00pm nine U3A geology group members from both Ruthin and Corwen met at the Sun Inn Eryrys for a guided tour of the area. Badges were handed out, fees collected and risk forms signed. The group was guided by two of its members- Heather Williams and Brian Hubble.
At 2.15pm Heather Williams gave a brief introduction, and showed the route of the walk. Care needed to be taken on the walk as it had been raining and parts may be slippery. A map was shown of the former lead mines in the area. The initial part of the walk along the land to Bryn Alyn would be parallel to the line of the Blaen y Nant vein which dates back to 1791. Lot Farm (which we pass) is named after the practice of the landowner claiming 1/12 or 1/13 of the ore raised, known as the lot. In the mid 1800s miners broke into a flooded cavern and were lucky to escape with their lives.
Before starting on the main walk Brian Hubble led us a short distance along the road to see the large glacial erratic, which is known as the Maen Digychwyn -'the stone that cannot be stirred' or the 'Great Immovable Stone', as past efforts to remove it have been unsuccessful! An erratic is a boulder that was carried by the ice during the last Ice Age (14,000 years ago) before being deposited on a different geological formation. In this case the boulder has been identified as originating in Snowdonia, most likely in the region of Arenig Fawr. Maen Dichgwyn is one of the largest erratics in Britain. It now forms part of a garden wall and is a Regionally Important Geodiversity Site.

We were fortunate that it was sunny and there were spectacular views towards the Clwydian Range and beyond, on our way up to the limestone pavement. Bryn Alyn is the second largest limestone pavement in Wales and is a Site of Special Scientific Interest. Some members had seen the limestone pavement on the Great Orme Head, but it was good to see a local pavement, which is less well known.
The Carboniferous Limestone is a very hard rock, its resistance to erosion often causing it to form prominent outcrops, as on the approach to Llangollen.

However this hardness means that stresses caused by tectonic movements, such as the faulting which has created the local outcrops, create a dense pattern of parallel stress fractures - i.e. tiny cracks.
As rain water is a dilute carbonic acid, it reacts (very slowly!) with the calcium carbonate to from calcium bicarbonate*, which is then soluble. As the body of the rock is non-porous, ground water is concentrated into the stress fractures, which are then chemically weathered into wider and wider cracks. In upland areas frost action might also contribute. Where these widened cracks form an especially dense pattern, surface water immediately drains away so soil cannot be created or supported, resulting in a bare pavement.



- $CaCO3 + H2O + CO2 = CaH2(CO3)2$

The subsequent accumulation of water below the surface leads to the origin, over geological time, of underground streams and caverns, with a whole catalogue of disappearing streams, underground features, and resurgent springs within a small area.
The Carboniferous Limestone is, therefore enigmatic - it is resistant to erosion, but not to weathering, and is permeable to water while being non-porous.

The main features visible are the clints (surface) and grikes (the channels). The plant ecology is of interest and one of our members counted at least 12 species in the area. This included harebells, wild thyme and hart's tongue ferns.
At the end of walk the group had a well earned drink in the cosy Sun Inn, dating back to the 1700s - which would have been a favourite watering hole of the thirsty lead miners. Photographs of the Blaen y Nant lead mine can be seen in the pub.

Iceland

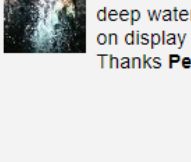
:-) Group Field Trip. 6th-9th October 2016.
Group photo by Mike Jones. All other photos by Eilir Hughes
Click on any picture to view it full size

On the afternoon of Thursday 6th October 15 members left their cars at the home of Mike & Kathy Jones and boarded a coach to Manchester airport. Our flight to Reykjavik left at 18.45pm. We should have been flying early morning but Easy Jet altered the flight time so we lost a very valuable free afternoon.
Having arrived at Hotel Fron around 10.30pm. most of us retired but a few ventured out as the hotel was situated in one of Reykjavik's main streets. The hotel met all our needs and served a continental breakfast with a restaurant next door.
The following day, Friday, we were collected from the hotel for our Golden Circle Tour. A fantastic trip of 8 & 1/2 hrs. With stops for coffees and lunch. The first stop was Thingvellir. This is where the Mid Adlantic Ridge can be seen. Two tectonic plates, the Eurasian and the American plate are moving away from each other at about 2cm a year.

The next stop was Gulfoss waterfall a beautiful site and it nearly always supports a rainbow. You can actually get right down to the water's edge. H&S is just a rope and a few poles.

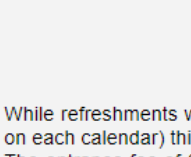
Then on to Strokkur Geyser. Hot bubbling pools of water and the Geyser erupting every 7 minutes. I thought that it didn't reach the height of a few years ago but it did delight everyone. Geyser itself hasn't erupted for many years due to a blockage caused by an earth tremor but it still bubbles now and then. Then we passed by Helisheri power station with its surrounding gushing steam vents. We arrived back at the hotel in time for a quick meal before our evening tour.

19.30 pm saw us on a coach again heading north to see the Northern lights. A coffee break at Borganes then on to Deildartunguhever where crowds were already waiting to see the lights. All we eventually saw was a green glow and a few shooting stars. A great disappointment after such a long journey, especially when the lights had been so bright a few nights earlier.
There was steam and the sound of gushing water where we waited for the lights, rather eerie in the dark. It came from a small area of red/brown rock where boiling hot water gushes out constantly, day in day out. It is collected and piped to Akranes as their means of hot water. One again H&S was sparse and really dangerous as it was almost pitch black apart from the odd torch.
We arrived home about 1.30 am
Saturday morning after very little sleep we were collected at 8.30 am for our South Coast Trip. A long day of 10 hours but many delightful stops and lunch. We visited numerous beautiful waterfalls, Uriddafoss, Skogarfoss and Seljalandsfoss. The last one has a pathway leading behind the waterfall and some members took advantage of this.

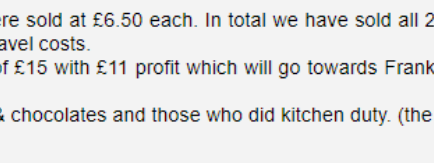


After Skogarfoss waterfall we then spent an hour in the Skogar Folk museum. A guide showing us what life was like in Iceland in the past.
On the journey we caught glimpses of Hekla and the ice cap of Eyjafjallajökull in the distance. We stopped to view the Thorvaldseyri farmhouse which has a museum showing videos of the 2010 Eyjaf eruption but it was closed for winter. Still, we were able to see the ice cap in the distance where the volcano lurks 'waiting' beneath the ice!

Next it was viewing the Solheimajokull glacier and its many moraines. Some groups were heading onto the glacier armed with crampons & ropes. Not us.



Following on was the black beach at Vik and seeing the massive Reynishverfi black basalt sea stacks. Then on Reynisfjara beach was something I had never seen before. An enormous cave, made up of gigantic grey basalt columns. I think it was a geological delight for everyone.



Heading for home our last stop was the waterfall Seljalandsfoss as mentioned above. On arrival back at the hotel most of us ate in the restaurant. Then it was time to pack ready for our departure at 4.30am

We saw many wonderful sites and all the names of places visited can be Googled for information. It was a great experience organizing the Icelandic visit and I hope everyone enjoyed it as much as I did. The group gave me a surprise present for organizing the trip. A lovely Icelandic book full of scenic photographs. Many thanks to everyone.
Isabel.

Red Wharf Bay

Click on any picture for a full size image

On Friday 21st October 10 members from the Corwen & Ruthin U3A groups met at Red Wharf Bay at 10am in the Boat House car park.

As the group was so small I had cancelled our guide Dr. Margaret Wood. After a H&S talk we set off along the beach clutching our handouts which I had prepared and two copies of the book 'The Rocks of Anglesey Coast' keeping in mind that high tide was around 3pm.

Our first stop was Castle Mawr, towering cliffs of limestone. We had to stand a distance away from the cliffs due to falling rocks but could easily see the different layers of rocks.
Grey limestone, formed in warm, shallow, tropical sea. In the Carboniferous era around 330MYA.
Yellow/orange sandstone, formed by river beds.
Grey/black shale, formed from swampy conditions.
We knew that over the millions of years when the rocks were being laid down that sea levels had varied as some of these rocks had been laid down on the sea bed and some when the land was exposed. Ice Ages had formed then melted causing the sea levels to rise and fall millions of year ago.

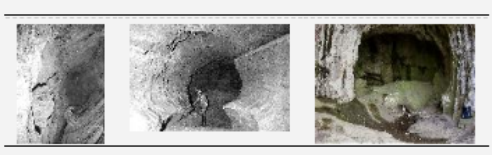
We moved along the beach to see a cave and sandstone pipes. The sandstone pipes are pot holes in the limestone that have been filled with sand over millions of years. They can be 3-5m in depth and taper at their base. Some are still embedded in the limestone and some are actually fully exposed.
There is a cave in the limestone in the cliff with a large pipe type of cavity. A sandstone plug dips down from the roof. This gives an idea of how sandstone pipes were formed.

We also saw a raised beach, patches of chert, rocks with sun cracks and if closely examined corals, brachiopods and crinoids can be seen. With an 'eye on the tide' we returned to the car park for our picnic. Some members because the weather was so warm and sunny decided to spend the afternoon at Moelfre and saw plenty more geology.
RWB is well worth a visit and more geological detail can be found on Google and the book mentioned above plus Dr Margaret Wood's book Footsteps Through Time. It is a great shame that the group was so small as the sun shone and there was plenty of geology to see.
Isabel.

Caves and Caving

Click on any picture for a full size image.

On Friday 18th Nov. at 2pm in Ruthin library 26 members gathered for the first of the winter's programme presentations, fee £1. Group member Peter Appleton was treating us to an hour's talk on 'Caves & Caving', a first for most of us.



Peter has been a caver since his youth and has explored caves in many different parts of the world. The ones he talked to us about were mainly in the Minera area.

He explained how the caves were formed, the excitement on discovering unexplored caves and the delights and dangers of caving. There can be quite a few miles of natural passage ways leading down to depths of 130 metres or more. Often passages have to be cleared of rubble to allow access when discovering new caves and you have no idea what is beyond the blockage. It could be a vast cavern full of stalacmites & stalagtites, a deep water filled drop or a dead end. Peter also showed us photographs of mineral veins and deposits within the caves and fault lines and he had on display some of the crystals and rocks from his caving days. A very interesting presentation.
Thanks **Peter.**

While refreshments were served the Icelandic Trip Calendars were sold at £6.50 each. In total we have sold all 25 calendars making a profit of £12.50 (50p on each calendar) this money will go towards outside speakers travel costs.
The entrance fee of £1 covered the charge for the library room of £15 with £11 profit which will go towards Frank Nicholson's travel costs when he does his presentation on 'Volcanic Disasters' Dec 16th.
A big thank you to all the members who brought, cakes, biscuits & chocolates and those who did kitchen duty. (the men's turn next)
Isabel.

Volcanoes

On Dec.16th at 2pm 22 members met in Ruthin library to enjoy a presentation given by Frank Nicholson. The subject 'Volcanic Hazards'.
He began talking about volcanic disasters, Vesuvius, Tambora, Krakatoa, Laki plus many more and the destruction and deaths they caused by hot lava flows, poisonous volcanic gases, suffocating hot ash, pyroclastic flows, tsunamis and effects on the climate causing drops in global temperature which caused crops to fail resulting in mass starvation.
Volcanic eruptions are difficult to predict.
Monitors record seismic activity, an increase in earth tremors is often a warning sign.
Ground swelling. (as on the flank of Mount St. Helens)
An increase in gas emissions.
Hot spots. (areas with patches of dead vegetation)
All the above signs could mean magma is on the rise. Once the magma is expelled from the volcano it is referred to as lava.
Frank spoke for 45 minutes and covered every aspect of volcanic hazards and he had many questions to answer afterwards. All his slides from the talk are on a pdf.
Volcanic HazardsU3A.pdf
To find out more on such topics as pyroclastic flows etc it can all be researched on Google.
To end the meeting we had a raffle then we all enjoyed delightful Christmas refreshments provided by members and a special thanks to Karen for her fantastic Christmas cake.
Thanks again to Frank Nicholson for a splendid talk.
Click **Volcanic Hazards** for an illustrated text in pdf format.
Isabel.

Iceland celebration

On Friday 3rd December all the U3A members who went on the 3 night trip to Iceland gathered together at Mike & Carolyn's house for a celebration party. Everyone took a plate of food and a bottle. It was a very successful and enjoyable evening.
I think we all were delighted with the trip, it may have be just a few days and very expensive but we didn't waste a minute and saw a great deal of Iceland's geology. Waterfalls, glaciers, geysers, hot bubbling mud pools, basalt columns, caves, volcanoes (quiet at the moment) and much more.
Watch this space for the next trip**!**
Isabel.