U3A Geology Group 2017

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Earthquakes

On Friday 20th January at 2pm in Ruthin library 30 members from the Geology Group attended a presentation on 'Earthquakes' given by Frank Nicholson. Frank is well known to our group and delivers excellent lectures.
He explained how many earthquakes are caused by fault slippage. Some of course are when magma is on the rise beneath the rocks. There are earthquakes/tremors everyday somewhere. Even in this country but often too small to notice. The scale of intensity of a quake is usually measured on the Richter scale, but the Mercalli scale and the Moment of Magnitude scale (MMS) are also used.
The Richter scale measures earthquakes roughly on a scale of 1 to 10. One unit increasing 30x's more in energy. So an earthquake measuring 7 would be 30 times greater than one measuring 6.
In 2010 a quake magnitude 7 killed 300,000 in Haiti and in Nepal 2015 8,787 were killed. It isn't the actual quake that kills but the disaster it causes, falling buildings, landslides, fires, lahars, tsunamis etc.
Frank discussed seismometers, earthquake measuring machines, the P & S waves and the oceanic crust subducting below the continental crust. Luckily all this information is on a PDF and can be read at leisure.

Education safety procedures are given in schools where quakes are a constant threat, California, Japan, New Zealand. DROP COVER HOLD. (hold as there could possibly be a second quake or falling masonry.) Japan's E.Q. in 2011 measured 9 on the Richter scale. This being followed by a massive tsunami.
A few signs before an E.Q. could possibly be changes in ground levels, small tremors and changes in animal/birds behaviour. Before a tsunami the sea gets drawn down and people often rush out to see this spectacular phenomenon instead of rushing up onto higher ground or to tops of buildings.
On the PDF you can see why buildings/bridges collapse during tremors and different methods of overcoming this problem.
Lastly Frank mentioned the earthquake on Wednesday 18th Jan. in Aquila, N Italy. 5 quakes within 5 hours measuring from 5.3 to 5.7. An avalanche probably triggered by the quakes destroyed the hotel Rigopiano in Farindola and they are still searching for survivors at the time of this report. Let us hope that everyone is found.
Isabel.

Mining talk

On Friday 24th February at 2pm 27 geology group members met at 2pm in Ruthin library to listen to Richard Thompson's talk on the 'The Changes In Mining Since the 60's.

He explained how he has been in mining most of his life and has visited & worked in mines all over the world. Were were show maps indicating the worlds mines, what minerals they produce and in what amounts. The demand for most minerals has greatly increased since the 60's with the exception of lead. (now no longer in demand for paint, batteries etc due to its toxic effect.)
Gradually since the 60's mining has become more sophisticated, H & S conscious and machinery is now technically more advanced. Even so it may take 10 years for a new mine to make any profit.
Coal, gems, silver, gold, copper, lead, iron, manganese ore, gypsum, tin etc are a few of the minerals mined. Open pits are cheaper to run but these are only used where the minerals are easily accessible. Minerals deeper below the surface have to be extracted from underground mines.
Richard covered much more information and this may be accessible if required. Plenty of questions followed the talk. Thank you Richard for another great presentation.
Before refreshments I addressed the group and asked for ideas on spending some of our £120 funds. I suggested Dr. Margaret Woods book 'Footsteps Through Time' and buying 6 lenses for when we are looking at rocks/fossils. Brian Hubble & Mike Baines suggested local geology maps of the area. Which Brian will organise. I have also bought the DVD 'Lost Worlds Vanished Lives'. By David Attenborough for our geology group library. £8.99 included p&p.
Nick Ward spoke about Friends of the Clwydian Range and Dee Valley and handed out leaflets. There is a 'Walk & Talk' on the rocks of the Clwydian Range on 13th Oct. Some members might like to participate in this and meet the said group and they may even want to join our 'spectacular' geology group.

The meeting ended with refreshments.
Isabel

Glacial Hazards

Natural Disasters In A Changing World.

On Friday 24th March Professor John Reynolds gave us a very knowledgeable presentation on 'Glacial Hazards, Earthquake Preparedness and Disaster Risk Management'.
21 members attended the meeting with apologies from those who had other commitments.

John travels the world assessing the risks in the mountainous regions due to earthquakes and climate change. Ice caps and glaciers are now melting at a much greater rate than before causing complete mayhem.

The Himalayan mountain range is still rising, caused by the movement of the tectonic plates. The Indo – Australian plate is moving towards the Eurasian plate pushing Tibet upwards around 2cm a year. The Himalayas contain more ice than anywhere else in the world except the Antarctic and Arctic and the melting glacial retreat is the fastest of anywhere.

There are around 1,600 glacial lakes in Nepal and around 20,000 across the Himalayas. So a great amount of melting water. So with all this melting and numerous earthquakes the future looks bleak for the population living at the foot of these mountains.

An earthquake cause landslides demolishing everything before it, blocks rivers, causes dams to burst. The melting glaciers are filling the glacial lakes much faster than before causing glacial lake out burst. The water rushing down the mountains taking ice and rocks on its journey downwards washing away whole towns and villages. In John's pdf it shows the village of Beding situated in the Rowaling valley before and after a glacial out burst.

The surrounding walls of the lakes could be either rock or melting ice you can't tell just by looking. Whole hills can collapse causing ice avalanches. Rocks as big as houses can come actually bouncing down the rock face.

These glacial lakes need constant observation and many need draining or at least some means of draining some of the water away. As the lakes are high in the mountains getting the engineering equipment to where it is needed is a great slow, expensive procedure.
This is where John's expertise and that of his company play a great part in dealing with such hazardous conditions. His knowledge on the stability of the lakes and what action is needed and when to prevent disasters ocurring.

Due to the movement of the tectonic plates there will always be earthquakes but by making sure the 6 most dangerous lakes are drained and the population are not living in areas likely to be washed away lives may be saved.

I think everyone enjoyed John's presentation and we were able to present him with a donation for the Nepal Earthquake Disaster Fund. Please contact me directly if you would like a copy of John's pdf.

Isabel.

Denbigh town walk

Denbigh Geological Town Walk.

On Friday the 28th April at 1.45pm twenty eight members from both the Ruthin & District and Berwyn & District U3A's gathered in Denbigh Town outside the library. Geologist Peter Jones and guide Goronwyn Wynne met us there ready to begin our walk.

After a H&S talk Peter with the help of diagrams explained how the bedrock of Denbigh was formed. Limestone laid down in warm tropical seas over 350 MYA. Followed by mudstone and sandstone. The sandstone being deposited in arid, desert type conditions when sea levels were much lower and the land was exposed.

Peter took us around the centre of town pointing out the buildings. Many were built using limestone with sandstone
around the windows, door frames and used for decorative features. Sandstone being much so easier to carve.
He pointed some igneous Larvikite decorative rock at the base of one building and Serpentine on another. Larvikite is mined in Norway and the Serpentine probably came from Cornwall.
The very old village sandstone village cross which had been removed from the town centre had a deep grove in its column. This was created by the Mediaeval butchers sharpening their knives.
The city walls were built from limestone and sandstone. Fossils such as brachiopods could be seen in the former. One house we saw had an amazing feature. It had every different rock possible protruding from its walls. I could have spent all day just examining them. All in the one place without having to climb about mountain sides looking for them.

Well it was a very interesting outing which everyone enjoyed. The castle and its walls splendid in the sunshine. Many thanks to Peter for sharing his knowledge and Goronwyn for being the back marker and keeping the rather large group safe.

Isabel.

Craven Arms

A Shropshire Geological Field Field Trip Examining Rocks & Fossils.

I was beginning to think that our latest field trip would be a complete disaster. Meeting times had been changed, it was a 2 hr. drive which could reduce numbers rapidly and rain was threatened.
So on Friday 19th the group met at Hillend Farm. A track off the A489 with not a sign in sight. Luckily everyone found it, our guide Professor Joe Crossley arrived on time and the sun shone. The group numbered 16.

After introductions and a H & S talk Joe took us to our first site. A short walk from the farm on the verge of the A489. An extremely noisy and busy road.

This site was layers of silty mudstone and coquinoid limestone. Jo explained what the layers were. We examined both types of rocks through our newly acquired group lenses. The shale was crawling with red ants and two common lizards were watching our every move.

The limestone was full of fragments of broken shells. Jo asked the group how this occurred, why some layers were thicker than others and many more questions. He was delighted with their knowledge and answers. He explained that devastating storms would have shattered the shells now found in the coquinoid limestone. Thicker layers of limestone would probably have been formed in quieter times.

All this activity was taking place about 420 MYA in the Silurian period. After lunch we visited two more sites. This time accompanied by very friendly, inquisitive young goats.

We covered and discussed

- Grain size,
- Shell growth,
- Erosion,
- Wave action,
- Ripples,
- Chondrites,
- Slaty cleavage,
- Unconformaties
- Faults
- Ice age erosion and much more

Joe was delighted when a member handed him a grooved, pyramidal, angular pebble. This was the product of the abrasive action of wind erosion formed under dessert conditions and is know as a Dreikanter. Maybe it was transported there during the Ice Age.

So another excellent field trip. Many thanks to our guide Joe and to the group for the important part they played.

Isabel.

Geology Field Trip to Trefor Rocks

On Friday 30th June 16 U3A geology members & 4 guest all geologists met at 9.45am in a lay-by beneath Trefor Quarry.
This was our first wet field trip in 2 years. Luckily it was a mild day and only fine intermittent drizzle. After meeting our guide geologist Raymond Roberts forms were signed, badges handed out and a £1 fee collected.

After a H&S talk Raymond explained that due to wet and at times slippery conditions the walk would mainly be on the level. The very steep, grassy slope up to the top of the escarpment would not be taken.
Even though it was misty we had good views of the Dee valley.

Raymond showed us a geological map pointing out the limestone areas, formed over 350MYA in warm, tropical, shallow seas. Being made up of shells & the hard bodies of sea creature over millions of years.

He pointed out the thin layers of rock between the much thicker layers of limestone. These were layers of shale made up of mud and silt.

We walked up a gentle, slopping, grassy track which still had signs of the old tram way. Raymond pointed out coral & brachiopod fossils then the group spread out to do their own searching. As it is a SSSI site hammers are were not allowed. Specimens found on the ground amongst the fallen rocks/ scree may be taken away.

Then it was time for a lunch break and a chat to the guest geologists. Around this area Richard found a large piece of rock which was fluted. Probably from the edge of a sink hole.

In Trefor quarry the layering of the limestone was very evident. Brachiopod & corals could be easily seen and there was one splendid specimen of a large single coral.

Once back in the car park Raymond showed us some fossils that he had collected on previous trips. He refused to take our collection of the fees and suggested we spent it on books.

It was a shame that we never made it to the top of the escarpment due to the damp conditions but now members know what to look for they can visit with their friends & their newly acquired knowledge.

A big thank you to Raymond and also to guest geologist Peter Del Strother for sharing his knowledge.

Isabel.

Lligwy Bay

On **Friday 21st July** at 11.30am 17 geology group members met in the car park at Lligwy Bay where we met our guide Paul Kabrna and his colleague Lynda.
After introductions and a quick picnic lunch we made our way over the sand dunes passing bushes weighed down with masses of colourful roses to Lligwy beach. The sandy beach is one of the largest on Anglesey's eastern shore.

The rocks we saw were red sandstone with interbedded Siltstone and mudstone. The red sandstone being the thicker, dominant layers. These rocks were formed around 400 MYA in the Devonian Era in desert like conditions when the land lay south of the equator. Rivers flooded, lakes were formed and later dried out and the deposited muds & silts, a continuous sequence formed the rocks over millions of years.

Paul pointed out suncracks, cornstones and the burrow tracks of marine worms. He also discussed the forming of the ancient super continents, plate tectonics, earthquakes, faulting, the Acadian Orogeny, a period of time in the Devonian Era when mountain ranges were formed. Anticlines, synclines, cross bedding and faults were all pointed out and questions asked.

We crossed over the bay to see the grey limestone and brown conglomerates. Formed in shallow, warm seas in the Carboniferous Era about 350MYA. Here we saw fossils of brachiopods and other fossils. Paul pointed out faulting, syncline and anticlines.

Our next stop was Lleiniog to see the effects of glaciation. 25,000 years ago the whole of Anglesey was under an ice sheet at least 1 kilometre thick. It was fed by glaciers from Ireland, Scotland & the Lake District. It covered over the effect of previous ice ages. Enormous boulders (erratics) smaller rocks, pebbles, etc. were all transported under the moving ice and these were in abundance in the Menai Straits shore.

Lynda pointed out the boulder clay (till) lying on top of the sands and gravels and explained about the different fluvial glacial structures. She talked about cross bedding which we could see in the sand layers & channeling caused by ice and water draining out of the layers of sand and gravels. (Flo channels.)
Pebbles can be found that have been transported from Scotland (Riebeckite), a red granite from Cumbria and the red boulder clay could possibly be from the Irish sea bed.

Glacial striations could be seen on the limestone boulders.
On the beach was a large stack made up of sand, gravel, till and limestone boulders.

All the above features can be seen on the photographs taken by Mike Cryne & Mike Baines.
Many thanks to Paul & Lynda and to all the members who braved the rain.
Isabel

2018 planning and Maps talk

As most members are away or looking after grandchildren in August I thought a small meeting in Ruthin library to discuss 2018's geology programme would be ideal. Group member Kay Culhane had requested a session on maps so Richard Thompson planned and arranged for this to follow my talk about next year's lectures & field trips.

So on Friday 25th at 2pm 16 geology members attended the meeting. I spent the first half hour discussing a variety of monthly trips and other members gave their suggestions.

This was followed by a spectacular ' MAP' talk given by Bill Saunders. Our oldest member. 93yrs. (He gave me permission to mention his age.)

He was a Royal Engineer in the last war. Mosquito planes took ariel views of the Far East and Bill and his colleagues produced maps from these aerial photo surveys. He showed us some of the old maps, photos of the planes, the pilots and his colleagues. Maps of the Sudan were created plus may other countries and Bill handed around these precious items.

His pride & joy was an atlas. ' The Atlas of Uganda ' produce before Uganda's independence. A treasure of a book and all thanks to Bill's hard work.

Another rather spectacular item on show was a very large map printed on silk of the Far East. A map on either side. Apparently this was one of the contents of the pilot & crews survival kit. It folded up small and anyone crash landing in the jungle was expected to use this to find their way to safety!

After Q's & A's and a great applause everyone gathered around Bill to to look at all the items on show.

This was followed by tea/cake. The £1 fee just covered the cost of the room. So thanks Bill for the lovely presentation & thanks to the members who helped tidy up in the kitchen and brought cakes.

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Presthaven Beach

On Friday 29th September 15 U3A geology members met in the free Presthaven Beach car park. Group member Richard Thompson had organised this field trip. Badges were handed out, fees collected followed by a H&S talk.

Richard then addressed the members impressing the point of keeping in a group and that we had a good 2 hrs before the tide changed.

We were asked to collect small interesting pebbles of different colours, texture and shape. Pebbles are fragments of rock so many of them will be local stone. The definition of a pebble is 'a small stone rounded by the action of water'.

Not all pebbles are of local rock, some rocks travelled beneath the ice during the past Ice Ages. Long since deposited when the ice melted and wave action formed them into pebble shape. So these pebbles could have been transported from Scotland, Snowdonia, Lake District and even the Irish sea bed. Some of these travelled pebbles could be jasper, chalk, granite, gabbro and flint.

Some pebbles will contain fossils, others veins of quartz or have holes, bored by types of shell fish or worms, some will sparkle and some will show crystals of various colours.

At a rather nice cafe we spread out our specimens and Richard explained what the various variety of pebbles were. Members were able to put our lenses to good use to see the sand grains and crystals. One specimen stood out from the rest. It was one of Richard's. A small brown flat pebble the size of a thumb nail showing some form of ! fossils. Through the lens these structures looked (to me) like some form of coral. Richard thought otherwise.

Our next task will be another meeting to classify our pebbles and discover what Richard's prize specimen is.

Everyone enjoyed the visit and the weather was fine. Many thanks to Richard for organising the visit and to Mike Cryne who took all the photos.

We are donating our fees this month to the Mexico Earthquake Disaster Fund.

Holt and Farndon

Examining the Triassic sandstone at Holt Village & Farndon. (Part of the Sandstone Trail.)

On Friday 27th of October 21 geology members met Professor Cynthia Burek in Holt village car park our guide for the day.

Cynthia handed out leaflets covering the Geological Holt Trail then explained about the formation of the Triassic Sandstone formed 230 MYA. When the land lay just north of the equator in desert conditions where large braided rivers filled channels with sand, gravel, pebbles and mud. Over millions of years these sediments formed the sandstone we were going to examine. The quartz grains became coated with a mineral called hematite giving the sandstone its redness.

Our journey began in the village itself looking at the medieval sandstone preaching cross and the war memorial constructed of the same stone with marble plaques.

We left the village and Cynthia pointed out the action of glaciation. During the last few Ice Ages the moving ice gouged out deep gorges in the sandstone through which the river Dee now flows with its spectacular meanders. We saw two river terraces formed in times gone by where the river once flowed before the gorges had been formed. (A very special site under the protection of RIGS. This is to safeguard the bodiversity & geodiversity of features & sites of international, national & local sites.)

Moving on to the ruins of Holt Castle which stands on a 39ft promontory of sandstone we had good view of the quarried sandstone and were able to see the cliffs that were once sand dunes. Now forming part of the Chester Pebble Bed Formation. Pebbles, cross bedding and faults were easy to see.

The sandstone cliffs in Farndon we just as interesting. Cynthia pointed out the Honey Comb effect in the cliffs formed by weathering (photo 40) and medieval carvings
(Photo 48) carved by the quarry men which had only recently been re discovered once trees and bushes had been removed. (photo 48) shows a very interesting feature. Caused by water ejection in the sandstone when the sand during rock formation became saturated with water. See if you can find the said feature.

So a really interesting day. Cynthia told & showed us much more than I have reported but I suggest that a visit to Holt & Farndon cliffs is well worth it and you may even learn how and why some of rocks of the Dee gorge are now over 2 miles away near Coddington.

Many thanks to Cynthia, Mike and the weather which was sunshine all day. Our £50 fee was given to Cynthia for
a donation towards RIGS.

Northwich Salt Museum

A Guided Tour of the Salt Museum, Northwich. 24th November.

Twenty Geology Group members and two guests met in the Salt Museum cafe at 10.45am ready for our guided tour at 11am. Each member paying £8 which covered both entrance fee and the tour.

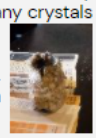
SALT. The Cheshire Basin rock salt was formed in the Triassic Period. The same time as the sandstone was being formed in Holt on the Cheshire Sandstone Trail where we had our field trip in October. The land at the time being north of the equator and under going very arid conditions and flash floods.
These flash floods covered the windblown sand dunes forming beds of sea water and also wind blown salt washed in from the land. These beds eventually evaporated leaving the salt crystals behind. This was a regular occurrence forming both thin and thick layers of salt. (A much better & correct account of the salt formation can be found on numerous Websites.)

The Romans discovered the salt and the museum has one of their salt pans and utensils on display which you can see on the photographs.

Rock salt was mined up to the 19C until it became uneconomical as many mines flooded. So methods changed to extract the salt. Water was pumped into the ground to dissolve the salt thus forming a solution called brine which was then pumped out and the salt extracted. A procedure which the museum takes you through.

Removing the rock salt and brine from deep below the ground left enormous empty cavities which eventually collapsed (and are still collapsing) causing land to collapse. Some of these site are now shallow stretches of water called 'Flashes' and are wonderful places for wild birds.

We needed two guides as we were a rather large group and were shown, the pump house, the boiling process, lofting, cutting and packing rooms. One interesting point was in the boiling room where the brine was in enormous tanks with furnaces beneath forming a cooler area at one end. The salt crystals that eventually appeared once all the water had evaporated were smaller at the hotter area of the tank and those in the cooler area were larger and flakier. Just like any crystals form. (The longer time the crystal has to form the larger it grows.)



It was well worth a visit and covered much more than I have reported on. The guides were excellent, the café welcoming and a well stocked shop. Thanks to Mike Cryne for the informative photographs. The last few shots were after the museum visit. Some members went onto see the Anderton Boat lift but it wasn't open to visitors. The boat lift information can be found on many Websites.

Another well attended geology visit.
Isabel

Plate Tectonics

On 15th December, at 2pm in Ruthin library 23 geology group members gathered for our Christmas meeting. Dr. Frank Nicholson gave a presentation on ' Plate Tectonics ' which was followed by a raffle and Christmas refreshments.

Dr. Frank Nicholson is a retired lecturer in Physical Geography & Earth Science and has given us quite a few excellent presentations.

He began by explaining how until around the 1960's the debate on the movement of the continental plates and the forming of supercontinents were not really understood or believed.
Alfred Wegeiner had been debating about Continental Drift in 1912 but it took up to the 60's before it started to become accepted. So the continent's have been coming together then parting at least 3 times over millions of years, the last one being Pangea 300 MYA. Apparently the next could occur in around 250 million years.

Frank explained the differences between Continental Crust & Oceanic Crust, how new oceanic floor is being created in the mid oceanic ridges, the dating of rocks through palaeomagnetism, faulting and much more.

His full presentation can be found at Plate Tectonics Download.

When a group of us went to Iceland we were able to see the Mid Atlantic Ridge where the two plates are moving away from each other and new land being formed. This is only one of two places where this can be seen as the ridges are under the ocean.

An excellent presentation and a nice geological end to 2017.
Isabel