The Black Country Geological Society

NEWSLETTER No. 158
MAY 2003

The Society does not provide personal accident cover for members or visitors on field trips. You are strongly 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.

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.

MONDAY 19TH MAY 2003 Lecture; Dr. Tony Waltham "Kamchatka Volcanoes"

Above a very active part of the Pacific subduction zone, the Kamchatka volcanoes have long been impossible to visit as they were in a military restricted area of Russia's far east. The more accessible sites around Petropavlovsk include two dangerously explosive andesite cones, the Strombolian activity of Karimsky, the Valley of Geysrs, a cratered basaltic shield and the splendid geothermal activity inside the Mutnovsky caldera. Worth a visit and/or a look!

Dr. Waltham is a Senior lecturer in Engineering Geology at Nottingham Trent University, and author of various books. He delights in travelling to distant "spectaculars", and for many years used cave exploration as an excuse. He now travels less energetically - mainly to volcanoes or mountain regions.

SATURDAY 28TH JUNE 2003 Field Trip: A Day Trip to Ludlow. Led by Mike Williams.

A day in Ludlow can be a wonderful day out. The castle, the architecture, pubs, shops and fossils makes this venue a great regional attraction.

We will meet at the new library and museum at 11 00 am. There is parking. A visit to the newly refurbished museum and study of the fossil collection will then follow. After lunch there will be a riverside walk, following a marked geological trail. Fossils can be observed in situ.
No hammers please. Please wear strong shoes and bring a waterproof.

SUNDAY 27th JULY 2003 – Field Trip: Wrens Nest Re-visited. Led by Graham Worton

Meet at 10am at the main Wrens Nest Car Park off Priory Road (opposite the King Arthur Pub on the A4123). This is a re-visit to the classic geology of the Wrens Nest. This site has been a National Nature Reserve for nearly 50 years because of its outstanding geology. Over that 50 years many changes have occurred in and around the site and this is an opportunity to update the picture about the reserve and the detail of the geology and human history that it holds.
We will also review the engineering works that are occurring in order to ensure the next century of heritage at the site.

Graham has a special expertise and interest in the area and will appraise the party of future plans for development of education and visitor attractions.

SUNDAY 28TH SEPTEMBER 2003 Field Trip: Trevor Rocks – Llangollen, North Wales - a joint meeting with the Mid Wales Geology Club. Led by Tony Thorp.

Limestone exposures with fossils.

Meet at 11 00 am at OS ref SJ234 432. Turn right by a phone box and pub on the main road at SJ 242 424 and continue uphill to a very tight turn at SJ232 432 and in 100 m there is a parking place for a few cars. If you reach the double hair pin you have gone too far.
The alternative access is via Castel Dinas Bran.

While in the area why not visit the world famous Pontcysyllte Aqueduct over the River Dee and the Chirk Aqueduct over the River Ceiriog.

Take a packed lunch and wear strong shoes.

EDITORIAL

We are now a few months after the 'Great Dudley Earthquake of September 2002' and much number crunching and debate has been had. The BGS recently published information about the effects of the quake which apparently was felt as far afield as Dublin to Yorkshire and Devon. Some 8000 people responded with information to the BGS and their comments included many about the deep rumbling and walls, ceilings cupboards and computer screens shaking with much worry about damage and structures collapsing etc. The BGS reports that two people were injured rushing out of their houses one breaking a leg and the other a toe. And perhaps the funniest quotation from them is a person who stated 'I was asleep and the whole house (on top of a hill) shook for over 10 seconds. There was a deep disturbing rumbling/rattling noise all around me and I felt I was lying on top of a large oscillating jelly structure'

The BGS put the Dudley quake in context by noting that each year there are 1300 of this size (4.8) or bigger and the UK gets a shock of this size about once every 8 years on average. Well the Dudley quake might not be a great shake on the world scale but it was a great reminder that even here miles from a plate boundary geological stuff is still happening.

REPORTS

MONDAY JANUARY 27th 2003 Lecture 'Silurian Soft-Bodied Fossils' by Professor Derek Siviter from the University of Natural History, Oxford.

Professor Siviter was born in Wolverhampton and went from the former Darlaston grammar school to the University of Leicestershire where he gained his BSc and PhD. He spent his post doctoral fellowship at Trinity College Dublin and spent some time in the Nature Conservatory Council followed by 10 years at the university of Hull. Until his present position at the University of Natural History, in Oxford, where he is has been Assistant Curator and reader in Earth Sciences. He researches Early Palaeozoic arthropods and has discovered some remarkable fossils from the Silurian and Cambrian of China.

Professor Siviter began his talk with a look at the nature of the Fossil Record, what kind of organisms are to be found within it and a brief overview of how preservation occurs with a few case studies. Most predominantly within the Fossil Record organisms with hard outer shells, internal and external skeletons of calcium carbonate and calcium phosphate, for example large faunas, molluscs, corals and arthropods tend to be preserved. But what about the organisms without such hard protection? Such as nudibranchs, or sea slugs, and jelly fish. Are these ever found preserved in the Fossil record?

The answer is, Yes, under conditions of special preservation. Around 60% of the organisms found in the oceans are entirely soft bodied animals. When found within the Fossil Record these organisms give a unique window into what the ancient marine environment might have looked like and also important clues into the diversity of different species.

Layers of rock containing these specially preserved fossils are referred to as KONSERVAT LAGERSTATTEN and are found in a number of places around the world with a variety of soft-bodied assemblages.

Professor Siviter then went on to talk about some important case studies relating to discoveries of soft-bodied organisms within the Fossil Record. The first example was located at Chengjiang in Southwest China where soft-bodied worms complete with segments and guts have been found within muddy limestones of Pre-Cambrian age. These fossils represent the first explosion of multicellular organisms on Earth making Chengjiang one of the major discoveries of the last century.

Probably the most well known soft-bodied assemblages come from the southern Rockies in British Columbia where shallow water limestones give way to deep water shales. First discovered by Charles walcott in the early 1900's this sequence of Lagerstatten is known as the Burgess Shales. These shales contain a whole host of 2-dimensionally preserved soft-bodied fossil faunas such as arthropods showing their antennae, feathery gills and internal organs.

Lagerstatten sequences range variably throughout the Cambrian but become much rarer through the Ordovician and Silurian up to the Devonian. For the next part of his talk Professor Siviter concentrated on a sequence of Lagerstatten from the Middle Silurian to be found in Herefordshire, England.

Pre-Silurian times Southern England formed part of the supercontinent of Gondwana and lay around 60 degrees south of the equator. As Gondwana began to split Southern England moved northwards until eventually it collided with the land mass of Avalonia which resulted in the closure of an ocean known as the Iapetus Ocean by the beginning of the Devonian. In Mid-Silurian times then central England comprised of a small number of landmasses surrounded by warm, shallow tropical waters of up to 200m in depth as confirmed by presence of brachiopods in the Fossil Record of the Midlands and the Welsh Borderlands. To the west, Central Wales comprised a deep ocean basin which provided excellent conditions for the accumulation of mud and turbidite deposits. Also found interbedded with deposits of the Mid-Silurian are layers of volcanic nodule-bearing ash. By this time it is believed that most volcanic activity in the area had ceased and so these deposits may well result from activity further a field, at the time, such as from the Czech and Slovak Republics, the Dingle peninsula in Ireland or even the Mendips. However the latter may be of the wrong age. It is within the nodules of these volcanic deposits where the fossilised soft-bodied remains of worms, crustacea and arthropods only a few millimetres in size have been found.

The fossils are believed to have grown independently of the nodules as a result of the dead organism becoming entombed within the deposited ash followed by a redistribution of carbonate and silicate minerals, as seen through an electron microscope, between the organism and the ashy matrix which resulted in the special preservation of the organism. The main body of the fossil tends to be formed out of coarse calcite crystals surrounded by a layer of finer crystals. Other minerals such as quartz, phosphate, pyrite and dolomite have been identified as forming other body parts such as the gut, anal canal and various appendages.

On cracking open a nodule in the field what is usually revealed is a tiny speck of crystalline calcite within and ashy matrix which may be easily over looked. Under the electron microscope however

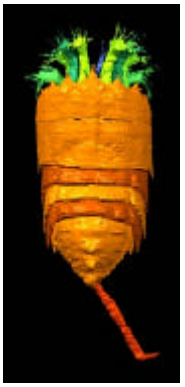
this crystalline speck transforms into either a recognisable or unrecognisable part of a fossil organism. Professor Siviter then continued his talk with a look at the kinds of organism that had been found entombed within these ash nodules and how the information on the organisms morphology maybe extracted.

Two main problems are associated with these fossils and their method of preservation centred around trying to recognise what is being looked at and also at how to extract the fossil from the matrix. All the usual physical means of extraction have to be ignored because of the size of the fossil and chemical means would result in the fossil being dissolved. The only method so far found to work has been literally to destroy the fossil by slicing the nodule up into 30 micron thick slices and digitally photographing each slice which may number between 300 and 400.

Each slice gives a 2D image of the organism which generally show up structures that maybe hairs, limbs or other structures and even a peculiar way in which the organism is positioned. Putting each 2D slice onto a computer allows a 3D representation of the fossil organism to be created. When complete on the computer screen the fossil organism finally takes shape showing its various morphological and anatomical features. On screen the image can be manipulated, rotated, dissected and coloured to show its various body parts, morphology and how the organism may have moved. Following on from the computer image the digital data may be fed into a scintering machine to produce a 3D resin model of the fossil.

Acaenoplax

The fossils preserved in these nodules are representative of the communities of the time. Although there is a lack of organisms such as jelly fish and nematodes the abundance of these fossils show that at the time soft bodied faunas formed a much greater part of the community than did the larger more hard bodied forms.



Offacolus

Throughout the lecture professor Siviter illustrated his examples with a number of slides and moving computer generated images of the fossil organisms encountered in the volcanic nodules. These accompanied a very enlightening and interesting talk into fossil ecosystems not often encountered and of which little is usually known from the rock record.

Andy Harrison

SATURDAY 12 APRIL 2003 Field Trip 'Coastal Geomorphology from Aberystwyth to Borth' led by Andrew Rochelle

It was a glorious day; fine and sunny with little wind, even along the cliff path. About twelve of us arrived at Aberystwyth train station at 11.22 and headed off for our first destination at the museum, which contains a small geology gallery. Having reminded ourselves of what could be found we set off in earnest, along the promenade (northwards) and up Constitution Hill. Already some of the stunning greywacke strata (early Silurian Llandovery Series) were visible on the seashore. For the most part the strike was parallel to the coastal path, and dipping gently inland at about 20 to 30 degrees, but there were some dramatic folds as well.

From the top of the hill fine views were had beyond Aberystwyth of the stepped raised beaches resulting from recent glacial induced sea level changes. All the way along flat wave cut platforms were revealed by the low tide. We arrived at Clarach Bay, a wide beach showing beautiful storm-formed cusp patterns in the shingle. It was quite a wide valley and obviously not formed by the rather small stream flowing through it – the Afon Stewi. It was glacial valley. We climbed up the other side where once again the vertical cliff displayed turbidite bedding. We had lunch on top, sat on soft cushions of fescue grass while the sun continued to shine.

In the distance could be seen a peculiar shingle bank heading straight out to sea. Called the Sarn Cynfelyn at Wallog, it looked like a natural spit except that closer examination showed it to jut

straight out with no preliminary sweeps or curves. Was it man made perhaps? Some of the party suggested it could be a well preserved glacial river bed but there was no chance to go down and examine it more closely.

Continuing on towards Borth, the greywackes were overlain by glacial deposits which contained some massive boulders of quartz, ripped from the underlying bedrock further inland – perhaps from Cwm Rheidol or Devil's Bridge area. As the sea erodes the cliff these boulders crash down onto the beach below, where several areas of these boulders could be seen. At various locations along the path whole sections of this softer deposit have slumped, with cracks and rifts in the ground visible near the edge – very dangerous! We all moved a few yards inland!

Behind the four mile long sandy beach of Borth there is a large peat bog stretching across to the Dyfi estuary. Called the Cors Fochno it contains many rare fauna and flora and is designated a SSSI of international importance, being one of only two such examples in Europe. The tide was in by now so we couldn't explore the possibilities of further submerged features such as ancient forests in Borth Bay. We had time for some tea before we left on the 17.46 train. A great day!

Ananda Shamo

Editor's Note: Andrew Rochelle would like to thank all who attended for making it such a successful and enjoyable day.

CONSERVATION COLUMN

Wrens Nest Update

The first stage of works to investigate the northern gallery of the Seven Sisters mine complex at Wrens Nest begins in May. If this cavern, which has been blocked from surface access since the 1960's is found to be in a suitable and stable condition it will be opened to create an alternative bat roost at the site as the deeper levels of the mine must now be infilled.

Design works to find the best solution to secure the main entrances (which are such an important part of the heritage of the site) is advancing rapidly with a very productive exchange of ideas between council, consultants and contractors with the involvement of English Nature, English Heritage and local people. Various meetings have occurred that have been looking into both the public safety and the future access to and interpretation of the heritage features. There is a real opportunity here to make this feature more accessible than ever before, and I am very happy to report that all parties are working towards this ambition even though we are breaking new ground and creating new levels of engineering complexity in the designs.

WORKING PARTY UPDATE

We expect that excavated materials from this first stage of works will be available for picking over to collect a comprehensive suite of specimens for the museum in June or July. As previously reported, when it becomes clearer in the negotiations exactly when this will be and what the rules are to permit this, I will call for a working party of BCGS members to help so that we are able to maximise the benefits from this work. I expect this to be announced in the June edition of this newsletter.

Dudley Museum Update

The architects draft plans for the redevelopment of the museum to bring this building up to the modern standards expected and demanded for a public access building have now been received. Quite apart from the obligatory installation of a lift shaft and other basic facilities such as better lighting and seating/café area, are plans to dramatically expand the geological galleries.

In the current scheme this would install geological displays on the whole of the top floor of the museum with the addition of a mezzanine floor level above this to further increase the public display area for earth science. I will provide much more information about these new plans in the next newsletter. Please feel free to get in contact with me about this if you have any ideas or opinions about what you think should be on display in the refitted geological suite of galleries. I would like the new galleries to be the best yet seen in the museum for geology and I believe that the more minds working on this and pouring ideas into the melting pot, the better the end result will be.

ROCK SURGERIES; I have decided that I need to formalise the 'call, drop-in and have your rock , mineral or fossil identified' sessions at the museum as the growing popularity, but increasingly random nature and expectations of expediency for this aspect of the museum geological service requires management. As such I have scheduled a series of dates based on at least one morning per month for this service. On the dates and during the times shown below, you will find myself and/or some of my volunteers and helpers working in the geology gallery on the top floor of the museum and ready to rise to the challenge of what the public may bring in! so if you have any stuff that you would like identified then make a note of the dates and times and come along and join us.

Saturday June 28th 10.00 am to 12.00 noon
Thursday July 24th 11.00am to 1.00pm
Saturday August 16th 10.00 am to 12.00 noon
Thursday September 18th 11.00am to 1.00pm

I will add more dates to the schedule for the autumn and winter period as school term and holiday dates dictate.

DUDLEY NATURE RESERVES RECEIVE AWARD Kevin Clements, Dudley's environmental manager, writes; At the Royal Show on 2nd July, Kevin Clements (Environmental Management Officer) and Jonathan Preston (Saltwells Senior Warden) accepted a SSSI Award for the management of Wren's Nest, Fens Pools, Brewin's Canal Cutting and Doulton's Claypit Sites of Special Scientific Interest.

Sir Don Curry (Chairman of the Food and Farming Commission) presented the English Nature-sponsored award, now in its sixth year, to 14 winners across three categories:

- People and Wildlife - enabling people to enjoy access to the crown jewels of our wildlife sites
- Contribution to Biodiversity Action Plan targets
- River, pond or lake SSSI

Sir Martin Doughty (Chair of English Nature) said: "*The Government requires that 95 per cent of Sites of Special Scientific Interest must be judged to be in favourable condition by 2010. Today's award winners show how this can be done in partnership with English Nature. We celebrate their success and hope it inspires other owners and occupiers and managers to manage their valuable wildlife sites with care to enable us all to once again enjoy an England teeming with wildlife and geological features*"

Wren's Nest is a classic geological site of exceptional importance, being one of the most notable geological locations in the British Isles. It is famous globally for the large numbers of beautifully preserved Silurian fossils that the site has yielded, collections of which can be found in museums throughout the world.

Fens Pools support an internationally important population of Great Crested Newts, in recognition of which part of the site has been forwarded to the European Commission as a Candidate Special Area of Conservation – the highest designation for any nature conservation site within Dudley.

Brewin's Canal Cutting and Doulton's Claypit, both within Saltwells nature reserve, are also geological SSSIs. The cutting contains one of the best exposures of the boundary between Upper

Silurian and Coal Measures rocks, whilst the claypit shows the best exposure of another part of the Coal Measures in the Midlands.

All four sites played an important part in the very development of the Black Country. Up to 20,000 tons of limestone were removed annually from Wren's Nest during the height of the Industrial Revolution, to act as a flux in the many local blast furnaces; Fens Pools and Doulton's Claypit were created as a result of clay extraction; and Brewin's Canal Cutting was excavated when a former tunnel on the Dudley No.2 Canal was widened in the 1850s.

The Award is a credit to the staff and volunteers involved in managing these sites and an acknowledgment of the seriousness with which the Authority regards the management of its nature conservation resource.

Kevin Clements
Environmental Management Officer

Until next time……Graham W

OTHER NEWS

NEXT COMMITTEE MEETING to be held on Monday 2 June 2003

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