Cymdeithas Daeareg Gogledd Cymru:
North Wales Geology Association

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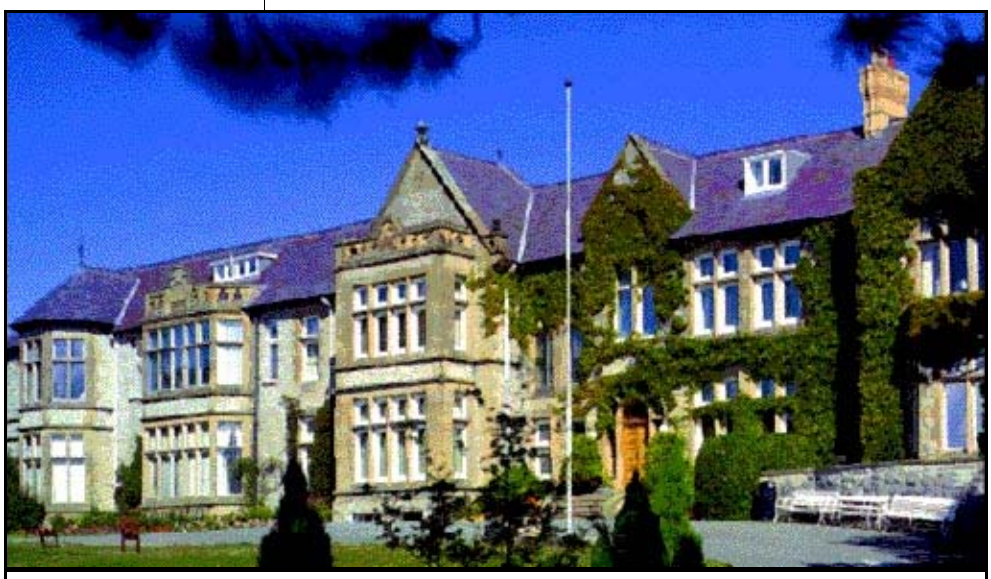
Note from the Chairman

Wednesday evenings have become even more interesting now that Titchmarsh has become geological. What a pity that there will be a clash on 10th November, when video recorders all over North Wales will need to be left to watch Alan in peace while we engage with the Moine Thrust. Perhaps, given Mr. T's famously purple prose, it is as well that he has not tried to bring enlightenment of that subject to the BBC. Speaking personally (as usual), I have severe reservations regarding the exposition of Devon's geology through the medium of jam and/or clotted cream. His Ice-Age programme was a huge improvement, but that is probably because someone involved with the production actually knew what it was about.



Robertson Research, near Llandudno, will be the venue for our AGM on January 22nd, 2005. This is a rare chance to see some of the work undertaken inside the World's top petroleum geological consultancy (www.robresint.co.uk).

Much better, then, Iolo Williams on BBC Wales, who does at least seem to have some sympathy with his subject, rather than use the landscape as a medium for strutting and self-inflation. Even this, however has failed to linger for sufficient detail of the subject to be apparent. Viewers did not get the chance to LOOK at the putative scratching by the debris-laden ice near Cwm Idwal – a close-up would have demonstrated this most tangible of geological interactions to the satisfaction of the most sceptical audience. I hope that other viewers have been interested or impressed, but I fear that it will not have made the anticipated impact. I hope also that you enjoyed the extensive coverage of the Neanderthal 'inhabitants' of Pont Newydd Cave, which we visited some years ago.

This winter season brings the AGM closer, and we should all focus our minds on the direction of the Association, both physically and metaphorically. I have said before that the team which brings you your meetings programme (essentially everything that the Association does) is desperately stretched at times, and does not seem likely to be augmented or refreshed in the near future. The view from this chair is not encouraging – not a single volunteer to put together a display for the Reunion in Cardiff, for example. I have stated my intention to resign as chairman, the reason being partly that I do not see that the direction I have taken has led the Association to any place where it can function in an organic way. Maybe our group is just different – for a start there are more professional members than many local geology associations – but if there are failings, I reason that after all these years then they must be mine. Please tell me otherwise, or stand for the committee and take your Association to new heights. Whatever your intention, please come to the AGM and join the discussion.

Next Talk of the Autumn Series this Wednesday (10th), Conwy

Sally Peake 1915-2002

Another Will Jones discovery...

I was looking through the annual report of the Geological Society for 2003 and was surprised to find an obituary for Dorothy Sarah Peake (nee Coates), generally known as Sally, a local lady who made a significant contribution to the geology of North Wales (Fig 1).

She was brought up at Bronington in what was then the detached part of Flintshire near Whitchurch, the daughter of the local school headmaster. She studied geology at Birmingham where she was inspired to take an interest in Quaternary deposits by Prof Wills. Subsequently she carried out research for an MSc, supervised by Wills, on the glacial deposits of Flintshire. Sally then spent three years as a teacher at Bromsgrove County High School before marrying Peter Peake and moving to Croydon in Surrey where they raised their family.

Twenty years later she was able to return to active research in North Wales and finally published an account of the Quaternary evolution of the Alyn Valley in the Quarterly Journal of the Geological Society in 1961. This is the classic description of the area.

She described how meltwater coming off the Welsh highlands became ponded against the western edge of the Irish Sea ice sheet, leaving deposits of gravel which now mantle the lower flanks of the high ground between Halkyn Mountain and Wrexham. A series of lakes were formed at successively lower levels as the ice sheet retreated. The gravel deposits left by these lakes now form a series of terraces which become progressively lower and younger from north to south, the youngest being the Wrexham delta terrace.

The map accompanying the paper shows the distribution of the deposits laid down in five different lakes and the position of the contemporary ice front for each one (Fig 2). This substantial description and map was a great help to me when I took an interest in the glacial deposits of the Wrexham area during the 1990s.

Her other major contribution to the geology of Wales was to edit the Welsh section of *A Correlation of Quaternary Deposits in the British Isles*, published by the Geological Society in 1973.

There is one more aspect to her career that intrigues me. Sally's interest in the Quaternary continued during her life in Surrey and culminated in the publication of her paper *The Ground Upon Which Croydon Was Built* by the Croydon Natural History and Scientific Society in 1982.

For a while in the 1980s I was a member of that society and was delighted to find that they had published a description of the local Quaternary beds. It is only now, on reading the obituary, that I realise that the work in Surrey and in North Wales was by the same person. I could probably have met Sally Peake.

Fig 1 . Sally Peake (courtesy of the Geological Society)

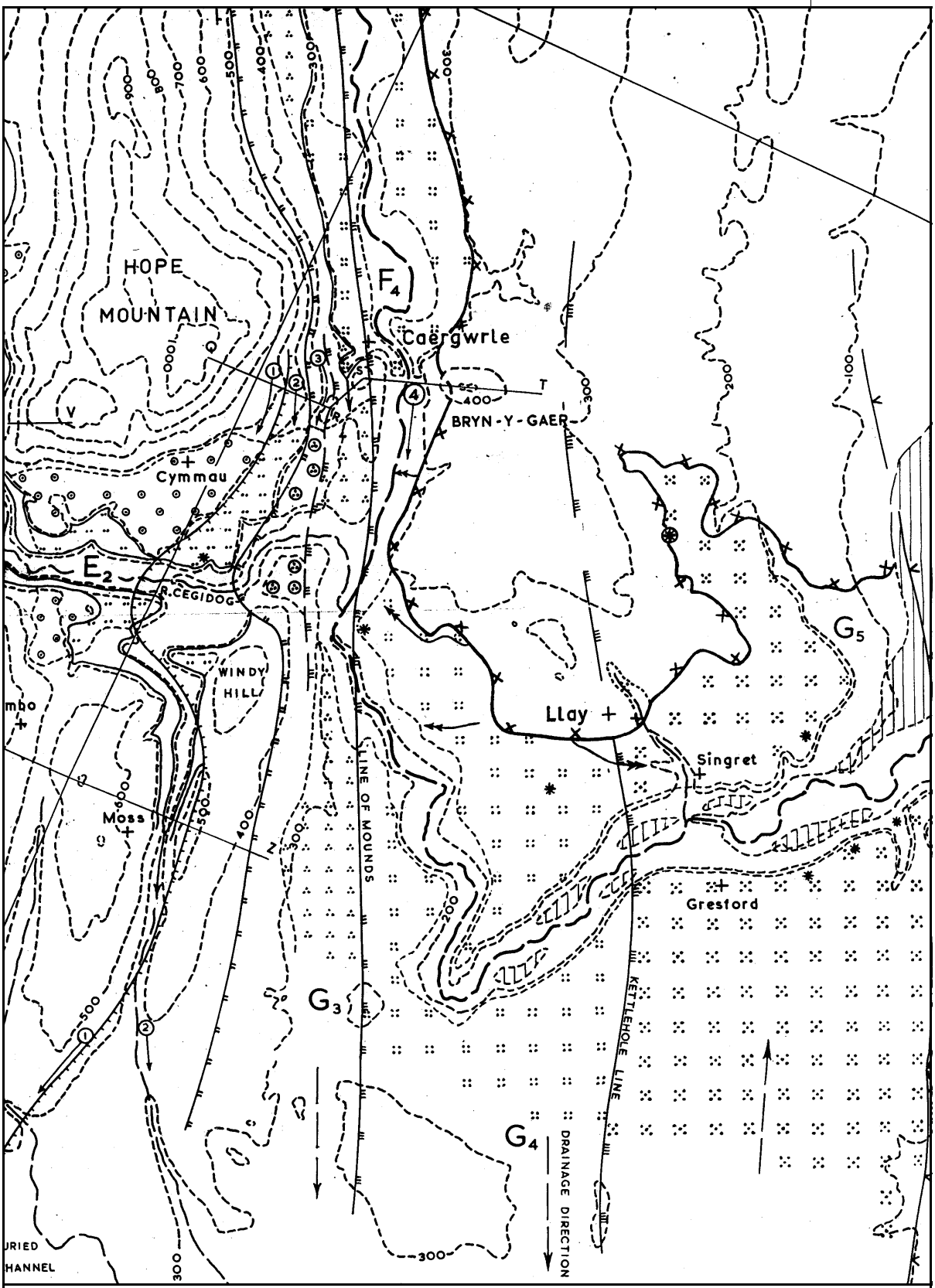
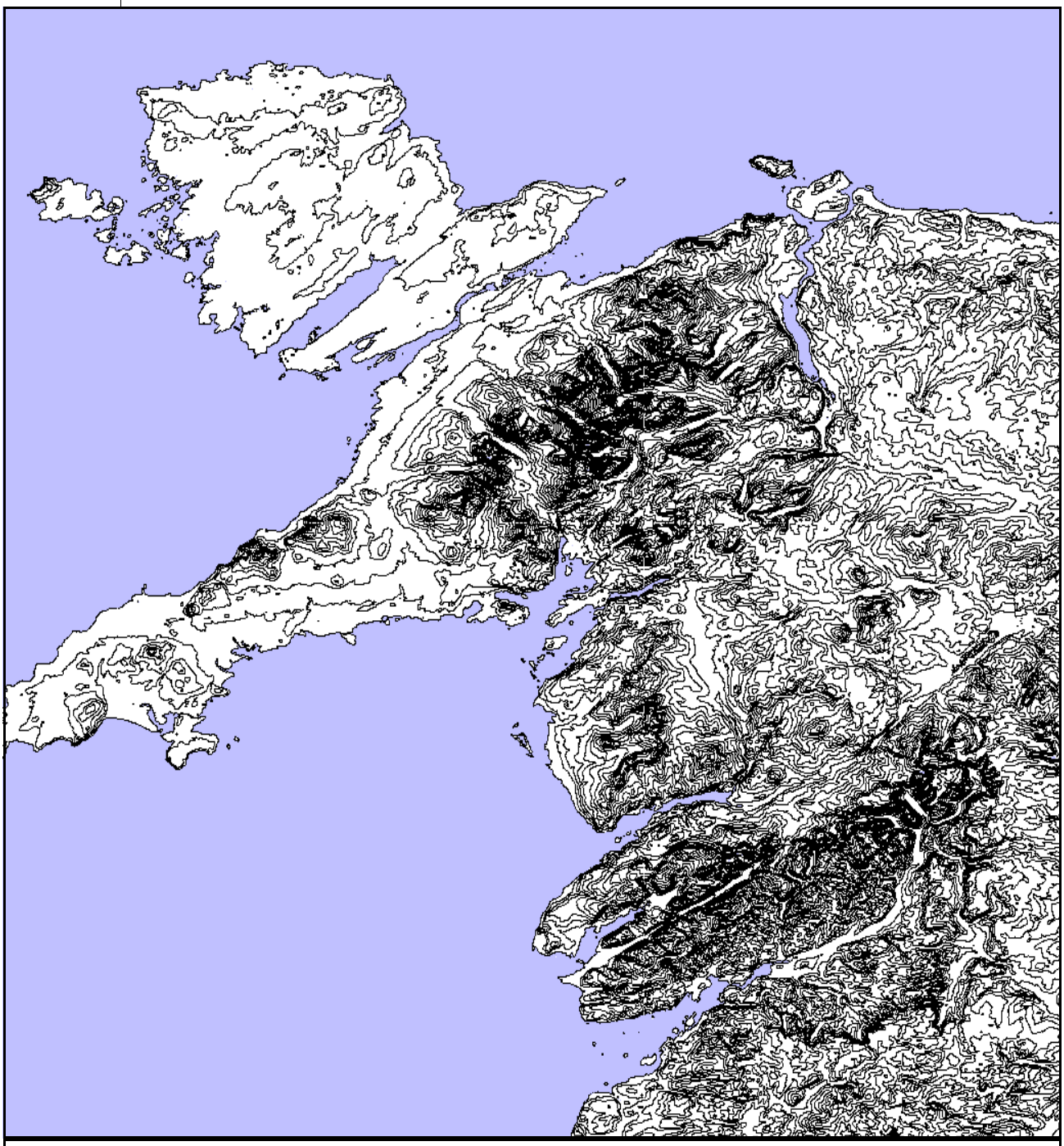


Fig 2 Part of Sally Peake's map of the Alyn river glacial deposits.

For location of this map area, see ring on shuttle radar topography map on page 5.



NW Wales, contours created at 50 metre intervals, starting 10 m above present sea level, using Shuttle radar topographic data supplied by the Jet Propulsion Laboratory, USA.

SHUTTLE RADAR TOPOGRAPHY

A new view of North Wales from Rob Crossley

Topographic data for most of the world has now been published by the Jet Propulsion Laboratory of the USA. The data mentioned in public has been acquired by radar at 30 metre horizontal spacing, with a vertical resolution of about 5 metres, though the data made available outside the USA has been downgraded to a horizontal spacing of about 90 metres. Whilst it is likely that there was a military motivation for obtaining this information, it is also very useful for us in the Earth Sciences.

Here I have contoured the data for North Wales, starting 10 m above sea level. This was necessary because our large tidal range and the effects of waves cause the radar to produce "topography" over the sea. Although the results are not perfect, the resulting over-

NE Wales, contours created at 50 metre intervals, starting 10 m above present sea level, using Shuttle radar topographic data supplied by the Jet Propulsion Laboratory, USA.

view is still very informative. Comparison with a standard map shows areas at risk of flooding by a modest rise in sea level. Many folk, including those on the Great Orme and Llandudno Junction would need to adapt to their new status as island dwellers!

Many of the coastal areas "missing" on this map might also be prone to flooding in the event of very heavy rainfall, simply because gradients are too gentle to allow rapid run-off. Folk crossing the Maltraeth Marsh area of Anglesey on the 24th/25th October would have seen the latter effect.

The flat-floored glacial valleys of Snowdonia and mid Wales, the unusual character of the Dee valley around Llangollen, and the strong linear control exerted by some geological faults in the mountain areas, all show clearly.

Sally Peake's map area (see page 3)

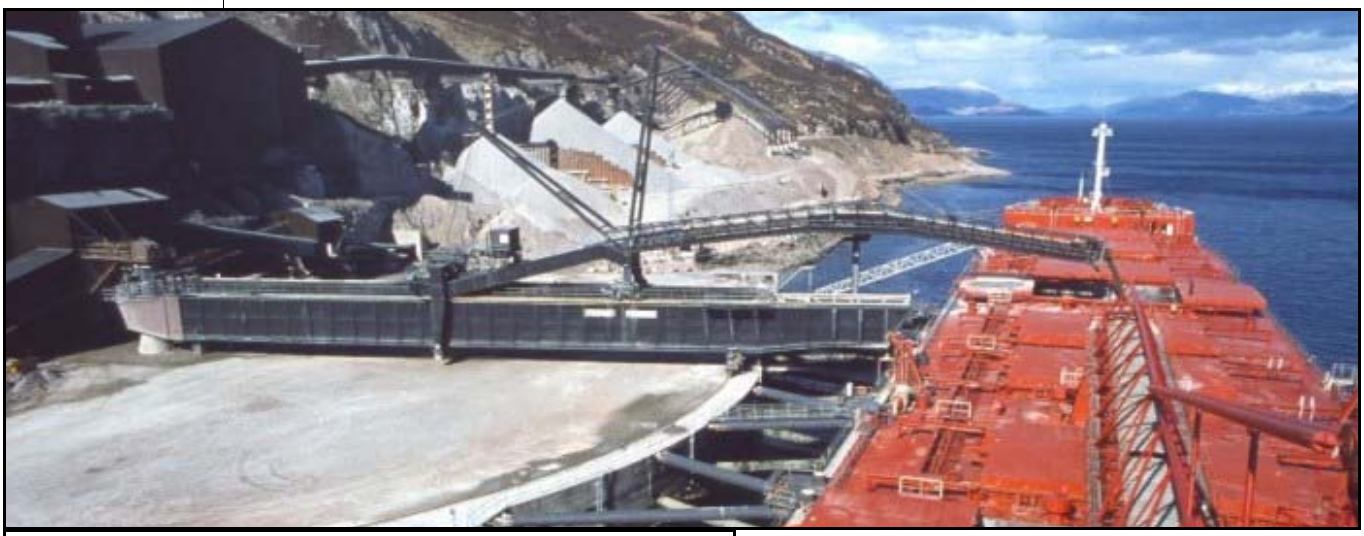
A Tale of Two Quarries

Direct loading of ships from coastal quarries, once a major feature of the North Wales coast, is now retained only at Llandullas.

Here Jonathan Wilkins explains the contrasting histories of two coastal quarries in NW Scotland

In the dark days of World War 2, emergency planning regulations were implemented to allow the exploitation of materials by mining and quarrying under a lenient regime that recognised the imperative of production for the war effort. Many such permissions, many never taken up, still exist - although some have been relinquished in favour of extensions to existing permissions, or to gain a 'green' tinge for a particular company - and there is concern that operation may start or continue outside of the modern planning process.

One such quarry was situated on the Isle of Harris, and exploited an igneous rock called anorthosite (called such because its mineralogy is 90% anorthite). During the war a road was built onto the slopes of Roneval and rather small-scale extraction of the inert, white rock which was powdered as a filler. The details are obscure, but production ended due to the occurrence of darker material which spoiled the product. In the 1970's there remained some plant abandoned from this time, but that was more or less the end - apart from some rather white scars on the hillside.



The Shiploader at Glensanda in the Great Glen of Scotland

In 1965, Redland Aggregates applied for planning permission for a small quarry at this site, and it is believed that there was small-scale production until 1968, when it ceased. In the late 1980's the idea began to grow that the way to move forward here was to open a 'superquarry' with production at the rate of 10 Mtons per year, and within the life-span of operations to remove completely the hill of Roneval and replace it with a 2km long sea loch 180m deep and culminating in a feature like the white cliffs of Dover. Anxious for jobs, the inhabitants of Harris voted in favour and the Western Isles Council granted permission - except that the application was then called to a public enquiry and ultimately rejected after a new referendum of the islanders. Some years then elapsed before the report reached the Scottish Assembly, and Redland's new owners (multi-national Lafarge) launched a legal challenge to the Assembly claiming a breach of their rights by failing to approve the permission which was already granted. In November 2000 the environment minister finally refused permission for the quarry, at which Lafarge launched an appeal, claiming that they had failed to give sufficient reason for the refusal, and muddied the waters by claiming that their original 1965 permission was still extant and that was a precedent.

An enquiry into the 1965 consent was then held, which upheld Lafarge's case, but only so far as it covered 5 hectares, not the 600ha which they sought. Again Lafarge appealed, and it took until January 2004 to reject their appeal - at which point they threw in the towel and said that they had no further interest in South Harris. This has been one of Scotland's longest running planning battles, and must have cost a fortune.

Meanwhile, things were stirring further south, on the shore of Loch Linnhe. Without putting their heads far above the parapet, Foster Yeoman the British pioneers of the superquarry at Merehead in Somerset, purchased the Glensanda estate, which covered a large part of the southern outcrop of the Loch Sunart granite

pluton. They obtained their planning permission with little fuss and started production in 1986 while everyone was focussed upon the fighting over Lingerbay. The enormous difference between the two cases boiled down to the fact that Yeoman's area was uninhabited and unapproachable, and they had a dastardly plan for ensuring that the quarry would be more or less invisible except from the air. The Glory Hole.

The huge difference in the environmental impact of the Glensanda scheme was due to the fact that it was designed to hollow out the natural hill terrain without breaking the skyline. The secret was to make a tunnel 2km in length from the shore and connect at the end with a hole 200m deep and 8m in diameter. The Glory Hole is in effect a large plughole that drains the basin of the quarry, whose operational life will be complete when the floor reaches the level of the outlet tunnel. By that time some 900M tons of material will have been produced in the 25 years design life of the quarry. All the primary crushing plant is mobile, and the Glory Hole forms a stockpile of crushed material to be fed down conveyors to the final crushing and screening plant which is undercover by the shore. Some 350,000 tons of material is in the active stockpile, allowing a ship of 50-60,000 tons to be loaded on demand by the shiploader at a rate of 6,000 tons per hour. During the first two years of production, all the material taken away from the site originated in the construction works! Naturally, such a large and innovative scheme attracted interest, and it was widely held that the location is actually a front for the UK's strategic nuclear waste disposal site.

The first customers were based in the eastern USA, where access to large quantities of hard rock was not so simple. The economics of bulk sea traffic, especially when the granite forms a back-load to boats carrying coal from South America to Europe, are inescapable. Foster Yeoman suggest that transport costs are reduced to 0.5% of road haulage, and 3% of rail-borne traffic (at which they were innovators of the British supertrain in earlier years). Early contracts were with the Channel Tunnel construction, and subsequently 5M tons has been absorbed by the construction of the Channel Tunnel Rail Link from Folkestone to South London. For this market there is a vast stockpile on the Isle of Grain in the Thames estuary able to supply almost any immediate requirement for aggregates or railway ballast. Terminals throughout northern Europe are supplied as the production costs are extremely low, and Foster Yeoman operates a fleet of four self-unloading ships to serve these ports – including the world's largest such vessel at 57,000 tons.

The Yeoman Bank seen in a Spanish Port

Why am I writing this? No, it has nothing to do with the geology of North Wales. It is just interesting, and is geology in the raw economic sense. The aggregates sector is far and away the largest geologically based industry in the UK. It also fits the simple criterion that if it is a big hole in the ground then it is fascinating to me, and if it is in igneous rock then it is doubly interesting. The other point is that the entire output is in the form of

A Tale of Two Quarries (cont.)

crushed rock, and none is exported as rock-armour or dimensioned products. This means that it is impossible to obtain a representative sample, short of nicking ballast from the Croydon Tramlink system or similar undertaking.

There is also a purely geological interest here, as the Loch Sunart granite pluton is (like many) a composite intrusion with more or less mafic or porphyritic members, and fresh samples of the pinker granodiorite are difficult to obtain. As I spent all my holidays as a child in the nearby village of Ardgour, I know the northern outcrop near to Strontian quite well, and have samples of the black & white facies already. I therefore sought to obtain for study a reference sample of one of the world's most freely-produced granites, and I was fortunate that Foster Yeoman proved to be most accommodating. Their technical department listened to my request and suggested that I contact their subsidiary in Liverpool, who handle the sale of concreting aggregates from Glensanda, as well as other recycled materials.

The problem was that nothing of useful size is ever landed here, and a special arrangement had to be made to ship a 'diplomatic bag' containing representative pieces of the stockpile from the primary crusher. As Liverpool only receives what is technically 'waste' material, they are frequently by-passed at times of high demand for quality product and it took several months for the delivery to be made, but at last in October I received word that the bag had arrived aboard the 37,000 ton YEOMAN BANK. The collection trip into the Liverpool Freeport at Seaforth was fascinating – past the busy container port and the huge animal feed store which shares the conveyor system with the stone stockpile and then to the alpine peaks of the aggregate stockpile. Along the seaward edge of the Freeport is a set of wind turbines spinning gracefully above a rock-armoured shore comprising huge limestone boulders and the recycled remains of earlier docks nearby which comprised very large squared blocks of a porphyritic (Cornish ?) granite.

Investigation of the samples is now under way – and there is plenty to spare if anybody would like a piece of this ubiquitous and epoch-defining construction material.

I am grateful to Foster Yeoman Ltd. for their generous assistance, to their web site for graphics and to Mining Magazine for background information of the quarry development.

Geology Programme Details

Two tremendous talks to round-off the year

November 10th Wed, Conwy, 7.30 pm, The Moine Thrust Belt—Its Discovery and Importance, a talk by Dr Rob Butler.

The North-West Highlands are valued for their extraordinarily rich scenery, and this meeting will provide a feast of fine landscapes as a backdrop to one of the classic areas of British geology. A meeting that should definitely not be missed.

The Moine Thrust is one of the great dislocations in the geology of the UK. It was the first such fault structure to be described in detail, and has thus always had an importance beyond its outcrop upon the ground. In the 1840s when it was first mapped by the Geological Survey nobody could comprehend the outcrops that were displayed, but an elegant series of experiments demonstrated that it could all be developed from simple compression and the dragging of one major rock unit over another. The scene was thus set for two centuries of studies by generations of geologists.

Rob is a graduate of Leeds University and completed his PhD from University College Swansea, becoming an honorary WELSH geologist in the process. He is committed to the appropriate conservation of geological and landscape resources, particularly in the NW Highlands of Scotland and wrote much of the upcoming guide to the Geological Con-

servation Review of Moine Thrust sites. Collaboration with the BGS has seen the development of the Assynt's Geology web-site, created and hosted in Leeds.

Dec 1 Wed, NEWI, Wrexham, 7.30 pm, Fantastic Fossils, a talk by Dr Sarah Gabbott (from Channel 4's Big Monster Dig programme) will be presenting the Christmas Lecture.

Sarah will focus on "exceptional preservation" with particular emphasis on the BURGESS SHALES. Sarah has spent time working on the Burgess Shale and will talk about the living conditions of the field season on the site, and the formation and exceptional preservation of the specimens. Sarah has some great specimens too which she will bring along. Sarah was a very enthusiastic and knowledgeable speaker.

She is currently working in the Geology department at Leicester University, her research interests are palaeontology and paleobiology of the Upper Ordovician Soom Shale of South Africa and the taphonomy of exceptionally preserved fossil biotas.

January 22nd Sat, Llandudno, 10.30 pm, Annual General Meeting

Meanwhile, if you would like to nominate someone or would like to be nominated for a position on your committee, please do get in touch

AGM AGENDA ITEMS:

- CHAIRMANS REPORT
  (a summary of our activities in 2004 and plans for the coming year)
- TREASURER'S REPORT
  (a report on finances for 2004)
- ELECTION OF OFFICERS FOR 2005
  (see below)
- SUBSCRIPTION RATES FOR 2005
  (these are agreed at the start of each year)

The NWGA is run by a committee of people carrying the following titles:

Chairman ……..
Membership…….
Wrexham Meetings ……. …..…
Other Meetings…….....
Secretary……..
Treasurer……
Newsletter …….

We are unanimous in our wish to encourage new members to join the committee. Please feel free to contact any committee member (see page 10 for some contact details) to find out what is involved, and send your nominations by 7th January to the association Secretary:

Susan Brookes
9 Pencae,
Llandegfan
Menai Bridge
LL59 5TT
YNYS MON

Robertson Research (Fugro-Robertson) is a few hundred metres south of Llanrhos (up a tree-lined drive on the west side of the B5115)

Talk Venues

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

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

EVENT NOTICES: Fred Owen, 01565 651004, fredowen@tinyworld.co.uk
Chairman & Website: Jonathan Wilkins, 01492 583052, www.ampyx.org.uk/cdgc
Meetings Will Jone 01492 580056
Secretary Susan Brooks, 01248 715381, DBMadryn@aol.com
Treasurer: Gareth Williams, 01248 680770
Newsletter Editor: Rob Crossley, 01492 623579, pencrossleys@aol.com

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

NORTH WALES GEOLOGY DIARY:

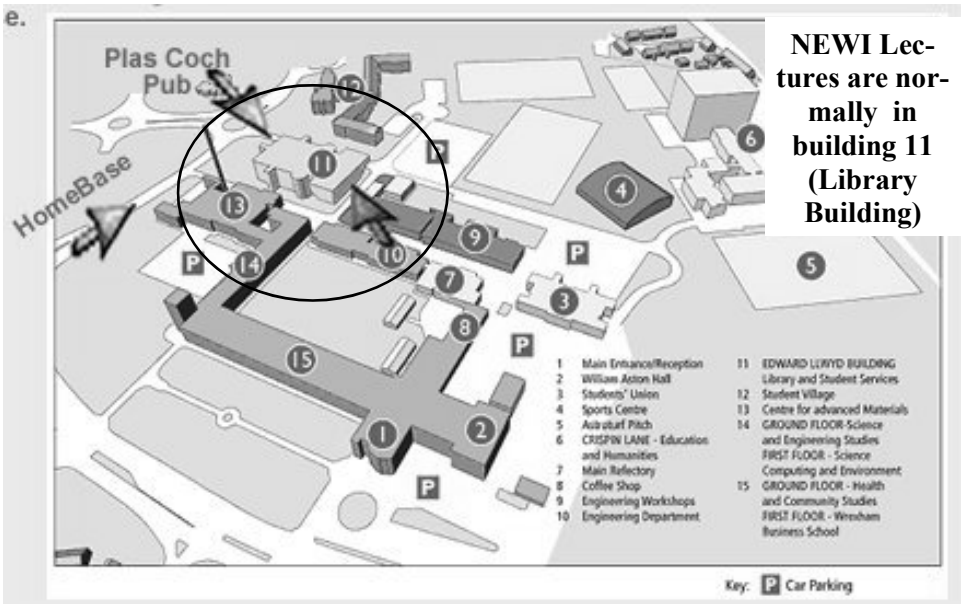
(FOR DETAILS SEE INSIDE)

Nov 7th, Visit the Prince Madog, Menai Bridge, NWGA/OUGS joint trip, trip is probably full, but if you are interested contact Fred Owen in case any places become available at the last minute.

November 10th Wed, Conwy, 7.30 pm, The Moine Thrust Belt—Its Discovery and Importance, a talk by Dr Rob Butler of the University of Leeds.

Dec 1 Wed, NEWI, Wrexham, 7.30 pm, Fantastic Fossils, a talk by Dr Sarah Gabbott, Geology Department Leicester University (and Channel 4's Big Monster Dig programme) will be presenting the Christmas Lecture.

January 22nd Sat, Llandudno, 10.30 – 12.30 pm, Annual General Meeting, Our AGM will be held at Fugro-Robertson (as Robertson Research is now called). This will include a look at some of the activities involved in modern petroleum geological exploration and production consultancy. The afternoon will include an opportunity to visit some local Palaeozoic outcrops—details will be posted by Jonathan on the website.



NEWI Lectures are normally in building 11 (Library Building)