

Newsletter

Thoughts from The Chair.....

Now in my 6th Year as Chair I have been reflecting on the life of our BGG Group and where we go from here.

Life began in December 2004 as the Bedfordshire and Luton Geology Group, formed by a handful of individuals, whose aim was to promote geology in Bedfordshire. Money was obtained primarily from the Heritage Lottery Fund, and used to identify RIGS, now known as LGS (Local Geology Sites). This progressed into providing interpretation boards for the sites, and a variety of leaflets.

Things were going well until 2008 when funding was difficult to obtain, and enthusiasm waned, resulting in an extraordinary meeting to decide the Group's future. As a new member, I was concerned that the Group would fold, so put myself forward as Chair, being elected in the September. My primary objectives were to ensure that the Group remained solvent, and to promote Bedfordshire geology by whatever means.

These last 5 years have been difficult, but through various means we have found funding to produce leaflets and to advertise our Group. Plus a variety of events have helped to increase our bank balance.

Our committee brings both professional and amateur experiences to the group and is respected by other geology groups and related associations. We continue our interest with The Higgins (Bedford Museum), and are now involved amongst other things, with Clophill Church. These are valuable contacts which will continue to enable us to promote Bedfordshire Geology.

....Where do we go from here?

We have a good sound platform to move in any direction we wish. We have an excellent committee with a broad wealth of knowledge, who work well as a team, and we have a supportive group of members.

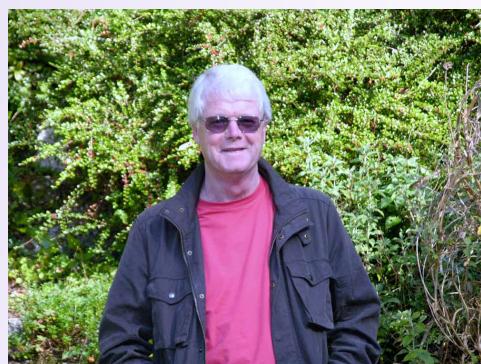
The committee has ideas, and so do you, so let's decide the move together.

I have recently asked if anyone would like to seek project funding for the Group. Our project ideas are not exhaustive, and we would welcome your ideas and thoughts on what they might be. For example, you might wish a leaflet to be created based on the geology of your favourite building or favourite walk, or just want to know about the geology of your village, town or an area within Bedfordshire.

If you would like something like this, why not write an article in this Newsletter, or if you wish, send your thoughts to either me, or one of the committee Members.

Looking forward to hearing from you.

Kind regards
Peter Lally



A Walk around a Victorian cemetery Sunday October 6th

By Frances Maynard

About 15 members of the BGG turned up on a beautiful autumn morning for a geological walk around Bedford Cemetery on Foster Hill Road. We looked at about a tenth of the cemetery surveying the different styles of memorials as well as the varying stone types.

A Victorian cemetery is a good place to see igneous, metamorphic and sedimentary rocks in very close proximity. The walk looked at 20+ different graves, starting with the Higgins Memorial (right) which marks the vault for the Higgins family. This was a fine example of marble on sandstone showing much weathering and discolouration from atmospheric pollution. The granite and igneous gravestones show better resistance to weathering and have increased in popularity since the 1840s.

The sedimentary rocks to be found within the cemetery included some fine sandstones (left), including some new red sandstone and oolitic and fossiliferous limestone.



The cemetery includes some fine examples of gabbro and the darker basaltic rocks (called either black, red or grey granite by monumental stonemasons) reflecting a more modern taste superseding the red granite (see below right). Finally there are only a few examples of metamorphic slate in the part of the cemetery that we visited – these again in excellent condition due to the protection of vegetation.

The cemetery has an active group of

'Friends' dedicated to its maintenance who also help family members research burial sites and history of the 'residents' of the cemetery. They told us some interesting stories about Bedford families and provided some excellent hospitality for our visit including home-made cakes and proved to be informative and interested colleagues.



If anyone is interested in one of their guided walks or talks on the cemetery why not visit their website:
<http://www.bedfordcemeteryfriends.org.uk>

Snowball Earth - a talk to the BGG

By Ron Elverson on October 17th

The ‘Snowball Earth Hypothesis’ proposed that around 650 million years ago the Earth was entirely covered by snow and ice.

This period, the Pre-Cambrian, preceded the Cambrian ‘Explosion’ of life typified by the appearance of trilobites.

Proponents of the Snowball Hypothesis argue that it best explains sedimentary deposits generally regarded as of glacial origin at tropical paleolatitudes (such as Namibia), and other otherwise enigmatic features in the geological record.

Ron's undergraduate project work involved mapping in Lapland – Karasjok and Adamsfjord (current latitude of around 69° North). The project found lithified tillite (glacial debris deposits) that showed geomagnetic positioning of around 20° south of the Equator. The lithification of the tillite was proof that they were exceedingly old – pre Cambrian in fact (about 2,700 Ma in age). Furthermore these deposits showed classic signs of glaciation: striations as well as a 'conglomerate' type composition (see fig. 1).

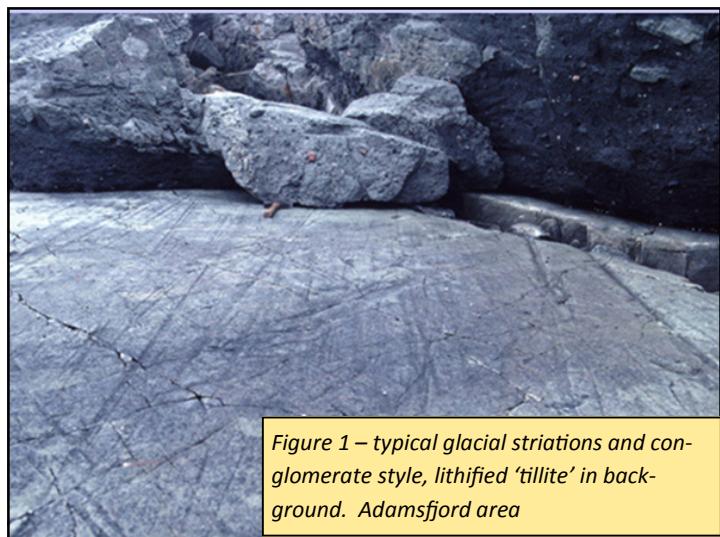


Figure 1 – typical glacial striations and conglomeric style, lithified ‘tillite’ in background. Adamsfjord area

The post-hoc interpretation of these deposits indicate a glacial climate but at a latitude far south of the Polar Regions. This must have been an exciting and at times challenging set of deposits to interpret, see the lithostratigraphy from 1990 (fig. 2) below .
(apologies if it's not very clear)

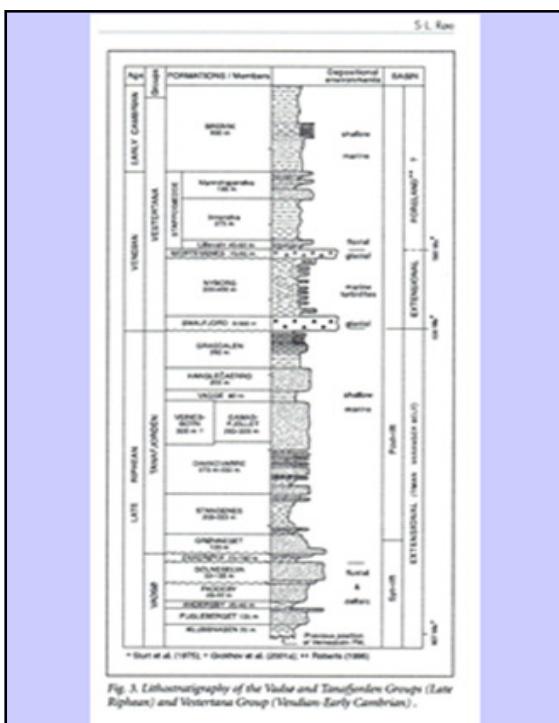


Figure 2: Lithostratigraphic diagram (S. R. Roe 1990) showing glacial deposits from Vendian stage of the pre-Cambrian (around 630 Ma)

Ron will give a further talk in January 2014 on the Snowball Earth hypothesis to bring the research up-to-date discussing some of the theories explaining how the glaciation may have occurred (a very low CO₂ environment perhaps) and what may have ended it.

Review of events held in 2013.....

from Frances Maynard

As this was my first year as Events Co-ordinator I wanted to ‘get-it-right’ in terms of appeal to you as members as well as degree of geological content. I hope you feel the balance has been about right, please let me know ([via fmaynard@btinternet.com](mailto:fmaynard@btinternet.com)) if you have any suggestions or ideas for future events.

The year started in February with a clear-up at Potton followed by a walk around Sandy to look at the excellent exposures of lower Greensand. March saw us visit the ‘waterfall’ at Podington – the main exposure of limestone in Bedfordshire. The waterfall was in good flow and revealed some excellent fossils that were later displayed at the ‘Open Farm Sunday’ at Podington in June.

The April field trip was to the Totternhoe Stone Pits – the site of long-standing quarrying for Totternhoe Clunch, a popular building and carving stone. The weather was kind and we were able to walk the circuit of the old and more recent workings, enjoying a fossil fossick on the way. This visit was extremely popular with guests from the local history group as well as BGG members.



Rock face cleaning at Potton in February

In May we put on our working gloves again and cleared the quarry face at Kensworth. This represents another fine example of Cretaceous chalk deposits with some good examples of flora and fauna (in particular ants!) that find chalk an ideal habitat. Afterwards we walked on to the Landpark site (a disused quarry owned by the Wildlife Trust) where the frosts and rain had led to the cleared face becoming very overgrown and difficult to access. Thus demonstrating the need for some continued maintenance work there for the next year. In June we visited Munday's Hill in Leighton Buzzard which is a working quarry needing specialist leadership from Bev Fowlston, safety gear and hi-viz jackets.

June saw the much awaited re-opening of Bedford Museum (The Higgins, Bedford) and BGG were excited to be able to have a tour around the museum in July. The geology displays remain very much ‘work-in-progress’ and so were a disappointment to the members of the group who had worked hard on identifying and labelling specimens and writing the text panels. It is hoped with time and more money that the displays may be improved to make more use of the museum’s geological collection.

The final field trip of the year coincided with the AGM in October when we toured Bedford’s Victorian cemetery on Foster Hill Road. See the report of this visit on page 2.

Following the AGM the winter programme of talks began with a talk on Snowball Earth by Ron Elverston (see page 3) and one on New Zealand: Land of Earthquakes and Volcanoes by Glynda Easterbrook (see page 8).

And what's coming up in 2014.....

Events for 2014 include:

- ◆ A further talk in January on Snowball Earth by Ron Elverson to explore some of the controversies and paradoxes
- ◆ A guided walk in February around Sandy Heath Quarry (which is still in use but has some parts that have been restored and show how heathland can appear after heavy industrial usage)
- ◆ A walk in March to see the Clophill Heritage Trail and how this is progressing (including possible identification work on the building stones in the church)
- ◆ A working party to Landpark on the Dunstable Downs
- ◆ Visit to Deepdale Quarry (lower Greensand) and a return visit to Mondays Hills to look at 'sandpulling' techniques for identifying timescales of deposits (such as tidal bundles)
- ◆ Finally for July a visit to follow the Bradwell Park to Newport Pagnell Geo-trail developed by Tom Hose.

I hope you will agree that this is an exciting and varied programme. The dates and exact details of the locations for these field trips will be posted on the events page of the BGG website:

<http://www.bedfordshiregeologygroup.org.uk>

Please let any committee member know if there is anything else you would like us to organise.

Wishing you a happy and healthy 2014, all the best, Frances Maynard

*Don't forget the Xmas Social on
Thursday December 12th, 7.30 -9pm, at
the Husbourne Crawley Reading Rooms.*

- ⇒ Talk on the volcanic caldera of Santorini
- ⇒ Raffle, prizes & quiz,
- ⇒ Party food & drinks



Please bring a plate of food (hot or cold, as we have full kitchen facilities available) or perhaps a bottle and a raffle prize!

When the earth shook Trinidad..... my earthquake experience

by Graham Hickman

The evening of October 11th 2013 was similar to most Friday nights in Trinidad. But our 'early night' was disrupted when we were rudely awoken by a violent shaking and a loud rumbling, similar to a large freight train rattling past.

The whole house was shaking, side to side and up and down; it was an earthquake! However, unlike the previous earthquakes I had experienced it seemed to go on forever, although the shaking probably only lasted 30 seconds. My heart was racing, the dogs next door were barking. We had rushed into our bathroom and donned dressing gowns and slippers. "What do we do now?" I had to admit that I had no real plan and the house was still shaking like a ship on heavy seas. Suddenly the shaking and the noises stopped. Was it over?

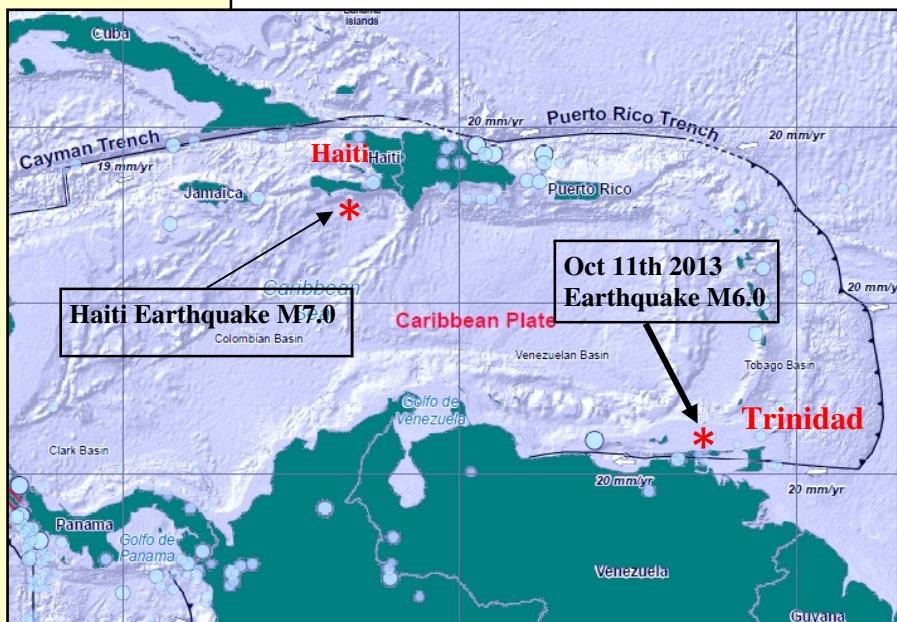
What next? Aftershocks? How much damage had been done?

Then the phone began to ring. Our neighbours, were sharing their experiences via WhatsApp group chat: "Wow that was a big one." But the strongest thread seemed to be, "biggest I've ever experienced!" Previous quakes experienced here had only lasted about 10 seconds but this one was different.

On the radio next day we learned that the University of the West Indies (UWI) recorded the earthquake as of magnitude 6.4 occurring at 10:10pm. The event was located at 10.86°N 62.12°W north-west of the Paria Peninsula Trinidad and offshore Venezuela. The epicentre was at a depth of 60km about 50km away from our home. Only minor damage and few injuries were reported, although several areas had suffered power cuts. The USGS later issued a report lowering the magnitude estimate to 6.1, apparently UWI often has higher readings than the USGS. Magnitudes 6.0-6.9 are still classed as strong earthquakes.

The USGS reports on the earthquake can be found at: <http://comcat.cr.usgs.gov/earthquakes/eventpage/usb000kbhi#summary>

The great depth at which the earthquake occurred was probably the reason why little damage was recorded, the shock waves travelling up from depth cause the buildings and ground to move up and down in phase. Had the earthquake been shallower with shock waves moving more horizontally the damage would undoubtedly have been greater. We were lucky! July through to December is also the wet season here and landslides are common. September and October had been relatively dry so perhaps we were doubly lucky.



Trinidad straddles the Caribbean and South American plate boundary. The northern part of the island, where I live, rides on the Caribbean plate and has an eastward motion of about 2mm/year while the southern part of the Island rides westwards on the South American plate. The edges of the Caribbean plate form a large eastward facing arc. A line of north-south volcanic islands formed by the subduction of the Atlantic Oceanic crust and large lateral strike-slip faults form at the boundaries.

The earthquake we experienced was associated with the lateral movement on the southern boundary of the Caribbean plate. The Haiti earthquake of January 12th 2010 (Magnitude 7.0) was associated with movement along the northern edge of the same plate.

After doing some research I discovered that since 1900, the largest earthquakes to occur along the southern Caribbean plate region were the October 29, 1900 M7.7 Caracas earthquake, and the July 29, 1967 M6.5 earthquake near this same region. Although on October 21st 1776 an earthquake near Antigua ~M7.9 caused mass destruction of buildings in Trinidad and economic disaster, the number of casualties and ultimate cost remains lost to history.

How does this make me feel? As a geologist I feel cheated having slept through part of the earthquake and not really being able to appreciate the power and awesomeness of the event. My emotions are however somewhat shaken, the event has shown me how fragile and vulnerable the built environment is to these natural events and how unpredictable they are. Lying in bed afterwards, I began wondering if there would be more aftershocks. I realised that living through a major earthquake, where aftershocks occur for months afterwards, must be a really terrifying experience; one I hope never to experience.

**Help me
identify this.....**



by Rodney Sims

Whilst sorting fossils reclaimed from our schools classroom at Calvert for potential display at College Lake, I came across this mollusc fossil.

In searching for identification features, I noticed a structure which to my eye resembled a rasp - a small one but definitely a rasp! I was and still am confused.

The rasp was strong, almost metallic, and seemed part of the fossil apparently emanating from the hinge. My knowledge of the mollusc anatomy is not great, but I have never suspected them capable of carpentry!

Please can someone help me identify the protuberance. Any suggestions please send to:
rodney.sims@tiscali.co.uk and
henriettaflynn@btinternet.com to be included in the next newsletter.



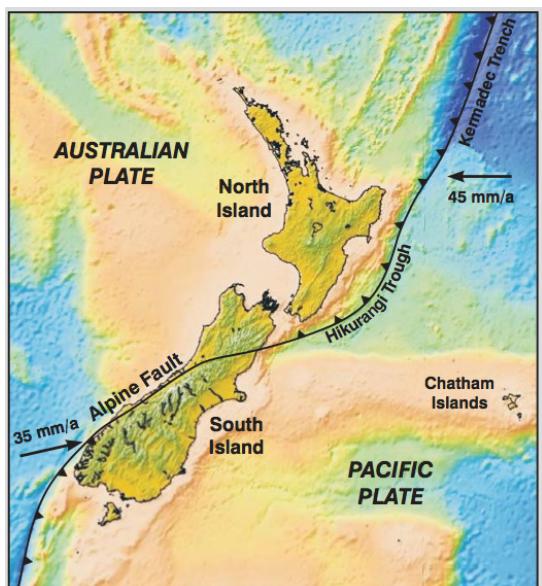
Perhaps Rodney you can bring it along to the Xmas Social for us all to have a look at?

Talk on the land of volcanoes and earthquakes—New Zealand

By Glynda Easterbrook

On the evening of November 14th, after becoming a Grandmother for the second time just a few hours before, Glynda gave her presentation on the geology of New Zealand. Having cruised the area earlier in the year she illustrated her talk with plenty of fascinating photos and images.

New Zealand began life as part of the super-continent of Gondwana. Its complex tectonic history is the result of it now sitting astride the convergent plate boundary between the Pacific and Australian Plates, with resulting volcanic, geothermal activity and earthquakes. The Pacific Plate is colliding with, and subducting beneath, the Australian Plate at an approximate rate of 40mm/yr. The East Coast of North Island is being compressed and rotated clockwise, whilst the East Coast of South Island is sliding obliquely towards the Alpine Fault, resulting in the Southern Alps. These are rising at a rate of approximately 10mm/yr, although they are also being worn down at a similar rate. In the southern part of South Island there is also subduction, although this is in the opposite direction, the Australian Plate here plunging beneath the Pacific Plate.



Tectonic map of New Zealand

Earthquakes occur all over New Zealand, although deep earthquakes are confined to the subducting plates in North Island and the southern part of South Island. There are few deep earthquakes in the Southern Alps because here the plates are sliding past each other. Shallow earthquakes are more widespread. Canterbury had been relatively stable until the earthquake on 4th September 2010, which was followed by more than 1000 aftershocks. These are thought to have weakened structures in Christchurch, which together with significant liquefaction, led to their collapse and the subsequent 185 fatalities in the later earthquake of 22nd February 2011.

New Zealand's current volcanic activity is confined to North Island, where the Pacific Plate is being subducted beneath the Australian Plate. Most of this activity is centred in the Taupo Volcanic Zone, which is also known for its geothermal activity in places such as Rotorua, although hot pools abound throughout New Zealand. Lake Taupo is a volcanic caldera, responsible for explosive eruptions about once every 1000 years. It was formed 26,500 years ago as a result of collapse during the supervolcanic Oruanui eruption. A line of undersea volcanoes also extends to the north of North Island, along the Kermadec Ridge. White Island is an active andesitic volcano with the potential to generate a tsunami in the Bay of Plenty. South Island has no currently active volcanoes, but it does have some historic volcanic activity.

Mount Ruapehu eruption, June 19



BGG Committee Members 2012 - 2013

Chairperson	Peter Lally	plally65@gmail.com
Secretary	Glynda Easterbrook	g.easterbrook@open.ac.uk
Treasurer/Membership Sec	Lindsay Hiles	bgg.membership@btinternet.com
LGS Manager	Anne Williams	annew36@hotmail.com
Events Coordinator	Frances Maynard	fmaynard@btinternet.com
Chalk area rep/Events Org	Janet Munro	jan.munro1@ntlworld.com
General Projects	Malcolm Oliver	msoliver@talktalk.net
BNHS rep	Janet Munro	jan.munro1@ntlworld.com
Newsletter Editor	Henrietta Flynn	henriettaflynn@btinternet.com
Public Relations/Fundraising	Glynda Easterbrook	g.easterbrook@open.ac.uk
Information Officer	Anne Williams	annew36@hotmail.com
Committee Member	Martin Day	francis.day@btinternet.com

We are all volunteers and bring together an assortment of skills, interests, experience and geological knowledge (or not, as the case may be!). If you feel we could benefit from your skills and ideas too, we would love to hear from you.
Please go to our website for further BGG information
www.bedfordshiregeologygroup.org.uk

And finally.....

we really do need you!!.....

At this year's AGM, Peter mentioned that the BGG was in need of someone to help in seeking Project Finance for both existing and future projects that we have in mind.

The role would be flexible, but would be to determine funds from organisations such as the Heritage Lottery, charities, environmental groups, councils, and even local communities. You don't necessarily have to be on the committee but just be able to report and liaise.

If you feel you 'fit the bill' and have a bit of experience in sourcing and negotiating funds with some project involvement we would love to hear from you. As usual please contact Peter or any of the committee .

Newsletter compiled and edited by Henrietta Flynn
 If you have any comments or wish to include an article in the next issue, then please contact me by email at
henriettaflynn@btinternet.com