



The
Black
Country
Geological
Society

NEWSLETTER No. 191 OCTOBER 2008

The Society provides limited personal accident cover for members attending meetings or field trips. Details can be obtained from the Secretary. Non-members attending society field trips are advised to take out your own personal accident insurance to the level you feel appropriate. Schools and other bodies should arrange their own insurance as a matter of course.

Leaders provide their services on a purely voluntary basis and may not be professionally qualified in this capacity.

The Society does not provide hard hats for use of members or visitors at field meetings. It is your responsibility to provide your own hard hat and other safety equipment (such as safety boots and goggles/glasses) and to use it when you feel it is necessary or when a site owner makes it a condition of entry.

Hammering is seldom necessary. It is the responsibility of the hammerer to ensure that other people are at a safe distance before doing so.

Joint Chairmen:
Alf Cole C.Sci;
Alan Cutler B.Sc.,
M.C.A.M.,
Dip.M., M.CIM.

Hon Treasurer
Mike Williams

Hon Secretary
Barbara Russell

Meetings Secretary
Gordon Hensman B.Sc.,
F.R.Met.S.

Field Secretary
Andrew Harrison BSC.,
MSc., F.G.S.

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**COPY DATE FOR NEXT NEWSLETTER IS
MONDAY 1st DECEMBER 2008**

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FUTURE PROGRAMME

**Lecture meetings are held at Dudley Museum, St James's Road, Dudley.
Phone (01384 815575)
7.30 for 8 o'clock start unless stated otherwise.**

SUNDAY 26TH OCTOBER 2008 (*Field meeting*)

The trip aims to place Whitmans Hill Quarry in the broader Silurian context. Note that the quarry where we will meet up is called NORTH QUARRY. Not to be confused with TANK quarry which is a little further up the road. We will meet initially at the quarry just BELOW the clock tower on North Malvern Road - (OS map ref 468773) at 10.30am, view outcrops and see a fault that has deformed the Silurian sediments we will see later on. Next we will visit two sites in West Malvern where clastic Silurian sediments (Llandoverly) are exposed - including the basal conglomerate. If time permits, a short walk from Cowliagh Bank allows us to see the impacts on the East Malvern landscape. Finally our tour will conclude at Whitmans Hill Quarry.

If members would like afternoon tea, at StorrIDGE Village hall I **MUST** know numbers attending in advance. Otherwise we will only be able to use the toilets and parking facilities. Two pubs are strategically placed on the itinerary if members would like a drink at lunch time. Please bring a packed lunch and stout footwear. Hard hats will be provided.

We had a great visit to the quarry last year which gives a good illustration of the environmental conditions present between the Wren's Nest and the Wenlock Edge during the Silurian. We also collected many fossils.

Please could members let me know if they are coming –

mob: 0797 333 0706. Day tel: 0121 693 3814 e-mail: andrew_harrison@urscorp.com

MONDAY 27TH OCTOBER 2008 (*Indoor meeting*)

The latest developments in the effort to remove CO₂ from the gases released when coal, gas or oil are burnt. Speaker: Christopher Rochelle BGS

Christopher will speak to us on power stations where captured CO₂ is forced down spent oil wells. This technology is very relevant to the whole business of curbing climate change. Christopher last spoke to us on this topic a couple of years ago, and we are very grateful to him for keeping us up to date in this highly topical and important matter which is being actively researched in several countries.

MONDAY 1st DECEMBER 2008 (*Indoor meeting*)

Members evening

NB. THIS EVENING WILL START EARLIER THAN USUAL AT 7 PM.

This is your chance to reveal the particular "bee in your bonnet"! Have your say. Have you a talk hidden inside? Have you some marvellous photos?

Les Riley will be bringing along some "real" stinking North Sea oil. Come along and sniff it! Past Members' Evenings have included: mini-talks on Newfoundland, Azores, Hawaii, Iceland, Borrowdale, and the Yukon. Displays of either individual rock specimens, or groups of rocks.

Seasonal Refreshments will be provided as usual and this year there will be a 'Rocks in the Bottle' contest - guess the number and win a prize!

If you want to talk on any topic, or bring along specimens, show slides or overhead transparencies, or simply ask a question, please try to get a message to any member of the Committee so that we can try to draw up a programme.

MONDAY 26TH JANUARY 2009 (*Indoor meeting*)

North Sea Oil. Speaker: Les Riley (BCGS Committee Member)

"Bugs and Black Gold; Palaeontology and its role in hydrocarbon exploration and production - examples and applications from the North Sea and Offshore Eastern Canada."

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Les has extensive experience as a working geologist in the North Sea Oil Industry, and in many other parts of the world. He will bring us up to date with the latest drilling techniques, and will bring along samples of drilling cores and equipment.

(Les has written an illustrated piece on this later in the Newsletter)

MONDAY 23rd FEBRUARY 2009 (Indoor meeting)

Natural and Man-Made Earthquakes in the U.K. Speaker: Professor Peter Styles. (University of Keele).

The Applied and Environmental Geophysics Group at Keele specialise in the application of high resolution geophysical techniques to investigate the region of the earth accessible to and accessed by human endeavour. These techniques include seismology, gravity, radar, magnetic and electrical methods and their computer modelling.

The problems include mining and past mining problems, pollution and its migration, forensic, archaeological and hydrogeological studies. Of special current interest is Clean Coal Technology for energy security and geological studies of Radwaste disposal. The areas of work include UK, Europe, Middle East, Africa and Australia. This talk will also touch on the Dudley Earthquake. The Research Group at Keele consists of 4 academic staff with several others who collaborate in using these techniques in their own research, 8 PhD's and 2 Post-Doctoral Workers

Andrew Harrison, Gordon Hensman

LAPWORTH LECTURES

All lectures commence at 5.00pm in the Dome Lecture Theatre, Earth Sciences, University of Birmingham.

Monday 20th October 2008

Dr Iain Stewart

(School of Earth, Ocean and Environmental Sciences, University of Plymouth)

Presenter of the BBC's *Earth: The Power of the Planet* and *Climate Wars*

Un-natural Hazards: the cultural geology of risk

(**Please note this lecture will take place in the Haworth lecture theatre**)

Monday 3rd November 2008

Professor Tim Reston

(School of Geography, Earth & Environmental Sciences, University of Birmingham)

Magma-poor continental break-up

Monday 17th November 2008

Professor Dave Harper

(Head of Geology, Natural History Museum of Denmark (Geological Museum), University of Copenhagen)

The Great Ordovician Biodiversification: causes and consequences of diversity's big bang

Monday 1st December 2008

Dr Kathryn Goodenough

(British Geological Survey, Edinburgh)

Madagascar: a geological jigsaw puzzle

For further details/information contact:-

Jon Clatworthy, Curator of the Lapworth Museum of Geology.

Tel: 0121 414 7294

E-mail: J.C.Clatworthy@bham.ac.uk

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*OTHER SOCIETIES***NORTH STAFFORDSHIRE GROUP OF THE GEOLOGISTS' ASSOCIATION****Thursday 6th November 2008: 7.30 pm in the Gemmell lecture theatre at Keele University.****The Professor Wolverson Cope Annual Lecture****Speaker: Professor Aubrey Manning, (Emeritus Professor of Natural History, University of Edinburgh) and well known TV personality.*****"2008 - UN International Year of Planet Earth."***

It is essential to book a place for this lecture; please see the flyer at the end of this Newsletter.

Thursday 8th January 2009 7.30 pm Speaker: Dr Ian Stimpson, Keele University*"The 2004 Boxing Day Earthquake and Tsunami"***Thursday 5th February 2009 7 30 pm****Speaker: Professor David Siveter, University of Leicester.***"Silurian soft-bodied sensations: a unique window on the evolution of life".***Thursday 5th March 2009 7:30pm AGM and Chairman's Address "Shark Bay to Wave Rock".**

Some of the interesting landforms of Western Australia by Elizabeth Hallam.

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| For further information contact NSGGA Field Secretary Gerald Ford , 01630-673409 or e-mail: g.ford@ukonline.co.uk |
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| For contact with the Field Secretary on the day of a field trip the mobile phone number is 07789 826807 when there is a chance that it will be switched on |
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*MEETING REPORT***SUNDAY 27th JULY 2008****Field Trip: 'The Permo-Triassic Geology of Kinver'****Leader Alan Cutler (Black Country Geological Society)**

The day began at the Trinity College Development just north of the Stourbridge ring road and was hot and sunny with a small number of members in attendance. Alan started by explaining how the Permo/Triassic Sandstones of the area lie within a very narrow graben structure bounded to the west by the Enville Fault and the Wyre Forest Coalfield and to the east by the Eastern Boundary fault and the South Staffordshire Coalfield. The Sherwood Sandstone Group is divided from youngest to oldest into the Bromsgrove Sandstone Formation (formerly Lower Keuper Sandstone), Wildmoor Sandstone Formation (formerly Upper Mottled Sandstone), Kidderminster Formation (formerly Bunter Pebble Beds) and Bridgnorth Sandstone Formation (formerly Lower Mottled Sandstone). From east to west the sandstones sequences have a generally eastwards dip and the Wildmoor, Kidderminster and Bridgnorth Sandstone Formations are repeated since they lie on the edge of a syncline with the Bromsgrove Sandstone Formation, not seen on this trip, at its centre.

Location 1: The Trinity College Development. This was once the site of a former sand and gravel pit and is now the site of a new residential development. We looked at an exposure of the Wildmoor Sandstone Formation, which is Triassic in age and represents reworked desert sands deposited into a desert lake by rivers draining from the south. Above the Wildmoor Sandstone Formation we saw a fluvio-glacial terrace deposited from great outpourings of glacial meltwater as the glaciers retreated during the last Ice Age. Found in this deposit around Stourbridge have been the fossil remains of mammoth, woolly rhinoceros, musk ox, horse, reindeer, hippopotamus, elephant and bison.

Coal and fireclay from the Middle Coal Measures (formerly Etruria Marl) and the sand from the Wildmoor Sandstone Formation were used as raw materials in the manufacture of glass in the local glassworks that Stourbridge is famous for. The sands and gravels from these fluvio-glacial

deposits have been historically important economically with deposits near to the Stewponey site having been worked until relatively recently.

Location 2: The Forest Arms Pub: On our way out of Stourbridge heading for Kinver we stopped at the Forest Arms Pub, which is situated close to the boundary of the Wildmoor Sandstone Formation and the older Kidderminster Formation. The Kidderminster Formation comprises coarse grained sandstones and calcareous conglomerates with occasional clayey bands. Rounded quartzite pebbles help to make this formation extremely resistant to erosion. It is believed that this formation was deposited within a desert basin environment fed by rivers caused to swell by seasonal rainfall or meltwater from melting snowfields on high distant mountains. Pebbles and sand were deposited as deltaic fans seen today as conglomerate layers, the thickness of which relates to the volume of water flowing within the swollen rivers.

This formation forms the Kinver Edge and several other ridges and is underlain by the Bridgnorth Sandstone Formation which it protects from erosion to produce high cliffs. This formation is often seen in roadside cuttings capping the Bridgnorth Sandstone Formation and the junction between the two represents an unconformity, which is often irregular, locally pocketed and eroded. Historically the Kidderminster Sandstone Formation was worked for gravel near Kinver although only to a small extent compared to elsewhere.

Locations 3 & 4: Mill House Cutting and The Holy Austin Rock Houses: From the Forest Arms Pub we headed into Kinver and first of all stopped at the Mill House Cutting to look at some rather overgrown outcrops of the Bridgnorth Sandstone Formation. This formation is Permian in age, brick red in colour, relatively soft, easy to work with hand tools, sufficiently competent to stand in vertical faces and underlies much of Kinver and the surrounding ground. Spherical sand grains and the bedding shown in the exposures indicate that this sandstone formed from wind blown desert sands forming ancient desert sand dunes when England was at a similar latitude to southern Sudan and Chad today. It is believed that the winds blew from the northeast off the Mercian Hills and the dunes moved west southwest.

After the Mill House Cutting we met up with David Bills, a local historian, and Mike Radnor, from the National Trust, who showed us round the Holy Austin Rock Houses. Although the true origin of the Rock Houses is uncertain it is known that they were inhabited from the 1770s up until the 1960s and had their heyday in the 1840s to 1860s. Then, the Rock Houses were home to up to 11 families who worked at the local ironworks and in later years as industry declined and the families moved away they either fell into decline or became cafes until the National Trust inherited them and began restoration work in 1964.

The Rock Houses are cut into the Bridgnorth Sandstone Formation and capped by the Kidderminster Formation. They are built on three levels and comprise a number of rooms with lime washed walls and provided very comfortable living conditions. The lower dwellings were carved entirely from the rock but the uppermost dwellings comprised a mixture of carved 'caves' and sandstone blocks. In the ceilings of the 'caves' can be seen the swirling patterns of ancient sand dunes. Each family living at the Rock Houses was totally self sufficient and on the slopes below can be seen their allotments and gardens.

Location 5: The Lydiats: After lunch at the White Heart Pub we headed eastwards to the Lydiats which lies close to the Enville Fault beyond which is the Wyre Forest Coalfield. From the cars we walked uphill passing outcrops of Bridgnorth Sandstone Formation that soon gave way to outcrops of Permian age Clent Formation, which here comprises a breccia of clay suspended pebbles. The pebbles are subangular and angular in shape coated with haematite and vary in nature from place to place, but include Uriconian igneous rock, quartzite, sandstone and limestone. This Formation represents rock debris and scree washed down from highland areas of Wales and the South Midlands by sudden storms, and then deposited onto a desert plain. The formation is bounded by unconformities and represents some 20 million years of time.

Location 6: St Peter's Church, Kinver: This was the last location of the day and has been built from blocks of local sandstone. Once again we saw within road cuttings the relationship between the Kidderminster Sandstone and Bridgnorth Sandstone Formations. However, the basement junction between the two was not exposed. Looking back towards the Black Country from the Church we saw rolling hills and various ridges, including the Kinver Edge, between which meandered the River Stour and the Smestow Brook. The Kidderminster Formation generally

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forms the ridges and hills whilst the current courses of the River Stour and Smestow Brook have been assisted by the action of glacial meltwater during the last Ice Age.

I would like to thank Alan for a very interesting trip and look forward to the next one.

Andy Harrison

EDITORIAL

When I prepare the next Newsletter for December it will be my 30th edition, and I will have done the editing for five years. I think it is a suitable time to step aside and allow someone else to take over. The job takes two or three evening every two months, and as you can see from this edition very little writing is involved as most of the material is emailed by members and sometimes friends of the society. What is required is a computer with 'Microsoft word' and email. The method I have used is to copy the previous Newsletter delete out of date material and change the number, dates etc. I then put all the material sent to me into our format, compress the pictures so that they are not too big and write the editorial. I also write Geobabble which I would continue to do for whoever takes over. If there is someone out there who would like take over, or at least find out more, please either email me (address at the end of this Newsletter) or speak to one of the committee. An ideal time to do that would be at our Members' evening, always an enjoyable event.

Bill Groves

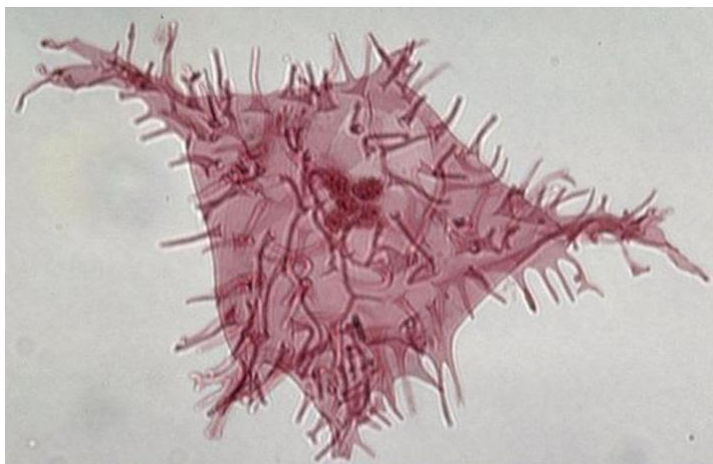
from LES RILEY

Fossil and extant microscopic algae– amazing little critters!

All of you are undoubtedly aware of toxic "red tides", algal blooms and associated human deaths associated with eating contaminated shell fish. These are caused by excessive dinoflagellate (Order: Dinoflagellata, Class: Dinophyceae) productivity due to oceanic upwellings and/or man made pollution leading to nutrient enrichment.

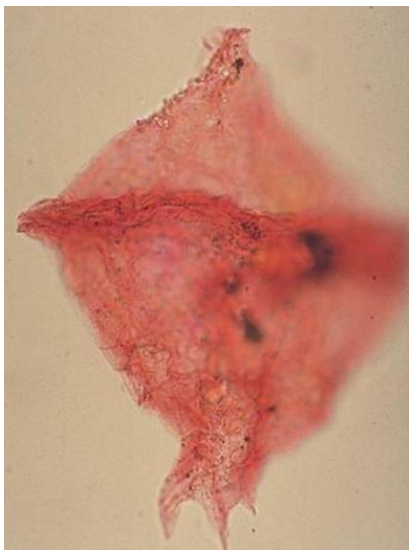
However, you may be unaware that fossilized dinoflagellate cysts (the resting stage of the motile, planktic form) have a geological age range extending back certainly to the Late Triassic and possibly even older.

Their small size, abundance in marine sediments and rapid evolutionary changes from the Jurassic onwards makes them ideal candidates for "biostratigraphic age dating" in, for example, hydrocarbon wells where sample sediment size is severely limited and "conventional fossils" such as ammonites and bivalves etc. cannot be utilized. Further more, their biologically and chemically altered (by increased temperature and pressure regimes) organic remains are an important oil precursor. Progressive "darkening" (from pale / colourless, through orange brown to black) has also been calibrated against temperature/depth of burial and used as an index for potential hydrocarbon generation from deeply buried marine source rocks.



As to a more current and topical issue - "global warming", changes in Holocene and Recent dinoflagellate cysts assemblages are currently being utilised for monitoring temporal and spatial variations in temperature, salinity and water mass/oceanic circulation patterns initiated by climate change.

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Illustrations*PREVIOUS PAGE: Apectodinium agustum :*

Early Tertiary

(Size approx 120 microns in width)

LEFT: Glossodinium dimorphum :

Late Jurassic

(Size approx. 100microns)

Les Riley

from GORDON HENSMAN**The Geology of Malta**

Malta, Gozo and tiny Comino make up the Maltese Archipelago. They are the highest parts of the Malta Plateau which extends southwards from Sicily, 90km to the north. Tunisia lies 300km to the west. Most of the sea area between southern Sicily and the North African coast is shallow, mostly less than 200m, although there are several deep valleys running NW-SE known as the Pantelleria Rifts reaching depths of 1000-1500m. This relatively shallow sea area separates the deeper Eastern and Western Mediterranean Basins, and is known as the Sicilian-Tunisian Platform, or the Pelagian Platform.

Malta is a "sandwich" of four layers of rock, almost horizontal, laid down as sediments in a shallow sea between about 35m and 6m years ago during the Oligocene and Miocene epochs in the Tertiary Period. They were subsequently uplifted and gently tilted to the North-East, down which slope valleys have been eroded during wetter times. The precise form of the surface depends on the resistance to weathering and erosion of these rocks.

1. Lower Coralline Limestone Formation 35-25my

This is the lowest of the four layers. It is a pale grey limestone containing some beds with fossil corals and common extant marine calcareous algae. It is over 140m thick in places with its base below sea level. It is a hard resistant formation forming high cliffs which are, nevertheless, slowly undercut by wave action.

2. Globigerina Limestone Formation 25-15my

It consists of a soft yellowish fine-grained limestone forming irregular slopes in which small terrace-like steps a few metres high pick out slightly harder bands. Globigerina is a type of microscopically small fossil shell that is abundant in this limestone which reaches a thickness between 20 to 200m. It is chalky and fairly soft with several harder bands such as two phosphatic conglomerate beds, which weather into flat layers forming steps in the landscape at each resistant band. These are often accentuated by the building up of terrace walls by successive generations of farmers – serving to emphasise the step-like nature of the landscape.

3. Blue Clay Formation 15-7my

This is very soft and rarely forms the surface, forming rolling slopes, mostly covered by soil or scattered rubble. Where it is exposed in cliffs etc. it is seen as a banded bluish grey-clay or marl. It is easily weathered and the clay minerals are easily disaggregated and washed down by rain to form the main constituent of the soils on the islands. The clay is impermeable to water and hence acts as a barrier to percolating water coming down through the overlying fractured and porous Upper Coralline Limestone. Major spring lines are found along the contact between these two units. Thickness 20 – 70m.

4. Upper Coralline Limestone 7-5my

It forms the topmost unit and is a hard, pale grey limestone. It forms sheer cliffs and hilltop cappings, and contains corals and coralline algal fossils. Thickness 150m.

Greensand

This lies between the *Upper Coralline* and *Blue Clay Formations*. However, it is so thin that it doesn't significantly affect the form of the land surface, although it reaches 10m in Gozo. It is generally no more than 1m thick. Fresh exposures are decidedly green in colour, created by a scattering of *glauconite* (potassium-iron-aluminium silicate). Where it is weathered the glauconite turns a chocolate brown to form distinctive brown layers.

Controlling Faultlines

Although the major faults, such as the Maghlaq Fault along the south coast, which formed when Sicily/Malta pulled away from Africa, run NW-SE to form the Pantilleria Rifts, there is another swarm of stress release fractures trending NE-SW. These are the dominant factors influencing the relief and outline of the island. The result is a system of horsts and grabens where land was either elevated or sank between fault lines. The Grand Harbour at Valetta and the north and south Comino Channels between Malta and Gozo were formed in this manner.

Solution Features.

As might be expected in an island almost entirely made up of limestone, there is an abundance of *karst* features. There are numerous caves that have fairly recently collapsed causing surface depressions. The more recent collapse features result from caves formed in the *Upper Coralline Limestone (UCL)*, and in many cases they are associated with cave systems which developed at the junction of the *UCL* and the underlying *Blue Clay*, which is impermeable. This junction is also an important spring line where it is exposed. In Gozo some collapse features appear to have formed in the early Miocene when the Maltese Archipelago was covered by fairly deep sea.

Younger Caves and Collapse Features.

These are mainly in the *UCL* as land caves at three levels. Sea caves are at present being cut in the *Lower Coralline Limestone*, and *Globigerina Limestone* where it is at sea level. There are also submerged caves and elevated caves on the south Maltese coast cut by higher sea levels, or before tectonic uplift. Some caves contain some of the few sedimentary deposits preserved since elevation above sea level in the Pliocene.

Older Collapse Features.

In Gozo there are several quasi-circular hollows, and even submarine vertical shafts some tens to hundreds of metres in depth, where the Miocene seabed collapsed. Perhaps as a result of continual faulting, some features continued to subside as much as 100m during the Pliocene and Pleistocene. Where the sediment infill is more resistant than the surrounding rocks, a circular erosional plateau results, known as a *Mesa*. Eocene evaporates are found in the Malta area such as salt and gypsum. These have been removed by sub-sea ground waters during the Oligo-Miocene period of marine sedimentation causing cave collapses. However, the currently favoured theory is that they are the result of karstic collapse associated with terrestrial cave formation.

The Holocene 10,000 to date

The Maltese Archipelago has been above sea level for at least the last 5m years, and joined to Sicily 18,000 BP. However, its size has varied enormously as the sea level rose and fell many times in response to the known 50 pulses of ice spreading and then melting. The Ghar Dalam Cave near Birzebbuga, west of Valetta, contains a cave sedimentation sequence recording several stages of the Pleistocene and Holocene. Many thousands of mammal and other bones have been recovered from the clay layers. Some of the animals are hedgehogs, swans, deer, turtles and pygmy elephants and dwarf hippopotami. These two latter dwarf animals, the size of large sheep, are unique to Sicily and Malta, and appear to have evolved during the earlier part of the Pleistocene when the Eurasian Elephant was common throughout Europe. With the restricted range on a small land area, evolution selectively encouraged smaller animals. Another line of evolution also gave rise to the Maltese dormouse the size of a cat!

Recent Tectonic Movement

Small islands off the coast around Marsaxlokk and Marsascala on the east coast are recorded on maps only a few centuries old. "Cart Ruts" (pre-Phoenician), are observed to run to almost a metre below sea level on the north and eastern coasts of Malta. Both suggest a slight increase of the downwards tilt to the north-east over the last 5,000 years.

Gordon Hensman

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GEOBABBLE



A very short Geobabble to make way for some excellent articles, but may I commend to you a website: www.historicalautographs.co.uk Looking at its catalogue I found this for sale, addressed to J Beete Jukes, a geologist working in Ireland and postmarked sometime in 1866. But who wrote the envelope? All will be revealed in next times Geobabble

Bill Groves

PLEASE CONTRIBUTE

We rely on all members to make the content of the Newsletter more interesting. If you are sending photographs, can you please reduce them as suitable for documents? The Newsletter is kept below 1MB for the convenience of members. In order to include material in the December Newsletter, please send or give it to me by **Monday 1st December 2008**

PLEASE SEND MATERIAL FOR THE NEXT NEWSLETTER

to

Bill Groves

billgroves300@btinternet.com

Why not have a look at our excellent website at:

www.bcgs.info

8th Professor Wolverson Cope Annual
Lecture
Thursday 6th November 2008 7.30 pm
Keele University, Alan Gemmell Theatre,
Huxley Building
Speaker: Professor Aubrey Manning
“2008 UN International Year of
Planet Earth”



The lecture is free to NSGGA members and students, £1 for non –members. Seating is limited to 160 so please apply for a seat reservation as soon as possible.

Please book by e-mail quoting “Aubrey Manning Lecture” in the subject line to:

Carol Fereday on candm.fereday@btinternet.com

or by post to: Carol Fereday, 24 Brookside Close,
Newcastle-under-Lyme, ST5 2HX
☎ 01782 712467

I/We would like to book _____ places for the lecture on Thursday, 6th
November 2008.

Please supply the names of all those wishing to attend, indicating whether they are members or non- members. Payment for non- members will be taken on the door.

Name(s)

Address:

Telephone:

E-mail address