

Bulletin Number 73 April 2005



Programme

Field Excursions:

16 April 2005

Wood Lane Gravel Pit, Ellesmere

Leader: Peter Mold

Start: 10:30 am - 2 hour visit of Quarry, land fill and nature reserve,
12.30pm - Group exploration of geographical features

Glacial gravel pit owned by Tudor Griffiths Group. Museum with glacial erratics.

Grid Reference: 422326 OS Landranger 126, (Off A528 towards Shrewsbury)

Numbers limited so contact Elizabeth or Eileen ASAP if you would like to join this group.

Weekend 20-22 May

Geology of Anglesey - weekend with Essex Group

Fully booked

Sun 12 June

Mam Tor - Derbyshire

Leader: Dr. Chris Arkwright

Start 10.30am at Blue John Cavern for a round trip of 5-6 Km

Namurian Delta Sediments & Dinantian limestone, mineralisation and mining archaeology of Odin's Rake and recent research on the MamTor..

Sat 16 July

Hawkstone Park Geology

Leader: Chris Rayner of Shropshire GA

Start: 10.30am at the Visitors Centre at Hawkstone Park

The geology of both the natural and man-made landscapes of this amazing north Shropshire parkland.

It will be a moderately strenuous day with some rough walking.

For more information about the field trips please contact
Elizabeth Hallam (☎ 01260 275616 k.hallam@virgin.net) or
Eileen Fraser (☎ 01260 271505) fraser@fraserco.co.uk

NSGGA Field Trip programme for 2005

Sun 7 August Wenlock Edge

Leader: Dr David Ray

Start: to be announced

Examining Wenlock Edge as a continuation of the trip last year to the Wrens Nest at Dudley.

Sun 11 Sept Lathkill Dale

Leader: Fred Broadhurst

Start: 10:30am Details: to be announced

Carboniferous limestone and fossils

The Indian Ocean Tsunami, 26 December 2004

The close of 2004 witnessed the worst natural disaster in recent history. Although the true human impact is unlikely ever to be

known, an estimated 1.5 million people were killed and countless injured, when a tsunami, triggered by a huge submarine earthquake off the coast of Sumatra, swept across the Indian Ocean. Whilst we are used to media reports of flash floods, hurricanes, earthquakes and the like, as news and images of the event's impact emerged during the following week, it became apparent that this was an exceptional natural hazard, both in terms of its physical characteristics, and the associated human tragedy.

As with many natural disasters, this was a composite event, involving more than one hazardous process occurring in combination. The first event was a submarine earthquake with an epicentre located off the western coast of Sumatra which struck at 7.58am local time and lasted for 4 minutes. Whilst the earthquake was initially estimated at M8.0 on the Richter scale, this was later upgraded to M9.0, making it the fourth largest earthquake since 1900 and over 1000 times stronger than the 1997 Kobe earthquake in Japan. As with the majority of large earthquakes, it was triggered by movement along an active plate boundary. In this region, the Indo-Australian plate is actively subducting beneath the Eurasian plate. Stresses stored by the "stick-slip" motion along the subduction zone were released instantaneously, triggering the earthquake and resulting in a substantial movement of the sea bed.

Whilst the earthquake caused widespread devastation in nearby Sumatra, its human impact was limited in comparison to the tsunami it generated. Tsunami is a Japanese term meaning "harbour wave" and they are often viewed simply as exceptionally high waves. However, there is more to them than this. All tsunamis are triggered by perturbations of the sea bed. Whilst most are caused by submarine earthquakes, they can also be created by volcanic eruptions (e.g. the eruption of Krakatoa in 1883) or by large landslides (more on this later). As a result, in contrast to normal waves that occur as surface ripples, they involve the displacement of huge volumes of water. Whilst in deep water, tsunami waves display low amplitudes, often of less than a metre, and consequently pose little threat. It is only when they reach coastal areas, that the shelving seafloor causes the leading edge of the wave to decelerate, compress and build to up to tens of metres in height. However, they do travel extremely rapidly (up to 700 km.h^{-1}) and can cover large distances very rapidly. For example, a tsunami generated off the Chilean coast in 1960 travelled the 10,000 km to Hawaii in under 15 hours. In addition, to add to the destruction they cause, they often occur as a series of waves of varied heights, each with wavelengths of hundreds of kilometres.

The instantaneous nature of their trigger, and the speed at which they travel, make tsunamis a classic example of what are known as "rapid-onset events" in which there is very limited time available for a warning to be issued and evacuation plans put into effect. These physical characteristics however provide only a partial explanation for the immense death toll. As with any natural hazard, the magnitude of the disaster is equally if not more dependent on the distribution, density, vulnerability and behaviour of the human population affected. In this respect, a number of human factors contributed to the human impact. Firstly, the presence of large numbers of people along the Indian Ocean coastline, both in indigenous settlements and large tourist developments provided a large "at risk" population. Secondly, the lack of any warning system or coherent means of issuing a warning, precluded any attempts to evacuate those "at risk". Thirdly, there are numerous eye witness reports of people being drawn onto the beachfront as the sea receded in advance of the first tsunami wave. Ironically, this is a classic precursor to tsunami waves that could have provided a final opportunity for people to escape and find shelter.

Bill McGuire, the well-known natural disaster expert has pointed out that from a geological standpoint the Indian Ocean tsunami is nothing exceptional, and indeed comparatively minor in comparison to the "mega-tsunami" that can be generated by other means. The collapse of the unstable flank of Cumbre Vieja, a volcano in the Canary Islands for example could generate tsunami waves in excess of 100 m high with the potential to devastate the eastern seaboard of the U.S.A. Even Britain is not immune to tsunamis. At least three giant submarine landslides known as the Storegga Slides have occurred off the Norwegian Coast in the last 30,000 years generating tsunamis that have affected the north-east coast of Scotland.

Ending on a more positive note, there are ways in which the level of risk can be reduced to ensure that future tsunamis never claim such monumental loss of life. As most tsunamis are triggered by earthquakes, seismic monitoring provides one means through which advance warning can be given. However, not all submarine earthquakes cause tsunamis, and not all tsunamis are triggered by earthquakes. A more direct approach is exemplified by the American DART (Deep Ocean Assessment and Reporting of Tsunamis) System. This comprises a series of tsunami detectors located off the Alaskan Coast. A passing tsunami is detected by a pressure transducer located on the seafloor. A signal is then transmitted to a buoy on the surface, then to an orbiting satellite, and finally to one of NOAA's Tsunami Warning Centres from which an alert can be issued. Such a system is however of little use if the public are unaware of what to do in such an eventuality. Consequently, technological approaches must be combined with public education and clear evacuation routes to safe locations. Considering the impact of the tsunami on the nations bordering the Indian Ocean and the international reaction to the disaster, it is hopefully only a matter of time before such mitigation measures are put in place.

Richard Waller

Cheshire Geology Course in May

Ros Todhunter is running a geophysical mapping course of Cheshire from 9-12 May. 3 days are spent mapping somewhere near Northwich, then Congleton and then Chester. The 4th day is spent at Northwich salt museum collating the information. You have to do at least one day in the field and then everyone does the salt museum day.

See the Continuing and Professional Education site of Keele University for details

<http://www.keele.ac.uk/courses/cpe> Course no:104GU438.

Planet Earth in the 21st Century

The Annual Geologists' Association / JAPEC Regional Meeting / Masterclass for 2005 will be held on **Saturday 16th April 2005** in the School of Earth Sciences and Geography at the **University of Keele** on the theme of "Planet Earth in the 21st Century".

There will be four talks in the morning:

1. The impact of geology on the historical/social development of the area around Keele;
2. Geohazards – earthquakes and tsunamis
3. Snowball Earth and climate
4. Energy supplies – where will our children get their energy supplies from?

The meeting will start at 10.00 a.m. with coffee from 9.30 a.m.

Mini buses will take participants to the Wrekin for the field trip in the afternoon.

No number limit for lectures but the field trip will be restricted to 50.

Advance registration and payment essential; entry to all events by ticket only.

Costs: £12 for coffee, lectures and lunch. £15 for coffee, lectures, lunch and field trip.

Please send cheque payable to the Geologists' Association and sae to Susan Brown, GA/JAPEC Meeting, The Geologists' Association, Burlington House, Piccadilly, London W1J 0DU.

The Geologists' Association is most grateful to Professor John Winchester Head of School at Keele for the venue and to Professor Peter Styles as co-organiser of the meeting.

Susan Brown, Co-organiser.

The landscape of north-west Shropshire

Friday 10 to Sunday 12 June 2005

Leader: Gordon Hillier

A weekend GA arranged field meeting, numbers will be limited to about 20, so please contact:

Sarah Stafford at the GA office, Burlington House, Piccadilly, London W1J 0DU

☎ 020 7434 9298 or email Geol.assoc@btinternet.com

if you are interested in attending, a fee of £10.00 per person confirms your place.

Hednesford Rocks!

From AONB News - Cannock Chase Area of Outstanding Natural Beauty Spring 2005:

"Staffordshire County Council's Countryside Service recently moved an 11 tonne rock from Apedale Country Park to the old RAF Hednesford camp, south of Cannock Chase Visitor Centre, to have a plaque carved into it commemorating those who served at the camp during World War II and on National Service. A service of commemoration will be held on 24th April."

The rock is likely to be an example of the buff coloured sandstone 'Banbury Rock'. This sandstone is associated with the Banbury Coal seam, an important coal opencasted at Miry Quarry, Apedale, and occurs at the top of the Carboniferous Coal Measures Westphalian A horizons.

Articles

Anon. 2005 **

A presentation to David Thompson

Teaching Earth Sciences 30 (1) pp.6-7

A review, with photo and quotes, of the presentation to David Thompson at the NSGGA meeting 9 December 2004

Brown, S. 2005 **

A presentation to David Thompson

GA Magazine of the Geologists' Association 4 (1) pp.16

A short review, with photo, of the presentation to David Thompson at the NSGGA meeting 9 December 2004

King, C. 2004 **

The Earth Science Education Unit - Any Quarry Guide

Teaching Earth Science 29 pp.7-15

What to do with students when you get to a rock exposure - a review of good questions to ask and answer at a quarry, cliff or rock face.

King, C. 2004 **

How can we use our local Quarry?

Teaching Earth Science 29 pp.16-17

A guide that should be of use in developing the educational potential of most quarries, with Ercall Quarry as an example.

Robinson, E. 2004 **

Out and about with Eric Robinson - North Staffordshire shows the way

Geology Today 20 (5) pp.164-166

Describes briefly the acquisition of Brown End Quarry, Waterhouses and reviews the revised presentation boards.

**Copies available for reference by prior appointment at The Potteries Museum & Art Gallery - 01782 232323

Update on John Myers Award Winners

Staffordshire University

(information supplied by Dr Dave Roberts, Staffordshire University)

1998: Steven Hennah - Winner. Completed his PhD on the Quantification of Rock Heterogeneity (a geophysics topic) from the University of Reading in April 2004.

1999: Vidar Brecke - Winner has returned to Norway and is moving back into Environmental geology work following his GIS experience in UK.

Neil Yates – Runner up has completed his MSc from Imperial College.

2000: Jon Goodwin – Runner up moved from Lafarge Aggregates after 4 year's service to join RPS water services in Clevedon as a Project Manager.

Neil Glover – Runner up left Wardell Armstrong to join Waste Recycling Group as an Engineering Manager in NW England for more money and a lot more management responsibility.

2001: Suzy Larnar (now Suzy Offord) - Winner completed her MSc from Grahamstown University South Africa and now has a management position with Tarmac.

2002: Paul Hayes - Winner has just left the Site investigation company he was working for to join a small consultancy, Hallette Associates in their Lincoln office.

Cheryl Bridden- Runner up has been with Wardell Armstrong in their West Bromwich office as a geotechnical engineer since

graduation.

Martin Cook – Runner up was also with Wardell Armstrong in West Bromwich but left last year to start a PhD on contaminated land in the Civil Engineering department at the University of Newcastle upon Tyne

2003: Alistair MacDonald - Winner joined Hyder Consulting after graduation, is still with them and is also following part time an MSc in Foundation Engineering at the University of Birmingham, Civil Engineering Department.

Heather Oatridge – Runner up joined JRV Grimley in their Birmingham office on graduation and is still there.

Andrew Thornton – Runner up started with Joynes Pike in Stoke on graduation but soon left (pay was poor!!) and has been at Cranfield University since then working for a PhD in water treatment fully funded by Thames Water.

2004: Louisa Olden – Runner up joined Wardell Armstrong in the West Bromwich office straight after graduation and is involved in Minerals Planning work

Rachel Morris – Runner up has decided to go into retail management and is undergoing training.

Update on John Myers Award Winners

Keele University

(information supplied by Dr Stuart Egan, Keele University)

1999: Zoë Robinson - Winner. Zoë completed a PhD at Keele entitled 'Groundwater geochemistry and behaviour under an Icelandic sandur' funded by the NERC. She subsequently went on to employment with MJCA in Warwickshire, a consultancy company providing technical advice on environmental issues, particularly in the area of water management. Zoë returned to Keele in 2004 to take up a lecturing position in Physical Geography.

David Meredith- Runner-up. David completed a PhD at Keele entitled 'Subsidence mechanisms within the Black and Caspian Seas region'. He remained at Keele as a Research Assistant developing computer software for the hydrocarbon exploration. This position was funded by Platte River Associates who are based in Colorado, USA. David has now moved on to a position with the Grid Technology Group at Daresbury Computing Laboratories in Cheshire.

2000: Neil Davies - Winner. Neil is currently completing a PhD at Birmingham University entitled "Palaeoenvironmental Analysis of the Siluro-Devonian Ringerike Group, southern Norway" funded by NERC.

Charlotte Vye- Runner up. Charlotte is working for the British Geological Survey. She is based in the BGS Edinburgh offices but is also one a team of geologists carrying out geological mapping in the North-East of England.

2002: Rachael Rowlands (joint winner) unknown.

Mark Rushton (joint winner) went on to do a PhD in Astrophysics at Keele University.

2003: Matthew Stringfellow - Winner now works for the environmental consultancy company, MJCA, in Warwickshire.

2004: Stephen Cain - Winner is currently completing a Masters course in Petroleum Geoscience at the University of Manchester.

Max McGillen - Runner up is now at the University of Manchester completing a PhD with the Atmospheric Science research group.

David Moy - Runner-up is currently completing a Masters course in Basin Evolution and Dynamics at Royal Holloway, University of London

Mike Fereday, February 2005

AGM 17 March 2005 - A Brief Summary

Due to an unfortunate accident involving a ladder, retiring Chairman Peter Floyd was unable to attend the meeting. In his absence the meeting was chaired by incoming Chairman Mike Fereday and Prof. John Winchester stepped in at very short notice to give a very interesting talk entitled 'Mineral exploration in Oz: some reminiscences'.

Committee changes involved Eileen Fraser being elected Secretary and Roger Clowes becomes Field Secretary.

Ecton Hill Archive

Ecton Hill Field Studies Association is currently trying to put together the archives of Ecton activities from the past 30 years. If you have any items like printed articles / photographs / slides etc. which we could have copies of we would be most grateful.

Please contact us at fleming.a.z@btinternet.com

or write to us: Alastair & Zoë Fleming, 23 Cullipool, Isle of Luing, Oban, Scotland PA34 4UB

NSGGA - Next Committee Meeting

- **Thursday 26th May (to be confirmed) 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: Ray Robinson,

SRIGS, PO Box 89, Buxton SK17 0WX ☎ 07810 152514

email: rayrobinson99@hotmail.com or ray.robinson@astrazeneca.com

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☎ 01782 232323 email: don.steward@stoke.gov.uk

Executive Committee (honorary):

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

Executive Committee (elected):

Lloyd Boardman; Elizabeth Hallam; David Osborn;

Janet Osborn; John Reynolds; John Winchester

Executive Committee (co-opted):

Janet Fairclough

Vanessa Pilley (Keele Geol. Soc)

Why not visit the NSGGA web pages: www.esci.keele.ac.uk/nsgga

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