Cymdeithas Daeareg Gogledd Cymru: North Wales Geology

Issue 57

Oct 2009

Chairman's Wanderings

I hope that the Summer has been kind to you for your holidays, geological outings and general enjoyment of the geosphere. It must be admitted that the weather was rather unkind at times, though curiously September has proved to be drier and more settled than expected. It is a matter of regret that we have been unable to organise any field meetings to take advantage of that fine weather.

We were very pleased during the Summer, to hear that our long-serving secretary, Susan Brooks, has finally achieved the move to England that she had been seeking for a very long time. She is now acquainting herself with the geology of the Bristol Channel, and we wish her and Dennis well in their new home, and have to place on record our thanks for her long service and involvement with the promotion of North Wales geology through both the NWGA and the GeoMon project. If you subscribe to Earth Heritage you will see Sue (and Rob Crossley) swigging a well-earned champagne to celebrate the new geopark.

The downside of Sue's move is that we must recruit a new secretary. The duties are not onerous, but it is a position that we should fill in order to maintain our proper quota of officers. It also highlights the loss of talent which we have suffered in recent years, first Will Jones and then Rob Crossley more recently. Both of them were exceptionally able geologists with a wide-ranging knowledge of more and less local geology, and their ability to organise and lead field meetings, in particular, is sorely missed. Their wide-ranging contacts in industry and academia was also very useful in helping to organise indoor meetings. The message is clear that we need more of that kind of stuff if we are to promote a viable programme of meetings for the future.

It is also a matter of urgency to take in your suggestions of where we may go in future. In seeking to broaden our area of focus, and to avoid the attractive trap of spending every field meeting on the coast of Anglesey, I put on a walk around the summit of Tal-y-Fan which is not an arduous or precipitous route. Clearly this was not adequately promoted, or was such an unattractive itinerary that just two people joined me on the day. – a very unsatisfactory outcome indeed, and one that did not truly justify the effort of researching and organising the trip.

We enjoyed our walk immensely, enjoyed superb weather and located a site which reveals the lower contact of the intrusion. On another occasion, however, a large and appreciative field party from the OUGS were treated to the story of the Conwy Rhyolite and Ordovician sedimentation, so it is clear that effort on the ground can bring rewards, and a similar trip has already been booked in advance for 2010 by another branch.

Glacially quarried dolerite blocks below summit escarpment of Tal-y-Fan

My own wanderings in Connemara were a huge success, living for a fortnight on an island granite outcrop that is part of the Galway Batholith. Like many Caledonian granites, the Galway has very subdued topography of peat bog and low, ice-scraped hummocky outcrop that has been widely flooded by sea rising faster than eustatic rebound. The famous mountains are a ring of hornfelsed Dalradian metamorphic rocks that surround this and other granite intrusions, which create together a fantastic and romantic wilderness that is exceptionally beautiful. Add in the Arans with coastal cliffs and limestone pavement to die for, and you have world-class geodiversity. With the N6 trunk road now dual-carriageway most of the way to Galway, and the expansion of Galway City itself to satisfy the retail and refreshment cravings there is hardly any excuse to stay away! I hope to return in future with the Edinburgh Geological Society on one of their excursion weeks, and look forward to the company of some of the many geologists who have conducted research in the area for a very long time.

Jonathan Wilkins

Hot Spot Volcanism – Geology in Hawaii
Norman Dean

My wife and I were fortunate enough to participate in a geological expedition to the Hawaiian Islands organised by Bristol University Extra-Mural Studies Department and led by Dr Brian Hawkins.

We met the rest of the party, 16 all told, and mostly like ourselves very much amateur geologists, at Heathrow Airport and flew to Los Angeles by the so called Polar Route over Iceland, Greenland and Northern Canada. Although the visibility was not particularly good, occasionally one glimpsed the ice covered tundra landscape and pack ice near the coast of Greenland and the incredible desolation of such a vast area made us appreciate our own country and climate.

At Los Angeles, we changed planes and flew to Honolulu on the island of Oahu, arriving toward evening – a very long day! After two days recovering from jet-lag, we flew to Hawaii, the "Big Island" as it is known locally, in order to study the active volcanic sites near Kilauea. When passing over the islands of Maui and Molokai, there was a good view of the highly eroded slopes and on the north side of Hawaii itself, we could see the steep cliffs caused by wave erosion that terminate the gentle slopes of Mauna Kea (13,800 ft) and the white dome of the observatory near the summit.

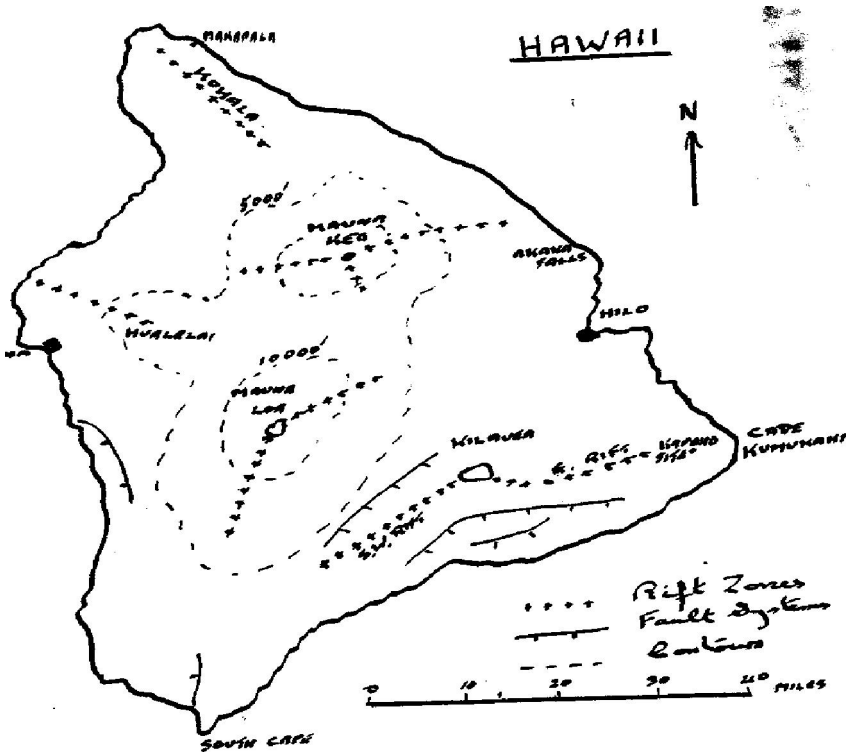
We landed at Hilo, the main town on the eastern side of the island, which had been built, and occasionally rebuilt on black lava flows. After checking into our hotel we travelled by minibus along the north coast, crossing several old lava flows on our way to Akaka Falls about 15 miles away. The vegetation is quite lush here due to the high rainfall from the north east trade winds and near the falls (some 300ft high) we walked through a forest area with many interesting species of trees – screw pine, hau tree etc. – and exotic flowers. On the return trip we saw a number of sugar plantations and stopped to taste some raw sugar cane (surprisingly it was not particularly sweet).

The following morning we arranged a charter flight from Hilo airport to see the most recent volcanic activity at close range. This proved to be a rather exciting firstly because our plane, a single engined 6 seater high wing affair, seemed reluctant to start and misfired quite a bit before take off. We flew south towards Kilauea and the line of craters that had opened up in the last decade or so, and in a few minutes were approaching Pu O'o, a large cone which was belching a lot of steam and smoke. We circled it at close range – quite turbulent conditions – but could not see the molten lava within the crater. The pilot then turned east and flew over the huge black lava fields that extended to the coast some six miles distant. The coastline consisted of cliffs averaging 50ft high and at two points hot lava, having travelled underground in lava tubes from the active site, entered the sea. The lava was issuing from vents above sea level apparently in surges, being immediately enveloped by the heavy surf with an impressive display of activity as it was rapidly cooled and tended to explode, and scattering fragments of rock into the water.

Other observers in a helicopter doubtless were able to get a better view, but nevertheless it was a sight never to be forgotten. We returned towards the volcano and this time flew over two small lava lakes which clearly contained molten rock and which occasionally were criss-crossed with lines of fire as red, almost white hot material reached the surface and burst through. Shortly afterwards we were crossing an agricultural area near Hilo and landed safely after a really fascinating experience.

On our way back to Hilo we drove out to Cape Kumukahi where in 1960 a large lave flow had overwhelmed the village of Kapoho and at the cape itself had encircled but not destroyed the lighthouse there. That night we had a lot of rain, indeed in this part of Hawaii is very wet as it lies in the path of the north east trade winds and we were lucky to get the magnificent view of Mauna Kea each morning.

Later we drove along the coast towards the same lava flows and after a few miles came to the first point at which the lava had blocked the road. Here we got out and walked over the flow, now relatively cool of course, which was about 12 feet above the road surface and extending for some 50 yards. The lava was mostly of the ropey (pahoehoe) type and crevassed in places where a red glow could be seen only about 6 feet below the surface. On each side of the track we noticed tree moulds, where trees had been incinerated by the molten lava which had surrounded them before the flow subsided leaving casts of the original trunks, some of the fallen trees and others that had remained standing. We continued along the road and crossed another flow before returning to our vehicle to visit a new black lava sand beach nearby. These beaches appear to form very quickly, following entry of lava into the sea and are relatively unstable. Nevertheless the sight of a long stretch of black rather than golden sand is quite remarkable.



We were now on our way to the Hawaiian Volcanoes National Park and after paying the usual park fee, drove through a forested area, mainly Ohia trees, steadily to the Volcano House, our base for the next three days. This hotel is situated literally on the edge of the large Kilauea caldera, and commands one of the best views of vulcanism in the world. It was built in the 19th century, and for many years it was possible to watch the lava fountains of Kilauea from a grandstand position. In more recent times the volcanic activity has shifted further to the east, first to Kilauea Iki and later to other volcanoes along the East Rift zone. Over the years, the Volcano House has been extended to cope with the ever increasing numbers of tourists, and there is also a museum and art centre nearby.

To be continued…….!

Contacts:

E-mail notices:
Derek Jones,
Natural and Built Environment Dept.,
Glyndwr University
01978 293098,
d.jones@glyndwr.ac.uk

Event Liaison:
Fred Owen,
01565 651004,
fredjowen@tbtinternet.com

Chairman & Website:
Jonathan Wilkins,
01492 583052
wilkins@ampyx.org.uk

Meetings Secretary:
Doug Hartill
01745 825904
doughartill@f2s.com

Secretary:
Vacant

Treasurer:
Jan Heiland
jan@vixenseven.co.uk

Newsletter Editor:
Lawrence Rodgers
07932 175007
rodgers46@hotmail.com

Visit our website: www.ampyx.org.uk/cdgc

Next Meeting:
Wednesday 11th November 2009
Civic Hall, Conwy
at 7.30pm

The Amazing Mud Factory: transformations of fossils and strata in the Welsh Basin from sedimentation to burial to tectonism.

Jan Zalasiewicz, Department of Geology, University of Leicester.

From late Ordovician to Silurian time, the Welsh Basin filled with muds and turbidites. The muds show evidence of oceanographic alternations between anoxic sea floors on which accumulated plankton-derived organic matter (including graptolites), and oxygenated sea floors with soft-bodied burrowing creatures. These alternations help define the stratigraphy of these rocks, and may also have acted as climate feedbacks, as varying amounts of carbon were buried and hence locked-up.

Subsequent burial of the deposits saw diagenetic and then low-grade metamorphic transformations. Soon (decades or less) after deposition, pyrite began precipitating within the graptolites in the 'anoxic' muds, while during 'oxic' intervals apatite precipitated as a cement at oxidation/reduction horizons just below the sea floor. Both of these diagenetic phases were to be instrumental subsequently in shielding fossil and mineral matter respectively from the deformation associated with Acadian mountain-building. A few million years later, after burial to a few kilometres depth, the deposits passed through the oil window and likely generated substantial amounts of oil and gas, that have long since disappeared. The (hydrocarbon-related?) fluid release likely drove wholesale redistribution of rare-earth elements, creating billions of tiny monazite nodules within the strata; around this time, fluid release also comprehensively reshuffled strontium isotopes within the rock. Both these subterranean events may be dated radiometrically.

Still later, tectonic compression associated with the building of the Welsh Mountains caused further changes: in tandem with slate formation, detrital micas were transformed into distinctive 'chlorite-mica stacks', while new micas grew around graptolites in clay-organic interactions. The latter phenomenon provides a further atomic clock - one that both dates the Acadian orogeny and also suggests that it took a complex course. Now, as the rocks are eroded, the characteristic phases so produced are being washed downriver into the Irish Sea to produce characteristic markers in the strata of the future (and, in some cases, potentially economically important deposits too).

NWGA Members are welcome at the following meetings:

Geoscience Wales

Tuesday 17th November Cambrian Academy, Crown Lane, Conwy, LL32 8AN (located behind Plas Mawr) and will begin at 6:30pm promptly. Refreshments will be served from 6pm. ***Dr Jonathan Craig*** **(Head Geology Global Exploration, ENI, Milan) "Global Climate, the Dawn of Life and the World's Oldest Petroleum Systems"**

Liverpool Geological Society

Tuesday November 4th "Gold Exploration in Ireland" - LGS Member Vaughan Williams

Manchester Geological Association

Saturday 21st November 2009 10.30 a.m. — 5pm "Darwin and the Voyage of the Beagle" Limited space—please book in advance—lectures@mangeolassoc.org.uk