

Bulletin

Number 78

July 2006



Field Trips:

Each person attending field meetings does so on the understanding that they attend at their own risk.

The NSGGA has Public Liability Insurance Cover for field and indoor meetings, but Personal accident Cover remains the responsibility of participants.

If you need or can offer a lift, please contact Gerald Ford who will endeavour to put you in contact.

Please note: a field fee of £2.00 is charged per head.

Sunday 16 July:

Glacial features of the Severn Valley near Shrewsbury.

Leader: David Pannett

Start: 10.00am. Meet at the Fisherman's Car park (between Atcham and Cross Houses) Grid ref: SJ538085. A selection of geological sites linked by short car journeys and walks (short but some rough underfoot). In the late Devensian glaciation of the Shropshire Plain the decay of Irish Sea Ice 'in situ' allowed the Severn Valley glacier to 'surge' towards Shrewsbury. This strong valley glacier has left a 'textbook' pattern of glacial features including, moraines, outwash plains, kettle holes, glacial lakes etc.

Sunday 20 August: Waterfalls Trail, Ingleton

Leader: Alan Diggles

Start: 10.30am at the Waterfalls Car Park, Ingleton. Grid ref: SD693733 (O.S. Sheet 98 - Wensleydale). Entrance fee £3.50 per head. The walk is quite scenic, about 5 miles in length using a well-defined footpath over rising ground (a packed lunch is necessary). It follows the course of two rivers, which have cut down to basement rock exposing the Ingleton Inlier. We shall see the effects of the Caledonian orogeny and the Variscan orogeny resulting in the Craven Faults and the Askrigg Block. One of the best examples of an unconformity will be seen where the Ordovician meets the Carboniferous showing the early stages of Carboniferous limestone deposition and finally the part played by glaciation over the area.

A minibus is planned subject to numbers, probably leaving from Keele; please return [bookings](#) to Gerald Ford (Field Secretary) by 31st July.

Field Meetings (continued)

Sunday 1 October: National Stone Centre, Wirksworth

Leader: Dr Fred Broadhurst

Start: 10.30am at the National Stone Centre, Grid ref: SK287552. Walk distance about 9 miles in total, mostly on the High Peak Trail. Geology, features of the Lower Carboniferous Limestone, including reefs, fossils, sedimentology, dolomitization and the cover of the Upper Carboniferous Ashover Grit. Returning to the Stone Centre at lunchtime (refreshments available) but suggest bring your own sandwiches! After lunch moving some or all of our cars to Middleton Top car park (charge made) for afternoon walk.

For further information contact NSGGA Field Secretary, Gerald Ford
 Tel: 01630 673409, e-mail: g.ford@ukonline.co.uk
 Mobile phone (on trip days only) 07789 826807

Diary dates

and provisional programme for our winter lectures

12th October 7:30p.m. Speaker Tim Harris - geomorphology
 9th November 7:30 pm Speaker Dr Dave McGarvie – volcanoes and research in Iceland.
 7th December Christmas Social & buffet

2007

12th January 7.30pm Speaker Dr Ralf Gertisser on volcanoes
 9th February 7.30pm Speaker Dr Bob Roach - Geology of the Bronze Age - the eruption of Santorini
 9th March 7:30pm AGM and Chairman's Lecture "The life and works of Blaise Pascal"

For further information contact NSGGA Secretary **Eileen Fraser** 01260 271505

Military Geology

Earth Sciences Continuing Education Courses at Keele University 2006/7

Autumn Semester 2006: Dates to be confirmed. Evening Class 7-9 Weekly, with Jamie Pringle.

Geological features have influenced military emplacements, constrained battlefield tactics and affected engineering and water supplies from medieval to current times worldwide. Discussed case studies include; From 'what the Romans did for us' to Medieval Military Geology; Gallipoli landings (1915); WW1/2 battle field geology; Fortress Britain (1940); Normandy landings and the 'Battle of the Bulge' (1944); underground tunnellers (Flanders (1915-18) and Vietnam (1962-75), The Falklands (1982) and Allied and Axis POW escapes 1941-45).

More details to be found via:

Website: www.keele.ac.uk/courses/cpe/

E-mail: enquiries@cpe.keele.ac.uk

Enrolment Hotline: 01782 583436

Geological Journals for Free

Free to a good home on a 'first come, first served' basis are the following journals:

Proceedings Geologists' Association 1971 (vol 82 pt 1) - 1973 (vol 84 pt 4) - 12 issues

Proceedings of the Yorkshire Geological Society 1973 (vol 39 pt 4) -1979 (vol 42 pt 3) - batch 1 - 10 issues

Proceedings of the Yorkshire Geological Society 1987 (vol 46 pt 3) -1990 (vol 48 pt 2) - batch 2 - 7 issues

They must be collected by arrangement with Pat Cossey who can be reached either by

☎ 01782 294438 or by email p.j.cossey@staffs.ac.uk

NSGGA Gazebo

The NSGGA owns a 2m x 2m gazebo that it kept at Carol and Mike Fereday's house. If you wish to borrow it for a party please contact them direct on 01782 713227.

Review: Field Trip of 12-14 May 2006

South Wales Coalfield and Surrounding Area (or One day I'd like to become a geologist.)

This was the annual joint weekend with the Essex Group of the Geologists' Association, led once again, by the able Dr Geraint Owen of Swansea University.

On Friday 12 May, we received a presentation on the geological history and the solid geology of the area roughly within the Brecon Beacons to the north, Cardiff to the east and Swansea to the west. An epic tale of tectonic movements, ocean closures, mountain building, massive erosion and sea transgressions.

Saturday 13th May, prior to the visit to the opencast Selar Colliery, we were introduced to the major structural features of the area, especially the east to west asymmetric syncline of the coalfield and the SW to NE (Caledonoid) trending 'Disturbances' which are thought to be Variscan reactivation of earlier underlying structures. The general fault trend resulting from the Variscan activity itself, on the other hand, trend NNW-SSE.

Location 1. Selar Opencast Colliery situated on the north- west flank of the Welsh Coalfield. Leader: Allen Cuthbertson BSc MIMM FRGS

Safety advice: in the event of the collapse of the 'High Wall' – "if you hear a dribble, its probably too late" (Joke – I hope).

The aims of the visit were to consider the stratigraphy and structure exposed in the pit; to look at some of the (relatively infrequent) fossils and to consider the working methods used to extract the deposits

Some statistics: the total area of the site is 330 hectares of which 91 hectares are currently excavated; maximum depth -164 Metres (538 feet); permitted extraction was for 4 million tonnes of anthracite; involving removal of 34 million cubic metres of overburden and the yield ratios are about 16.76 cubic metres of overburden to 1 tonne of coal. The measures are of 'Westphalian

B' age.

Barrel washing is employed to recover coal from mixed shale and coal recovered from the tips and also from other sites.

Examples of *Calamites*, *Mariopteris*, *Pecopteris* and *Annularia*, among others, were found in the spoil.

Extraction is by cut and fill, where spoil is constantly used to back-fill earlier extraction areas. At the end of the process the residue will be about 15% greater than the original volume of rock.

Location 2. The Geological trail from Pontneddfechan to the Scwd Gwladus Waterfall The aims of the visit were: to progress downwards from the stratigraphical units of the Lower Coal Measures into the Shale and Basal Grit Groups of the Millstone Grit; to observe the differential erosion of the relatively hard quartzite and sandstone members and the softer shales; to note the presence of fossil horizons and the implication of these in interpreting the environmental history and to consider the industrial use of the silica extraction in the valley.

Sunday 14th May. The aim of the day today was to look at the Mesozoic rocks at Barry Island, Sully Island and Penarth and their relationship to the older Palaeozoic rocks that they overlie.

Location 1. Barry Island – Friar's Point to Whitmore Bay

Towards Friar's Point, near horizontal strata of the marginal Upper Triassic, containing fossiliferous brecciated clasts of Carboniferous Limestone; sit with an angular unconformity, on the south-dipping Carboniferous Limestone. Since not only are Upper Carboniferous rocks absent but also the whole of the Permian and the Lower and Middle Triassic, the time gap, representing deposits that were laid down and subsequently eroded or the absence of any deposition, is considerable (something in the order of 100 Ma).

The interpretation is of a series of terraces that have been cut into the shore of a very large lake with different terraces representing changes in lake level. .

At the western corner of Whitmore Bay is a small exposure red and green Mercia Mudstones cut by a small normal fault and containing calcite-replaced, gypsum nodules. (In was near here the Vice Chairman was found secreting away a colour-coordinated bucket and spade!!)

Location 2 Sully Island Access to the Island is via a causeway at low tide.

The marginal Triassic beds here represent conditions between the breccias observed on Barry Island and the classic Triassic Red Marls facies, with occasional thin, dolomitized beds from shallow ponds and lakes. Occasional ripple marks and polygonal (mud crack) patterns have been observed. There are close similarities between conditions here and nearby areas where bipedal and quadripedal dinosaur footprints have been found.

The angular unconformity between the Triassic and Carboniferous Limestones is well exposed and at the western end of the island a small gully revealed mineralization.

It was here that one member received a major shock when an arthropod wandered into his line of vision while taking a close look at the minerals with a hand lens!!

Location 3. Lavernock Point near Penarth. The aim was to observe the boundary between the Upper Triassic and the Jurassic and to observe the lithology and some of the fossils present. The facies along the beach show a gradual change in environment but the stratigraphical boundary is based on the appearance of the first ammonites rather than lithology.

Thanks go out to Gerald Ford for organizing the weekend and Dr Owen for his good guidance.

A more detailed account of the weekend is available, if required, (contact john.parton@talk21.com).

John H. Parton.

Review: Field Trip of 20 April 2006 The Salt Union Limited, Rock Salt Mine at Winsford

Upon arrival at the 'De-icing Centre' our guides for the day, Zoë Ellis and Dave Egerton gave us an introduction to the mine and safety briefing. Winsford mine is the largest in the UK, extending underground 3 miles west to east (bounded by the Winsford and King Street faults respectively) and 2 miles north to south where the workings are bounded by folds in the rock strata.

Winsford was opened in 1844 and worked from two shafts using picks and shovels, black powder, straw fuses and tallow candles for lighting. When another mine was opened at Northwich in 1892, the intense competition that followed led to the closure of Winsford. However, when the Northwich mine was later closed due to flooding, Winsford re-opened. The mine is now operated through three shafts, No. 3 (1941) provides personnel access, No. 4 (1964) for materials, equipment (up to a minibus in size), ventilation and No. 5 (1973) for mineral winding.

In the 19thC rock salt was used for animal feed and for strengthening brine, annual production was about 20,000 tonnes. Demand for de-icing products to keep the road network clear in winter took off after WW 2, combined with the development of anti caking agents in the 1950's to improve storage and handle-ability; annual production is now 2 million tonnes. Rock salt is ~ 94% pure NaCl, the marl inclusions giving it a gritty texture.

The rock salt was laid down in the Triassic period ~220 million years ago, at Winsford several layers are sandwiched in-between Keuper Marl; a lower seam at a depth of ~150 metres is being exploited. The clay being impervious keeps water out. The method of working is basically to follow the rock salt strata to maximise production, in order to maintain the depth they have had to drill through one fold.

Suitably equipped with dustcoats, hard hats with lamps and emergency breathing equipment (weighing ~13lbs) the party descended by lift in 65 seconds. In the old workings the former use of tramways was evident in the floor, here the caverns were larger as the area was worked more intensively. Scrambling into an open topped 'minibus' equipped with additional side lighting we then set off on an eight mile round trip, Dave doing the driving and Zoë providing the commentary.

Geologically, the mine is famous for its large salt polygons, which can be up to 20m across. As we travelled along the roadway, cross-sections of the polygons could be seen in the roof, whereas vertical sections were seen in the walls of the older caverns.

The polygons were formed by desiccation of the salt solutions, with the vertical cracks so formed subsequently infilled with irregular masses of coarsely crystalline salt. These vertical masses, of variable thickness, delineated the margins of each polygon. The saucer shapes observed in vertical section represent the repeated cycles of flooding, evaporation and crystallisation of the salt in small ponds that developed across a broad shallow lagoon environment.

Arriving in a large cavern equipped as a mini cinema, a ten-minute video took us through the history of the mine. Up to 2001 a drill and blast technique was used, the aim was to blast ~1,300 tonnes at a time; cuts were made into the top and bottom of the face which was drilled for blasting. The loosened rock was transported by dumper truck and conveyor for crushing and/or stockpiling. Significant investment then took place in a face-cutting machine.

Travelling to the current working face in the northern part of the mine we watched the new method of extraction being used. An electrically powered face cutting machine, which can be operated by one man using a remote control, cuts a face 3.5m high by 3.5m wide, in two passes it develops a face some 7m high. The rock salt is automatically loaded onto the conveyor system which takes it back to the underground crushing and screening plant to produce either a 6mm or 10mm sized product. Samples were collected.

A seam of overall depth of 24m is being worked. The main roadways are about 19m wide and 9m high; the roof is self-supporting and gases are not encountered, controlled ventilation being required largely to remove vehicle fumes. The mine has been developed on a giant grid with 20 metre square columns of rock salt left between roadways to support the roof. We were told that subsidence is not an issue, extraction taking place under open countryside. When blasting occurs vibration is kept to a minimum.

With over 100 miles of underground roads and 23 miles of conveyors, the scale of working, size of the roadways and equipment is very impressive. At a photo stop a Caterpillar 990 loading shovel dwarfed the group, there being room for all in the bucket!

At the next stop an apparent fold had been exposed at the side of the roadway, which incorporated the underlying 'bluestone'. It was suggested that the base of the salt seam has risen as a result of folding under compression. However, further examination and discussion suggested that this steep junction probably represented a fault. Small mm-sized fibrous salt veinlets terminated at the junction. As the best of the salt deposit is at the bottom of the seam the method of working is to drill ahead of the face to maintain the floor level one metre above the bluestone. Again, samples were collected, the cubic crystal structure of the sodium chloride being well displayed. The rock salt is coloured pink by marl, which is thought to have blown in from an adjacent land area to the east.

Business development, the mine employs 38 people. Because of the seasonal nature of the de-icing business additional enterprises are being developed, the void space is recognised as an asset. Part is being used for the disposal of ash from waste incineration. In another area a facility (Deepstore) is being operated for the storage of archives, a business that is expanding fast. Here sections of road are formed into separate fireproof rooms containing racking up to the ceiling for stacking document boxes. The conditions of constant temperature (~13°C), low humidity and the high level of security are proving attractive to customers.

After the obligatory stop with all lights extinguished to show just how dark is dark, we then returned to the lift shaft, passing the crushing and screening plant from which the salt is lifted to the surface in skips at a rate of 9 tonnes per minute. A stockpile of 400,00 tonnes of rock salt is normally maintained, a good winter for them by definition is a bad winter for everybody else! The mine has some 70 years of available reserves.

Back at the De-icing centre there was a small exhibition about the mine, its layout, geological sections and history with some fascinating photographs from 'olden' times. Finally, Chairman Mike gave the vote of thanks for a highly instructive and enjoyable visit.

Gerald Ford (with thanks to Peter Floyd)

John Myers' Awards 2006

This year's assessment took place on Saturday 10th June and the panel comprised: John Reynolds, David Thompson, Lloyd Boardman, David Osborn, Eileen Fraser and Mike Fereday.

The following awards were made:

Keele University Tuesday 4th July 2006:

Winner: To be awarded a cheque for £100 and the John Myers Medal.

- Hannah Bowyer a 3-year Single Honours (Geology) undergraduate for her mapping project in Spain.

Runners up: Each to be awarded a cheque for £20.

- Linda Austin, a 4-year MGeoscience undergraduate and
- Laura Oakley a 3-year Single Honours (Geology) undergraduate.

Staffordshire University Wednesday 5th July 2006:

Winner: To be awarded a cheque for £100 and the John Myers Medal.

- Mick Ferneyhough, a 3-year Applied Geology undergraduate for his work on "A resource estimate of Milldam Mine, Derbyshire".

Runners up: Each to be awarded a cheque for £20

- Sharon Crossley: a 3-year Applied Geology undergraduate and
- Adam F Barnard: a 3-year Applied Geology undergraduate.

Dudley Rock and Fossil Festival

Saturday 16th & Sunday 17th September 2006

The Midlands largest fossil extravaganza returns in September 2006. It will be bigger and better than ever before. Many exhibitors from the world of geology - including superb fossil and crystal displays, rocks, gems, geology tools and apparel. During 2006, we will be celebrating the 50th Anniversary of Wren's Nest National Nature Reserve becoming the UK's first Geological Nature Reserve. The Festival will therefore also be a celebration of the Nature Reserve and the Geology of the Black Country with many activities planned during September.

- ROCK, FOSSIL & MINERAL ROADSHOW - Bring along your prized finds and stump the experts!
- SPECIAL EVENTS – Films, talks, Bouncy castle, face painting, craft stalls, trilobite races, dinosaur movies, interactive entertainment, not to mention prize competitions!
- RADIO ROADSHOW – Our very own international satellite broadcast radio roadshow beaming around the world!

At Dudley Concert Hall and Dudley Museum & Art Gallery

10am-5pm on Saturday, 10am-4pm on Sunday

Adults £2, Children £1, Families £5 (2 adults & up to 3 children)

For further information about the Festival please contact:

Dudley Museum & Art Gallery on 01384 815575

www.dudley.gov.uk/leisure-and-culture/tourism-travel/events/rock--fossil-festival-2006

Shropshire Geological Society Fieldtrips

Sunday 16 July 2006: **The Severn Valley** -

details from David Pannett 01743 850 773, also a NSGGA trip

Sunday 20 August 2006: **Dolyhir Quarry and Old Radnor Inlier** -

prior booking essential by telephoning Martin Allbutt 01694 724 879

Obituary - Ken Godden (1920 - 4.5.2006)

Sadly we have to report the death of long time NSGGA member Ken Godden. Ken was particularly active with the Group in the 1980s whilst living in Newcastle-under-Lyme, although his active participation became less when he moved to Ipstones in 1991.

NSGGA - Next Committee Meeting

- **Thursday 21 September 2006 at 7.00pm**

in the School of Earth Sciences and Geography, Keele University

Staffordshire RIGS Group

For details about the Group and meetings, contact:

SRIGS Secretary: Sue Lawley,

c/o Staffordshire Wildlife Trust, The Wolseley Centre, Wolseley Bridge, Stafford ST17 0WT

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Executive Committee (honorary):

Dr. Colin Exley; Terry Jones; David Thompson; Ted Watkin.

Executive Committee (elected):

Lloyd Boardman; Peter Floyd; David Osborn;

Janet Osborn; John Reynolds; John Winchester

Executive Committee (co-opted):

Vanessa Pilley (Keele Geol. Soc)

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