The Black Country Geological Society

NEWSLETTER No. 146
April 2001

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 in the Banquet Room (Dudley Suite) at the Ward Arms Hotel, Birmingham Road. Phone (01384) 458070. 7:30 p.m. for 8 o'clock start.

THURSDAY 5th APRIL 2001 'The Trilobites and their relatives': an international symposium.
BCGS members are welcome to attend this event which will involve a fossil hunt at Wrens Nest, a visit to the Black Country Museum and caverns, and socialising. For details phone Graham on 013384 815 574 but very few places now remain and advance booking is essential.

SATURDAY 14th APRIL 2001 An introduction to Hay Head and Barr Beacon. Visit postponed because of foot and mouth infection.

MONDAY 23rd APRIL 2001 An evening of Short Talks by society members including 'The Power of Ice' by Andrew Rochelle.

MONDAY MAY 21st. 2001 "The Geology of Eastern Europe" Dr Jan Zalasiewicz, Department of Geology, University of Leicester
The lecture will tell of the current state of geology in Eastern Europe illustrated by snapshots of geological activities in Poland. In communist times many geologists were employed in both academic and applied fields. Many lost their jobs as a result of the transfer to democracy. The rest form a thriving community with greater links with western geologists. Now much work is required in assessing and cleaning the environment damaged by smokestack industries, particularly in the industrial corridor in the SW, bordering the Czech Republic and in former East Germany. Also there is more understanding of the problems in Polish geology, helped by international co-operation and access to modern analytical equipment. In the communist years a 1km borehole was drilled through high grade igneous/metamorphic rocks as well as sedimentary examples of extraordinary and delicate sedimentary/tectonic structures, relics of a Variscan accretionary prism in the Sudetan Mts.

SATURDAY 23rd JUNE 2001 A walk through time: an overview of the Malverns. Leader Dr Mike Bell (Cheltenham and Gloucester College of Higher Education.)
The field meeting will visit localities between Gullet Quarry and Herefordshire Beacon, to study the Late Precambrian Volcanic and metamorphic rocks, and to

consider the deformation which produced the Malvern Hills. Some fossils, igneous and metamorphic rocks will be seen. Meet at 10.00 am. at Gullet Quarry, Grid reference SO 762 381. About a 5 km walk along a path. with some rough and steep sections. Field meeting should finish at approximately 4 p.m. Hard hats are required for this meeting. MEMBERS MUST PROVIDE THEIR OWN. Boots/stout shoes and waterproofs are required. Lunch can be either a packed lunch or we can be at a pub. No hammers are allowed.

SUNDAY 8th JULY 2001 Creswell Crags. Nottingham. There is geological, archaeological, flora and fauna interest at this site. The Trust who runs the site is holding an Open Day. The leader will be the East Midlands Geological Society's magnesium limestone expert. This year the EMGS has offered to lead trips to interpret the geology in the gorge and we will do a specific one for the BCGS. The leader will be Dr. Peter Gutteridge. We will also have a display interpreting the geology of the area with thin sections and seismic profiles. The event is part of the Creswell Crags Heritage Centre's Roadshow day when, if it is like last year, there will be Archaeological and Geological experts on hand to identify items the public bring along.

The site is of great importance pertaining to early man and ice age fauna and we have encouraged the trust to arrange trips in to some of the caves to explain this and hopefully explain some of the finds that are in the site museum. If the Trust is able to arrange what we have suggested, torches and hard hats will be necessary. Hammering is NOT allowed!
A packed lunch is suggested. There is parking on site and there are no charges for any aspect of the day. (Alan Filmer will confirm the details when he has confirmed them with the Trust.)

SUNDAY 9th SEPTEMBER 2001 Ice,Water,Frost: the influence of the Ice Age on the landscape of East Shropshire. Leader: Andrew Rochelle. Meet at 10.00 am at the Canal Warehouse car park, Newport (GR SJ 744 194)
The local landscape received its last great influences from ice, meltwater and frost. East Shropshire and West Staffordshire exhibit classic sites and these will be studied using maps and field visits. See local erratic boulders, Gnosall glacial overflow channel, kame and eskers, and the glacial lake at Aqualate Park. Bring Ordnance survey map Sheet 127, and be prepared for wet and muddy conditions.

From September it is proposed that lecture meetings should be held at Dudley Museum. More details should be in the next newsletter.

SATURDAY & SUNDAY 22nd & 23nd SEPTEMBER 2001 - Dudley Rock and Fossil Fair

MONDAY 24th SEPTEMBER 2001 Lecture: The disposal of carbon dioxide in spent oil wells - an ongoing experiment jointly funded by the USA, Canada and Europe. Dr Christopher Rochelle, British Geological Survey.

MONDAY 29th OCTOBER 2001 Lecture: "Enigmatic Fossils of the Burgess Shales" by Dr Duncan Friend of Rockwatch.

MONDAY NOVEMBER 26th 2001 Lecture: Petroleum Geology - a personal perspective from Trinidad, Libya, Iran, the North Sea and Wytch Farm, Dorset. Gordon Hillier.

An apology
The last newsletter contained a report of the lecture given by Professor Hallam on mass extinctions. Professor Hallam had kindly sent a résumé of his lecture which I used for the newsletter and I acknowledged this in the material which I sent off on disc for its final formatting and only added a couple of lines of additional material under my own name. Unfortunately, after I had sent the article off, Professor Hallam's name was removed and the whole report was included as though I had written it. I am embarrassed by this and do apologise. (As editor I am responsible for the errors but in order to speed things up I don't see the final print copy and not all the errors that remain are directly attributable to me.)

REPORTS

Fantastic Family Fossil Fun Day at Dudley Museum with Rockwatch Saturday 27th January 2001

This was a wonderful and very busy day at Dudley Museum. Over 650 people came through the doors between 10 am and 4.00 pm. The events and activities included something for the very young as well as the older children families and adults. These included a junior story telling session about 'Terry the Trilobite and his friends' in the Silurian Seas, remote controlled Dudley Bugs, mineral testing, geology quizzes including the supermarket trolley challenge, dinosaur bits handling, a do-it-yourself geological time chart, build your own dinosaur garden and much more. Everyone seemed to enjoy the day and those helping and the museum staff received many
compliments and happy comments. The society's stand promoted our heritage and showed examples of polished building stones.

As an observer, there were visitors of widely varying backgrounds in attendance and all sorts of rocks and fossils were brought in for identification including an almost complete mososaur skeleton and some large fossil fish. All-in-all it was a wonderful and rewarding day. Many thanks to all who helped out and joined in the fun. Special thanks to Rockwatch for their materials, enthusiasm and for providing lunch for the team.

Please see the excellent reviews of this exhibition sent to us by two nine year old pupils of Hurst Hill Primary School. Thank you, Jade and Abbie!

A much bigger discovery/activity room is now being planned for the Rock & Fossil Fair in September with even more to see and do.
Little Geophysics

Monday 29th January 2001. Lecture: 'Little Geophysics –looking in the top 100 metres' by Dr. Ian Hill, University of Leicester.

What exactly is Geophysics?. Dr. Hill supplied the following definition: "The study of the Earth by making quantitative measurements of physical fields at the surface".

On this basis it includes not only geology but meteorology and oceanography as well, and Dr Hill pointed out that all these disciplines use more or less the same methodology and techniques of measurement. They all involve measurements of temperature, fluid flow etc. but in greatly differing levels of accuracy and in time scale. On the geological side, the main activity of geophysics is in exploration for hydrocarbons (oil and gas) which although relatively near the surface may involve going down several kilometres.

But Dr Hill's main interest - and the subject of his lecture - is in conditions near the surface, in the 'top 100 metres' as in the title of his lecture. The main geophysics activity in this top layer covers a surprisingly wide range of topics and Dr Hill listed a few:

ENVIRONMENT	INDUSTRIAL	ARCHAEOLOGY
Subsidence	Foundation studies	Land&marine
Derelict land	Mine planning	
Landfill monitoring	Structural integrity of bridges, roads etc.	

In his view, "Geophysics' time has come" due to the improved technology which gives measurements much more accurate than was possible even a few years ago. Near-surface geophysicists make use of many techniques including Seismics, Airborne Surveys, Hydro-geology, MRI (magnetic resonance imaging) Gravity measurements and Surveys of the Earth's magnetic field.

Dr Hill then gave some practical examples of his own work in this field.

A GYPSUM MINE which started on land near the seacoast but then extended out under the sea. Would the sea water percolate into the mine or would the (hopefully) impervious beds keep the water out? A seismic survey working in reverse (i.e. upwards from the roof of the mine towards the seabed) gave an indication of the types of strata above the miners' heads.

The FIESTA project, an airborne survey looking at mineral resources across Central England, taking measurements of magnetic field, electric field and nuclear radiation. The survey of 14000 sq. km. was completed in only 2 or 3 weeks. This type of survey is also useful in surveying large areas of derelict land.

HYDROGEOLOGY techniques can measure the height of the water table, and indicate the percentage porosity of an aquifer, by ground-penetrating radar and other means. Seismic techniques can detect whether an aquifer has water in its pore-space or is dry.
DERELICT LAND can be checked for voids due to mining or subsidence, using extremely accurate gravity measurements.

ARCHAEOLOGICAL investigations using electrical resistance and/or magnetic field data, coupled with GPS (global position satellite) information showing the sensor position to within a few metres, are familiar due to their use in the 'Time Team' TV programme, but Dr Hill said there were now much more sophisticated instruments available giving even better results.

LEICESTER UNIVERSITY TEST SITE is used to test new types of sensor and new investigation methods. It measures 70 X 40 metres and they have buried in the site various objects at different depths, such as metal drums in various attitudes, some empty and others filled with sand etc. which the sensors have to locate. The test site is also used as a demonstration area to show possible clients Leicester's investigation capability.

Dr Hill also described the American UXO (unexploded ordinance) programme which surveys disused military training ranges in the USA for unexploded bombs, land-mines etc. so that the land can be reused. This is a sophisticated and money-no-object programme, and uses specially-built trolleys entirely made of plastic (to avoid interference with the magnetic field measurements) carrying sensors and a GPS tracking system. It shows what is possible where there are no financial limitations (SIGH !*).*

Summing up, Dr Hill said that the use of 'Little Geophysics' is growing rapidly. The available higher technology is giving faster and better results at lower cost, and because it is being more widely used this is leading to ever more application areas.

This lecture was of great interest to the large audience present, particularly as it touched on an area of geology not often appreciated by the generality of practising geologists. Our thanks to Dr Hill for an enthralling lecture.

Paul Shilston.

Wednesday 21st February 2001 Rockwatch day at Walsall Town Hall.

The Rockwatch was brilliant! We made plaster of Paris fossils which were really fun to make. There were radio controlled trilobites which were super to drive and a geological quiz that was absolutely fascinating. Andrew Jennings (Aged nine)

Quaternary Topics

Monday 26th February "Quaternary Topics" by Dr D. H. Keen. Department of Geography. University of Coventry.

Dr Keen returned to the Society, this time to give us a talk on areas nearer to home i.e. The Channel coast and Channel Isles. (His last lecture to us was on China.)
The first section of his talk concerned evidence of former raised sea levels. He showed us a smooth platform at approximately 60 metres above sea level stretching for twenty five kilometres at the western tip of Guernsey. Are these high platforms marine in origin? They

lack the shelly sands or fossils which would provide irrefutable evidence. Seawards of the 60 metre platforms is often an old cliff line. Other smoothed platforms at this height can be found on the Cotentin Peninsula, in Pembroke and in Cornwall. Further smoothed platforms are in evidence just above High Tide Level and also at modern mean sea level.
Sometimes there is evidence of deposition on raised beaches including fossil evidence. Too often the acid substrate precludes the preservation of fossils and the loosely consolidated material is readily eroded. Boxgrove in Sussex, site of the earliest evidence of human habitation in Britain, is well excavated and shows clear evidence of raised beaches to 40 metres but mostly at 30 metres OD. The flint material is well rounded and flakes from hand axes date from half a million years ago. South Hill on St Hellier exhibits a raised beach. At Hope's Nose, near Torbay, oysterbeds contain oysters much larger than those of today. The Channel Islands have raised beaches with a big height range within one unit. Material found on raised beaches ranges from rounded boulders to blown sand. Not all are on hard rock. Some overlie head. Some have periglacial deposits overlying them. Jersey shows cemented raised beach material sticking through today's beach material.
The raised beach at Selsey has erratics of porphyritic granite. In the nineteenth century all modern Sussex storm beaches were removed by storms. The erratics have to be of glacial origin. How did they reach here?
How did the beaches and platforms become raised? Current theories favour the isostatic raising of these coastal areas in response to erosion. Rates of 7 mm per thousand years have been suggested. Sea levels must also have fluctuated, falling with glacial and rising with interglacial episodes.
How can the raised beaches be dated? Are the highest the oldest? The Channel Islands are in an area of very high tidal range which precludes a simple correlation of age with height. Carbonate shell deposits can be dated by amino-acid dating. The process is species dependent and temperature controlled so interpreting the results is complex. The cement of beach material can be subjected to uranium series dating. Tor Bay, by this latter method, has beaches dated at 300,000, 200.000 and 120,000 B.P.
The granite and metamorphic erratics can be regarded as products from the Irish Sea Ice, which calved and, floating up the Channel, were dropped on the coast, but sea level in glacial times was expected to be lower than today so the mechanism remains a puzzle.
What research remains to be done? Results from the British side of the channel need to be compared with those from France. Many more dates are needed from beach material, using amino-acid and uranium techniques. Glacial erratics should be sought down the sea slope.
Questioning focused on the extent of the ice sheets and the dating of the formation of the English Channel. There is much evidence that the Channel was in existence during the last interglacial.
Kate Ashcroft.

Celebrity lecture at Dudley Museum

Celebrity lecture at Dudley Museum Professor Richard Fortey. (Not a BCGS event)

A large audience was assembled for this lecture.
Professor Fortey began with a brief introduction to trilobite anatomy. The horse shoe crab is its nearest living relative. The ontogeny is well known as earlier growth stages are fossilised from moult stages.
The lecture concentrated on the interpretation of modes of life of fossil forms from three lines of argument:
namely design, analogy and geology.
Each lens of the trilobite eye consists of a single calcite crystal with its optical axis normal to the surface. Hence the field of view of each trilobite can be readily established. Opipeuter, which has eyes occupying the entire lateral lobe, had 360 degree vision, seeing to the side, below it and in front, and is therefore interpreted as being a free swimmer. The eye hung down below the rest of the thorax.
Trilobites with big long eyes tucked into the side of the head with a long head and dogfish type profile can be interpreted as fast swimming predators. (Models are made and floated in a tank as water is made to flow past so the drag on the animal can be calculated.)
Very accurate measurements of the eye parameters enable calculations of the depths to which individual trilobites lived.

Geological evidence suggests that the surface living trilobites extended to all sea areas within 30 degrees of the equator but in colder water trilobites with eyes lived to the edge of the photic zone and the blind ones even deeper.
Feeding habits can be interpreted from features of the hypostome and the manner of its attachment. Where the hypostome curves inside the head cavity a trilobite might have rested on its genal spine and whipped up the mud, being a suspension feeder.
It was postulated that trilobites with the hypostome detached from the doublure and on a flexible membrane may have used the hypostome as a scoop and been particle feeders. Such groups live communally and are usually small and leave tractor trails in the mud.
Some trilobites adapted to peculiar modes of life. The rocks in which some live exude hydrogen sulphide and these fossils come from a low oxygen environment. Their many segmented bodies would hide many gill branches. By analogy with modern creatures who live around black smokers we can surmise that they lived symbiotically with sulphur bacteria in an anaerobic environment. The vast area inside the gills would allow space for the bacteria. Thus, by example, we were shown how morphology, geology and analogy can be used to interpret the mode of life of an extinct species.
Professor Fortey signed books for us.

The museum, meanwhile, housed a temporary exhibition of spectacular trilobites. I had no idea that there was such a variety of lifeforms among the group and the exhibition was beautifully laid out and well described. I'm sorry that we could not give members advance notice of this exhibition which has now closed.
Kate Ashcroft.

EDITORIAL

For the last few months I've been playing with the Internet connection on my computer and am amazed at what can be achieved. I know those of you who work with the things already take this for granted but I do wish I'd made use of the facilities when I was working. Trouble was, I didn't then have the time to learn how! The amount of geological information which can be readily obtained is fantastic. We put in our holiday destination and the word rocks and out came page after page of geology in a choice of languages together with far more geological maps than I can afford to print. This morning the items that Graham and Sarah supplied for this newsletter streamed off the machine in seconds by e-mail including photographs of the Brewin's bridge outcrop before and after the Conservation work. (I'm not sure that the latter will photocopy well enough for you.) With a click of a switch, the material was incorporated into the newsletter. Graham Hickman e-mailed from America saying he believes he could help with the Society's web site.

CONSERVATION COLUMN

Clean up of Rock Faces at Brewins Bridge Canal Section. Saltwells by English Nature's Facelift Programme

This classic canalside geological section had become very overgrown with many large bushes and recent birch trees etc. to the extent that visiting field parties, schools and colleges were unable to see and study the features in the rockfaces. Much of the open rock was thickly covered with moss due to the prolonged wet conditions of last year.

English Nature offered financial support to enable BCGS with other organisations (Support in kind from British Waterways Board, voluntary help from the Dudley Canal Trust and Dudley Cave Rescue Team and paid professional chainsaw work) to carry out the heavy clearance works needed. We accepted the generous offer and organised a working patty to carry out the work.

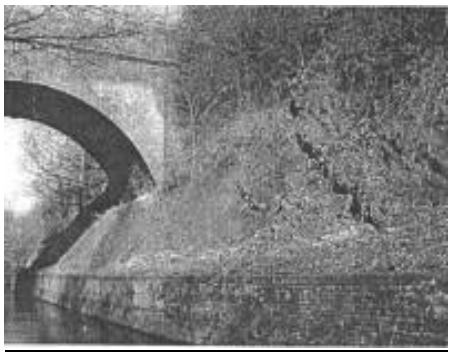
During the weekend of the 3rd and 4th of March a small group of hardy volunteers braved the freezing but sunny conditions at the canal at Brewin's bridge, Netherton. We worked alongside two paid chainsaw professionals. The Canal Trust supplied three narrowboats for

the work and the English Nature funding paid for fuel, the chainsaw professionals time, 2 skips at Park Head Locks and the hire of a small machine to load the debris into them, some hand tools (that we can use on future work) and insurance. The works consisted of,

- **Cutting back a large amount of heavy vegetation**
- **Removal of rubbish, soil and fallen vegetation by boat to skips at Park Head**
- **Wire-brushing rock faces to remove moss lichen etc.**
- **Recording the works in progress**

The group cleared all the important features, restoring them to a former glory and usefulness that the sections haven't enjoyed since our last working patty in 1991. Our thanks go to all of the 15 souls who gave up their weekend to help us to do some good. Further thanks, of course, go to English Nature, without whom this project would have taken much longer to arrange and would have undoubtedly been on a much smaller scale. (Particular thanks to Kate Jeffries at English Nature's Taunton outpost for her enthusiasm and drive). Major thanks are also due to Dudley Canal Trust whose practical skills and abilities ensured success to the scheme.

This was a superb project to be involved in and has given us back a prime Earth-Science site that was becoming unusable. All involved can feel very proud of their achievements.


Cutting after the work (March 2001)

UKRigs Development Strategy Released

We have received the final copy of the UKRigs Development Strategy from the executive committee. This sets out the forward intentions of the assembly of Rigs Groups across the UK. If you are interested in seeing a copy, one will be on the table at the rear of the room during indoor meetings and will also be available for inspection at the museum.

New Wrens Nest Leaflet for Spring 2001

15,000 copies of the new Wrens Nest leaflet have now been received by Dudley MBC from the printers. Almost all of the 20,000 print run of the last edition of the Wrens Nest glossy leaflet have now been given away. In response to this fact and the fact that some changes to access at the site and human contacts for the site has occurred since its production in the mid 1990's, English Nature and Dudley Council have joined their financial resources in order to update and reprint it Corrections have been agreed and a new version is in production. This should be available in the spring 2001. We are also taking advantage of new technology so that versions of the leaflet can be downloaded from the Dudley mbc website (and hopefully the BCGS website as well). This should mean that future amendments should be virtually immediate (to the electronic version anyway!) and that we need never run out again! Keep your eye on these sites.
A copy will be provided in next months newsletter subject to final approval from the council and English Nature.

Changes at Wrens Nest NNR in response to Rock fall

On the night of 8th March 2001, prolonged freezing conditions rapidly changed to temperatures of around plus 14~ Celsius accompanied by heavy rain. These circumstances were probably the cause of an overnight slip on the uppermost rippled bed at trail marker 5. This fall is in the immediate area of rippled beds that had been previously undermined at the base of the slope by collectors extracting fossils directly from the rock faces with hammers. This had resulted last year in unstable and dangerous conditions in part of the fossil trench that had to be fenced off. Action was taken immediately to avoid the likelihood of anyone attempting to enter the fenced area to get at the fallen limestone. A machine was brought on to the site on the morning of 11th March 2001 and the fallen material was removed. In many ways this is a tragedy as one of the best loved features of the reserve has been considerably damaged by the fall and the irresponsible actions of the individual collectors whose hammering precipitated this event. However, I took the opportunity to use the machine to churn over the scree in the base of the fossil trench in order to re-vitalise the collecting potential of this area of the reserve. We will also be carefully looking over the fallen material that has been removed from the rockfall, to put the best material released by the fall into the heritage collections at Dudley Museum. Every cloud has a silver lining.

Update on the The Black Country Geological Society Collection

A considerable amount of rock and fossil material has been given to Dudley museum by members of the society during February and March 2001. This is now being sorted through to determine which pieces are of sufficient quality and have sufficient information associated with them to formally accept into the I3CGS Collection of the Dudley Geological Collections. The material which doesn't make the grade will be used for teaching purposes and given to schools. Many thanks and keep bringing in well documented samples to help to make the BCGS one of the finest collections that we have.

Dudley Museum website

At the publication date of this newsletter, Dudley museum will have launched its new website (www.dudlev.gov/dudlevmuseum). Check it out.

Until next time Graham W

NEWS IN BRIEF

1 Welcome to New Members

Andrew Harrison - Wolverhampton
Liz Devonish - Suckley, Worcester
Bill Bagley - Llanidloes, Powys
Phil Hough - Birmingham
Alex Dent - Essex

2. The University of Bristol Public Relations Office have sent us leaflets on the following field courses:

Geology in the Lizard Peninsula 4 to 6 May 2001 - Leader Peter G Hardy
The Geology and Scenery of Arran 16 - 22 June 2001 - Leader Peter G Hardy
Rocks and Fossils of the Welsh Borderland, South Shropshire 9/10 June 2001 - Tutor Tom Barklem
Ancient Rome 8 - 15 September 2001 - Leader Tom Barklem
Pompeii and Herculaneum 18 - 25 May 2001 - Leader Tom Barklem

Leaflets will be available at meetings but further details can be obtained from Sandra Powell, Public Relations Office on 0117 9287 155.

Editor:
K. M. Ashcroft

Hon.Secretary:
Dr Sarah Worton