Cymdeithas Daeareg Gogledd Cymru:
North Wales Geology Association

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INSIDE THIS ISSUE:

Coming up soon:

- **Next talk:** Dr Bill Fitches will present a pictorial traverse through the Alps, 7.30 pm. Wednesday September 12th, Civic Hall, Conwy
- **Next field trip:** Dr Rob Crossley, North Anglesey, Sunday September 16th, meet Lligwy Bay
- **Talks and Walks for 2002:** We are now planning the programme for next year, so please get in touch with suggestions.

This is the first time the GA Festival has been held so close—don't miss it.

BREACHED OIL FIELD EXPOSED?

The field trip with the OUGS to Hilbre Island examined stratigraphic equivalents of Triassic sandstones which beneath the Irish Sea provide reservoirs for the oil and gas discovered, and now being exploited, by BHP and its partners.

The sedimentary facies and tectonic structures at Hilbre appear similar to those reported by BHP in the subsurface offshore. These sandstones and mudstones across most of the Wirral, Cheshire and the Vale of Clwyd show the deep red colours typical of sediments deposited in desert environments.

Bleached cross-bedded sandstones interbedded with darker (red) flat laminated, less permeable sandstones at the lunch stop on Hilbre Island.

In contrast the core sample of reservoir sandstone displayed in the BHP Visitor Centre at Point of Ayre has been bleached white.

Interestingly, at Hilbre many of the sandstones have also been bleached white, though the interbedded impermeable mudstone layers and clasts of mudstone within the pebbly sandstones retain their previous red colour.

A plausible interpretation of these observations is that the bleaching was caused by hydrocarbons entering the pores of the permeable sandstones. In contrast, hydrocarbons could not enter the impermeable mudstones, so they retain their red colouration.

Even if this interpretation of the pale colours is correct, this does not prove that the rocks of Hilbre were once an oil field. An accumulation of sufficient hydrocarbons to give an oil field requires that an appropriate structure, with impermeable seal rocks to form a trap, was present.

Bleaching might alternatively occur simply as hydrocarbons were migrating through the sandstones en route to form an oil seep at the surface. However, it seemed from our brief visit that the combination of dipping beds and normal faults in the Hilbre outcrops might have created a trap if the presently exposed sandstones were originally overlain by mudstones.

A further visit would be needed to check this out—let's hope the OUGS organise a return trip.

GEOLOGISTS' ASSOCIATION FESTIVAL OF GEOLOGY IN LIVERPOOL 2-4 NOV

This is a great chance to meet other geology groups and to see the facilities and research activities of the Department of Earth Sciences at the University of Liverpool.

On Saturday 3rd November there will be exhibits from various groups (including our own NWGA stand), family "Discovery Room" activities and opportunities to participate in "behind the scenes" tours of university "supercomputer", isotope analysis and electron microscopy facilities . On Sunday there is a choice of 4 field trips: a town trail, sea defences of north Wirral, the Triassic sandstones of Wirral and Quaternary glacial geology in the Dee estuary.

Contact us as soon as possible if you are interested in more details, in sharing transport, or in helping on the stand-manning rotation (see also page 9).

Links between North Wales and the Scottish island of Ailsa Craig

By Jonathan Wilkins

AILSA CRAIG GRANITE

On the beaches of Deganwy and Penmaenmawr the search for erratic pebbles of granites (and other rocks, let's be fair) continues.

Folklore, collecting and numerous published works suggest that granites from Scotland, including Ailsa Craig, are well-known along the entire eastern and southern coast of the Irish Sea.

The map indicates the principal granitic bodies which are considered to be potential sources of recognisable erratics, and inferred ice drift directions. At which point a small problem arises. Does anybody know what Ailsa Craig's famous micro-granite looks like?

Well, in Deganwy, at least, there are some very strange forces at work, and not only Irish Sea Ice. The search for a hand specimen of the famous Ailsa Craig micro-granite had an unexpected outcome, and as a tale of some local geological interest I think it is worth telling.

THE GEOLOGY OF AILSA CRAIG

Let us first consider Ailsa Craig and its rather unusual geology. The majority of granites in the 'study area' are of Caledonian age; that is they are related to the subduction of the dwindling Iapetus Ocean and the subsequent mountain-building. Criffel, Shap, Eskdale, Newry and Leinster are examples of these.

However, during the initial stages of opening of the present Atlantic Ocean there was a new upsurge of magma. During the Late Cretaceous and Tertiary period this gave rise to the flood basalts of the Thulean province, as found today in Antrim and the Scottish Hebrides. Associated with that magmatism were some more or less minor granitic bodies which are often isolated and topographically distinct - Wolf Rock in Cornwall, Lundy Island in the Bristol Channel, Mourne Mountains in Ireland, Ailsa Craig, Goat Fell on Arran and most remote of all, lonely Rockall.

Key To Principal Granitic Intrusions Of The Irish Sea Margins:

A—Ailsa Craig
B—Loch Doon
C—Cairnsmore of Fleet
D—Criffel
E—Skiddaw
F—Eskdale
G—Shap
H—Dhoon
J—Foxdale
K—Leinster
L—Newry
M—Goat Fell

The rock of Ailsa Craig is unusual, a very pale grey, or speckled, fine-grained 'microgranite' which comprises quartz, feldspar in crystals typically less than a millimetre in length, and hornblende (variously described as riebeckite or arfvedsonite) which occurs in mafic clusters with some pyroxene and accessories such as fluorspar and magnetite.

The fine grain-size and extreme composition suggest that this is a highly-fractionated body that crystallised at a high crustal level. The nature of the jointing suggests that we are viewing more or less all that there ever has been of this small intrusion, which is now denuded of all its (Permian sandstone) envelope. The island is a steep, roughly circular cone, 1200 metres in diameter at its base and 340 metres high.

The jointing is crucial - it looks like cooling-induced, columnar jointing, but is actually a result of the intersection of three principal joint sets and results in four or five-sided columns with a mean diameter between 0.5 - 1.0 metre. The physical strength and chemical stability of the rock has ensured its survival through several ice-ages and resulted in fame and distribution over a wide area.

AILSA CRAIG CURLING STONES—THE BASICS

The origins of this small intrusion are obscure and much disputed, but that need not worry us - we must just be thankful that it is there at all! The island was simply too precipitous for almost everything except 'harvesting' sea birds and standing on top shouting 'KEEP OFF', for which purpose a castle was built. In 1883 a lighthouse was built on the raised beach at the East end of the island - the only appreciably flat area.

Historically, Ailsa Craig has seen almost no commercial activity apart from the quarrying of curling stones, which has resulted in the distribution of erratic boulders of highly specialised shape around the globe.

Until recently, I knew nothing about curling, except that the sport depends upon sliding large, smooth stones with great skill upon ice, and is best described as bowling for those from freezing climates and rough terrain! However, I am informed that the

critical property to be found in good stones is actually porosity, or rather, the lack of it. Strength, shape and correct weight, are essential. Sets of stones should also match well, but that is an aesthetic, as is the general surface polish which is attractive but irrelevant.

The raw material for curling stones was traditionally gathered from a small quarry on the North-east side of the island, where the best stone was known as the 'Blue Hone'. Week-long campaigns would be mounted to hew 'cheeses' from the jointed microgranite using black powder, plug and feathers, hammer and chisel and much muscle power. Consignments of a few scores of cheeses would be ferried to the mainland in an open boat of no great size, and subject to the considerable vagaries of the weather.

Once landed, the cheeses would be fettled with hand tools until they were approximately the correct shape using a template. Then the stone would be progressively improved on a turntable until it was smooth enough to turn on a large lathe, where hardened tools would finish the shaping process. The finished stone includes a small dish on one side and a deeper dish on the other, creating a larger or smaller diameter of sliding contact surface for use in different ice conditions.

A central hole of about an inch in diameter would be drilled through for attaching the handle. The 'striking' surface around the circumference would be tooled to an ideal roughness that prevented cracking on impact. Then, finally, polishing could start using carborundum sticks and finish with tin oxide. That a smooth, polished finish could be achieved in this way is little short of miraculous, and the time and human effort consumed was clearly enormous. Curling stones were consequently a high-value, craft product.

Making curling stones by hand was a slow, and doubtless painful, process.

CURLING STONE MANUFACTURE IN SCOTLAND

In the early 1960's the William Robertson Shipping Company of Glasgow was looking for diversification in its portfolio and purchased the Scottish Curling Stone Company of Girvan (the nearest seaport to Ailsa Craig) and the quarrying rights on the island. They also purchased the limestone quarry of Kneeshaw Lupton Ltd at Llanddulas near Colwyn Bay, from which their ships, trading as Gem Line, were engaged in carrying. Another diversification was into the production of Skye Marble, but that came to nothing.

In order to expand the science base of their quarrying company the eminent 'Doc' Cummings was enticed away from Glasgow University and the world-renowned Robertson Research geological consultancy business was born. One of his briefs was to find a way of mechanising the curling stone production so that production could rise to the rate of a hundred or more per week.

At that time, diamond cutting tools were in their infancy, and the performance of large hollow 'trepanning' bits of around 15 inches was investigated, so that stones could be started with a perfect circular section. One problem was the waste caused by bringing rough cheeses from the island quarry, so experiments were conducted in coring the cheeses directly from the quarry face, but this was not successful as the drilling rig could not be made stable enough. Back at the Girvan factory, more coring experiments were conducted to find ways of prolonging the life of the horrendously expensive diamond tools.

Remarkably, the answer was found in a new, soluble lubricant additive to the cooling water, and rates of up to an inch of cutting per minute were achieved, together with a tool life of hundreds of feet. The machinery used were massive lathes and drill presses, suited no doubt to the Herculean processes of the Clydeside shipbuilding industry. Cylindrical plugs would be cut from the raw blocks of stone and the rough ends sawn off to give a squat, cylindrical blank. This blank would then be shaped on a copy lathe, and profiled using a specially-produced, diamond-impregnated shaping tool. The target was a stone which weighed about 20Kg, but in matched sets which had to be within a tolerance of about 1%, which was quite a challenge.

In this way, the door was opened to mass-production. Funding was obtained from the Scottish Highlands and Islands Development Board to perfect the techniques and to investigate other sources of stone. Production was started in Inverness in the late 'sixties, still using the traditional source of stone from Ailsa Craig. From this period originated the paperweight curling stones of around 10cm diameter, which are occasionally found in places you least expect them - true erratics - and made from granites that were not necessarily used for the full-sized stones. Very collectable!

The increased rate of production required a similar increase in the supply of raw material, but this did not happen. The

The struggle to increase output by improving rock-cutting technology

North Wales: Geology On Our Doorstep

Ailsa Craig: all that remains of the microgranite complex off SW Scotland, after being eroded by successive advances of Scottish ice during the Ice Ages (Harrison et al., 1987)

Welsh rock entrepeneurs predate "Catatonia"

difficulties of quarrying the remote and inhospitable island, together with the continual increase in regulation of quarry activities made the search for an alternative source of material imperative.

Scotland is well-endowed with a great variety of granitic rocks which would appear to be suitable, but they are all let down by their porosity and are unsuitable. Granites are not renowned for porosity, but on a microscopic scale, the grain boundaries are significant. Remember that curling is performed on ice, and as all elementary physicists know, the slipperiness of ice is due mostly to the fact that pressure causes melting and the contact surfaces are then lubricated by a thin film of water. Thus, the stone as it crosses the ice is in contact with water which is continually freezing and thawing, expanding and contracting as it does - and, if there is any porosity, this will cause plucking and pitting of the smooth sliding surface. Destroy that, and the stone is useless.

CURLING STONE MANUFACTURE IN WALES

The search for a replacement was on. Ailsa Craig is a small intrusion, which is postulated to have cooled fairly quickly at a high level in the contemporary crust. The fine grain which resulted is widely thought to be the reason for its durability - so maybe another, similar intrusive body would yield the right properties? The North Wales area abounds in minor granitic intrusions of Ordovician age, associated with the volcanism that defines the Snowdonia area. Samples from active quarries at Penmaenmawr and Trefor were tested, and that from Trefor was found to be the best alternative. Thus was born the 'Blue Nefyn' curling stone, and the irony of taking Welsh rock to Scotland for a very traditional product.

The resulting grey stones had a very attractive, speckled finish, though rather coarser than the microgranite. The coarser grain and less perfect polish to the sliding surface was overcome by making the larger part of the stone from the Blue Nefyn, but a very precise central core was removed and replaced with Ailsa Craig stone which was glued in with epoxy resin. The composite stone, with its "Ailsert", was then finished and polished. The sliding surface of the stone was entirely within the central core, preserving the sliding quality and resistance to pitting. The point of the exercise was the reduction in the size of Ailsa Craig material required, which was an important factor as the supply of suitable material dwindled.

In the run-up to the floating of Robertson Research PLC on the London Stock Exchange, production was relocated to Deganwy. For a while the operation was conducted in the back of the Robertson Research Engineering Services Ltd. building - known today after a management buyout as Robertson Geologging Ltd. The tools were subsequently moved to Deganwy Dock, where the business was conducted in the old boat-building shed, which is still there at the time of writing, but subject to demolition and redevelopment at any moment. The production of curling stones was one of the many satellite parts of the Robertson Group to be privatised during the run up to flotation. Bonspiel Curling Ltd. was the result.

In the mid to late 1980's the construction of the Conwy Road Crossing resulted in a new hiatus. The owner of Deganwy Dock gave notice for the business to quit, since it was entirely expected that the whole site might be taken over as part of the approach works for the tunnel. After a great deal of searching, no suitable home could be found, and the decision was taken to amalgamate the company with its competitor Andrew Kay in Scotland. Production on Deganwy Dock ceased in about 1990. Thus was Kay Bonspiel Ltd formed, continuing in production in Mauchline in Ayrshire. Nowadays, the quarry on Ailsa Craig is no longer used. Modern regulation is too onerous and expensive to implement for the volume of abstraction that is required for the business, so cored stones using loose blocks from the island are the norm. The best Blue Hone stones have thus developed some value as a rarity.

There is another legacy of the activity on Deganwy Dock. The blocks from which cores had been cut were thrown away, together with the discs sliced from top and bottom of the cores. Both of these waste products found a ready market. The discs made very attractive stepping stones, and the blocks (if they were symmetrical and had a base) made interesting planters. Mine has a collection of Saxifrage, Sedum and Lewisia growing in it.

POSTSCRIPT:

On 16th April 2001 I picked up a very smooth, speckled cobble of curious grey colour and fine texture from Deganwy beach. It was still embedded in the red clay matrix, and had been exposed for so long

that weed and barnacles had started to attach themselves. The rock had been examined and rejected on every previous visit, and rejected as 'probably limestone'. It just goes to show that it helps if you know what you are looking for!

Petrological sections were prepared and its origin on Ailsa Craig confirmed. The alkali amphibole mineral which is so distinctive is remarkable for its deep turquoise-blue pleochroism. I have not found any of the fluorite which is listed as an accessory mineral, but my sample is not necessarily representative. However, the whole story has a most satisfying outcome.

References and Acknowledgements:

This article would have been quite impossible without the assistance of the following people who have been associated with the curling-stone industry of Deganwy. I am grateful for their assistance and forbearance in the face of detailed questioning on some points:
Messrs. Mike Hughes, Laszlo Lombos, Colin Wilson, Charles Drackett and Max Cater.

Harrison, R.K. et al, Geology, Petrology and Geochemistry of Ailsa Craig, Ayrshire, HMSO 1987
Jackson, D.I. et al, The Geology of the Irish Sea, HMSO 1995.
Richey, J.E., British Regional Geology, Scotland: The Tertiary Volcanic Districts, HMSO 1961.
Smith, B. & George, T.N., British Regional Geology, North Wales, HMSO 1961.
Wilson H.E., British Regional Geology, Northern Ireland, HMSO 1972.

Transport of Ailsa Craig rock to North Wales during glaciation confirmed by Jonathan's own observations

SIMILAR ARTICLES WANTED

There are many folk in North Wales who will at some stage have been involved in work of geological interest. We are keen to invite articles on almost any theme—whether they be a paragraph or two, or longer works.

In this way we can help ensure the history of a particular activity, be it a specific local quarry or something wider in scope, is not lost with the passage of time. If you know of someone (they don't have to be NWGA members) with buried nuggets, please give them a prod.

WORLD-CLASS PILLOW LAVAS AND JASPER ON THE LLEYN PENINSULA

On Saturday 1st September, Margaret Wood and Stewart Campbell led a field trip to examine a selection of the **r**egionally **i**mportant **g**eological **s**ites (RIGS) on the Lleyn Penisula.

One site, on the slopes of Mynydd Carreg near Aberdaron, showed spectacular deposits of Precambrian red jasper, which have in the past been quarried for jewellery. The jasper occurs as unusually thick sedimentary units and also infills what once were spaces between submarine lava pillows.

The precise stratigraphic relationships between the pillow lavas and the major jasper units are presently enigmatic, but there is enough rock exposed in the jasper quarries to be optimistic that these important relationships could be resolved—provided the quarries are protected from infill.

A preliminary look at a second Precambrian pillow lava site, at Porth Dinllaen, showed beautifully exposed pillow lavas, easily accessed by a coastal footpath. Despite their great age, these pillow structures are as good as anything you will see anywhere in the world. The trip participants hoped the site would make the grade, but the locality will need more assessment work by Stewart and Margaret before it could be considered for official RIGS registration.

The thick sequences of glacial and fluvioglacial deposits which overlie the ice-scratched pillow-lavas at Porth Dinllaen have already been registered as a RIGS site. However, we spent so long engrossed in the Precambrian that the last 20,000 years of the rock and sediment record will have to await a return visit.

The AGM of the Gwynedd and Mon RIGS Group will be held at Bangor University on September 20th. If you would like to know more about how RIGS groups help identify key educational or scientific outcrops, or for details of the AGM meeting, then please contact Susan Brooks on 01248 715381.

RIGS groups help preserve the rock record for future generations

North Wales: Geology On Our Doorstep

Patagonia is closer than you think

A FIELD TRIP TO PATAGONIA

On May 16th Fred Owen gave us a talk on his 10-day field trip to Patagonia earlier in the year. For details see Fred's two articles—the first is in the current issue of the OUGS newsletter, and the second article will be in the follow-up issue.

Fred's pictures of volcanic ash sequences, lava flows and granite intrusions, highlighted the analogue value of the Mesozoic-Tertiary setting of Patagonia for the Palaeozoic of North Wales.

The images of Snowdonia-like scenery, in climatic conditions similar to those that must have prevailed in Wales as the last glacial ice sheets began to melt, helped stimulate the imagination.

The fact that a substantial Welsh community settled in Patagonia in the 1850s, and the observation that the native communities have been decimated by imported disease and by cultural/economic attrition, also provided food for thought.

Patagonia outcrops- could be in Snowdonia!

Patagonia today or Snowdonia at the end of the last ice age? (above) and ricketty bridge (below)

Early photo of native group –extinctions do not only occur on geological time-scales? (in: Uttermost Part of the Earth, Lucas Bridges, 1951)

Although North Wales has long been frequented by geologists & geographers, many unknowns remain.

THE GLACIAL "LEE" OF THE ORME

Despite the dramatic nature of the glacial scenery and deposits of North Wales, the time series represented by the preserved glacial/interglacial record is poor. The latest Irish Sea ice and Snowdonia glaciers in combination "wiped out" most of the previous Pleistocene sedimentary record.

Struggling to the top of the section in the evening light

On June 13 Nigel Bannerman led a preliminary RIGS assessment visit to a sequence of till, scree and fluvio-glacial deposits tucked away against the SW cliffs of the Great Orme. The site is not in the direct path of the Conwy valley glacier ice, and is also protected from the southward push of the Irish Sea ice sheet by the buttresses of the Great Orme. A remarkably thick and complex sedimentary sequence is present, though it is not yet clear whether this includes deposits of an age not normally preserved in this part of Wales

RADON HAZARDS—FACT OR FICTION?

Fred Owen examines the radon question

Members who attended this joint NEWI/ NWGA meeting in Wrexham on Wednesday 24 April, were treated to two interesting, informative and thought-provoking presentations on the potential hazards of radon gas, and its sources, in the home.

First, Dr Martyn Green of the National Radiological Protection Board (NRPB), explained the science and statistical data which required the public to be aware of the risks associated with living in radon 'hot-spots', - regions of potentially harmful concentrations of the gas. Unlike many hazards this one has not received much media publicity, maybe because everyone in the scientific, (chemical and medical) world agrees there is a risk, and because it is a natural phenomenon no-one can be blamed for it. There is no conflict! In fact 50% of our total exposure to radiation comes from natural sources, compared to ca 1% from industrial activities.

To separate fact from fiction Dr Green explained that:

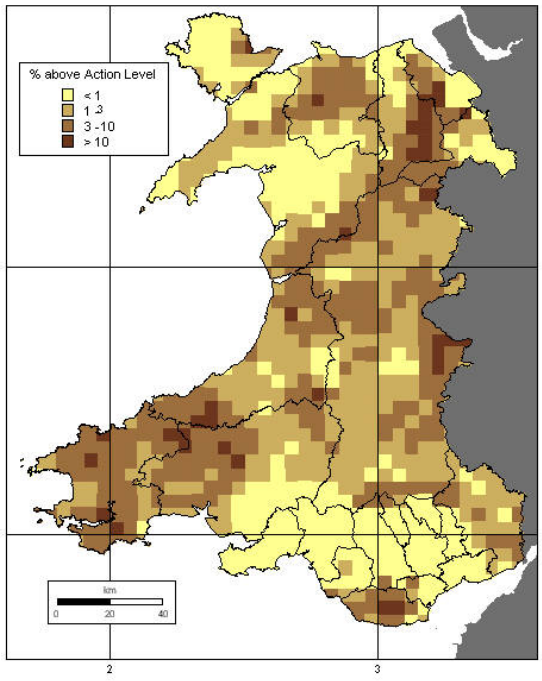
- Radon is the heaviest of the inert gases; but because its concentration is so low it does not separate by gravity to low points.
- Houses have a slight under-pressure so radon is drawn into them.
- Radon emits alpha particles so its decay products become charged and attract other matter, like dust and smoke particles. When ingested these become embedded in the lung and damage its DNA as they further decay by alpha particle emission.
- Most damaged cells repair themselves; but a small proportion do not and these become the pre-cancerous cells which multiply to cause the progressive development of lung cancer.
- The half-life of radon and its decay products is between 3 and 4 days. It is the continuous supply of radon from the source rocks which produces the long-term damaging exposure.

The extent of the risk was assessed by detailed statistical analysis of the incidence of lung cancer in populations of 85,000 Japanese affected over 45 yrs by the fall-out from atomic bombs, and a population of ca 40,000 uranium miners having 25 yrs exposure. The latter experience greater exposure to radon because of the working environment underground. The data shows that both populations had significantly higher incidence of lung cancer than a normal population. Surprisingly, the risk to the miners was significantly higher than to those exposed to the radiation from the bombs. Additionally, it was shown that smokers have a risk ten times greater than non-smokers for the same radon exposure.

The conclusion of all this work is that in the UK (exc Scotland) about 2000 people die each year from lung cancer induced by exposure to radon. It is the second largest cause of lung cancer after smoking.

Having established the scientific mechanism for the cause and the link to radon, it became essential to map the sources of potential harmful concentrations. In the second talk Don Appleton, of the BGS, described the complexities of gathering the data on radon concentrations in houses and superimposing it accurately on geological maps.

Rocks with high radon potential are uranium bearing granites, black shales, sandstones and phosphates whilst siltstones, mudstones and clays emit little radon. Permeable rocks, like limestone and sandstone, become enriched in radon as the soluble components are removed by solution. Two case studies were described showing how the detail was built up on different scale maps to show the links between underlying bedrock type and radon concentrations in houses. This confirmed that limestone, black shale and granite areas coincided with radon hot-spots. However, where such rocks are covered with impervious clay the radon concentration is reduced to relatively low risk levels.



Radon map for Wales (darkest colours are where >10% of home are estimated to be above the Action Level—see references for full explanation)

Maps showing radon risk levels are available and are being refined to increase their accuracy at larger scales as more data is collected.

The good news is that the risk can be controlled to an acceptable level, at a

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modest cost, by a series of measures tailored to the individual circumstances of each property. This is usually a combination of sealing the fabric of the building to reduce ingress of radon and a fan assisted air extraction system suitably located to remove, dilute and disperse the radon to a safe place. Wind speed and direction are important so specialist help must be obtained. Further information is available from the addresses given below.

Rob Crossley thanked the speakers for their contributions and Derek Jones, (Natural and Built Environment, NEWI), for organising such a successful meeting and for making the facilities at NEWI available to NWGA.

We left convinced that radon hazards are fact, not fiction.

Useful addresses and hotlines for further information:

Radon in the home, advice, health risks and test packs: NRPB Radon Freephone 0800 614529 at NRPB, Chilton, Didcot, Oxon, OX11 0RQ.

Practical advice about construction methods for reducing radon levels: BRE Radon hotline 01923 664707 at BRE, Garston, Watford, WD2 7JR.

Radon: you can test for it and *Radon – a householder's guide,* are free guides published by the Welsh Office, obtainable from Welsh Office, Cathays Park, Cardiff, CF1 3NQ.

EISTEDDFOD

Geology and archaeology

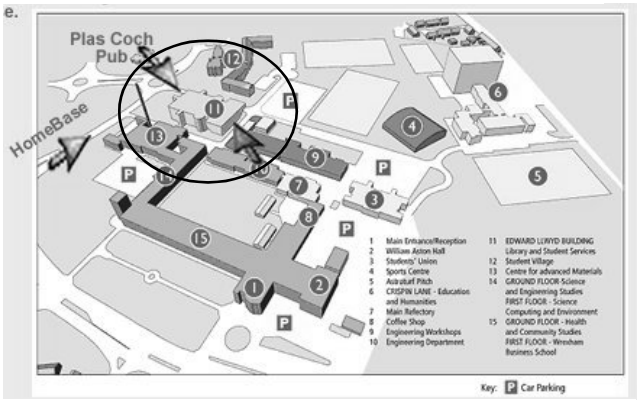
In early August we helped man the RIGS stand at the national Eisteddfod in Denbigh. This proved a good opportunity to launch the new Denbigh town trail bilingual brochure, and also provided the incentive to translate some of our NWGA poster material into Welsh.

An unexpected benefit was to find our stand alongside that of the Gwynedd Archaeological Trust. There are clearly many common interests between our two groups. A high proportion of their effort involves understanding prehistoric sites, and so overlaps with issues of glacial/post glacial stratigraphy. Their historical/industrial archaeology inevitably, in the North Wales context, has a strong geological bias. One current project shows how bedrock/drift geology affects field boundary types and thus fundamentally influences the agricultural landscape.

VENUES AND CONTACTS

NEWI (North East Wales Institute of Higher Education), Wrexham. Derek Jones, NEWI Natural and Built Environment Dept. 01978 293098, d.jones@newi.ac.uk

NEWI College is located on the NW edge of Wrexham



NEWI Lectures are normally in building 11 (Library Building)

If in doubt, contact us, (we don't bite...)

CONWY, Library and Civic Hall, Castle Street, Conwy (door by pedestrian crossing)

EVENT NOTICES: Fred Owen, 01565 651004, fredowen@tinyworld.co.uk
NWGS WEBSITE: Jonathan Wilkins, 01492 583052, www.ampyx.org.uk/cdgc
NWGS Secretary and RIGS info.: Susan Brooks, 01248 715381, DBMadryn@aol.com
NWGS Treasurer: Gareth Williams, 01248 680770
NWGS Chairman and Newsletter : Rob Crossley, 01492 623579, pencrossleys@aol.com

EVENT DETAILS

Sep 12 Wed. Civic Hall, Conwy, 7.30 pm. Bill Fitches will present a **pictorial traverse through the Alps.** The folding and faulting spectacularly displayed in the Alps influenced much of early geological thinking on structural styles and mechanisms of deformation in orogenic belts. Bill will guide us through these outcrops in the light of current thinking and draw a few lessons for structural styles in North Wales.

Sep 16 Sun. Lligwy Bay, Anglesey, 10.30 am. Rob Crossley will lead an OUGS field trip looking at **Devonian to Carboniferous sections.** It is unusual to find interbedded successions of carbonate and sandstone in the geological record — sequences are usually all carbonate or all clastic. On this trip we try to interpret the depositional settings which gave rise to the well-exposed limestone/sandstone sequences on the north coast of Anglesey.

Contact Fred Owen so we can track numbers and share transport where helpful.

Start: Traeth Lligwy, 10.30 a.m. Grid Ref.: SH 496871 Simplest Route: Go straight across at the roundabout near Moelfre on the A 5025, follow the narrow lane for 1.5 km to a cross roads. Straight across, reaching the beach in 400 m.

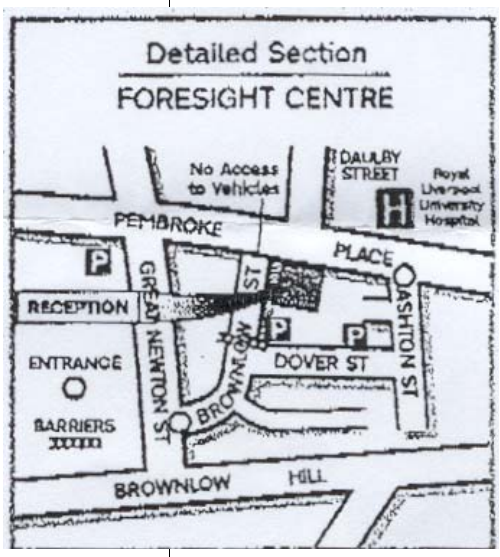
In total there is about 3 km of mainly horizontal walking to Moelfre and back, with a few short steepish scrambly bits (less than 10 m vertical). Under foot, the coastal path can be muddy in places after heavy rain. At the outcrops, the ground is uneven but basically solid. In places the beach sections are bouldery under foot. Hard hats might be advisable at a couple of the outcrops, but most are not under large cliffs. If time and weather permit a visit to outcrops at Red Wharf Bay by car may be possible. Bring packed lunch and drink, aim to finish by 3.30-4.00.

Sunday 28 Oct; Knutsford (am) and Styal Country Park, Wilmslow (pm) Fred Owen will lead a town trail looking at **building stone and cobbles of Knutsford** and a **geowalk in Styal Country Park**. Knutsford start 10.15 am in the car park in front of Sessions House on Toft Road (SJ 752 785). Styal start 2.00pm on the right just inside the main car park entrance to Styal Quarry (parking fee of £2 for non-NT members). Packed lunch, boots or strong walking shoes and waterproofs advised for Styal, hard hats not required, walking is easy. Please note for safety reasons **numbers are limited to 20 max.** It is essential to book with Fred Owen for either or both walks so that he can adopt a first come first served policy.

Oct 17 Wed. NEWI, Wrexham, 7.30 pm. Prof Derek Mottershead will present a talk on: **Weathering of Building Stones.** Rock weathering can usefully be studied in environments where it is accelerated by local conditions. This is particularly the case in coastal locations. When datable structures are present, then rates of weathering rates can be calculated. Coastal castles and sea walls offer good opportunities for such studies.

Field observations of weathering rates can lead to the generation of hypotheses concerning the processes involved. These may then be tested by controlled experiments in the laboratory. This topic lends itself to project work suitable for A level and GCSE students.

Nov 2nd-4th Fri.-Sun. Liverpool, Festival of Geology.



Some of us will be involved in setting up our display and in attending the Local Groups Meeting on Friday the 2nd.

The main events on the Saturday take place in the University of Liverpool's "state of the art" Foresight Centre.

The field trips on the Sunday will give chance to pick the brains of experts in the local geology -Dr Hilary Davies will for example lead using her new "Rock Around Liverpool" building stones guide. Some trips may involve relatively early starts since they are designed to finish early enough for visitors to return to their far-flung corners of the UK.

Do contact us soon if you think you may be interested in any of these events.

Watch for updates on our website

North Wales: Geology On Our Doorstep

Horse-back geology in Patagonia
(see p.6)

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North Wales: Geology On Our Doorstep

NORTH WALES GEOLOGY DIARY:

(FOR DETAILS SEE INSIDE)

Sep 12 Wed. Civic Hall, Conwy, 7.30 pm.

Bill Fitches will present ***A Pictorial Traverse through the Alps.***

Sep 16 Sun. Lligwy Bay, Anglesey, 10.30 am.

Rob Crossley will lead an OUGS field trip looking at ***Devonian to Carboniferous sections***.

Sep 20 Thurs. Bangor University

Gwynedd-Mon RIGS AGM.

Oct 17 Wed. NEWI, Wrexham, 7.30 pm.

Prof Derek Mottershead will present a talk on ***Weathering of Building Stones***

Oct 28 Sun. Knutsford (am) and Styal Country Park, (pm)

Fred Owen will lead a town trail looking at ***Building stone and cobbles of Knutsford*** and a ***Geowalk in Styal Country Park, Wilmslow***.

Nov 2nd-4th Fri.-Sun. Liverpool, Festival of Geology.

On the Saturday: talks, displays and a chance to peer behind the scenes at the University Geology Department, followed on Sunday by a choice of Field Trips.

- **Nov 14 Wed. Civic Hall, Conwy, 7.30 pm**

Rob Crossley will illustrate the geology of the Indian Ocean islands of ***Mauritius, Reunion and Madagascar***

- **Dec 12 Wed. NEWI, Wrexham, 7.30 pm**

Gordon Hillier will talk on the ***Geology and Archaeology of NW Shropshire***

- **January 2002 AGM**

Information in the next newsletter.