NEWSLETTER No. 177
JUNE 2006

The Black Country Geological Society

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.

In this edition:

Copy date for August Newsletter is **Monday 7th August 2006**
(see 'Contact Us' – page 10)

Dudley Rock and Fossil Festival 2006

Your Society Needs You!

Are you available over the weekend of 16th and 17th September 2006? Can you spare some time to join with other society members to help make this year's event the best yet? Yes? Please read on……..

Fair Volunteers

As in previous years the Black Country Geological Society is sponsoring the Rock and Fossil Festival, and as part of our sponsorship the society provides volunteers to act as stewards and cashiers for the event. Three cashiers take money on the door, and the other people act as stewards distributing programmes and helping people find their way around. We need approximately seven people 'on duty' at any one time which includes enough to allow breaks for everyone. No one is left on their own and it's a real team effort; a great way of getting to know other members. Once we know who is available to help we'll organise a get together to go through the details of who does what.

We usually organise the volunteer rota so that people help out for half day stints – in the past this has been from 10.00am to 13.30pm or from 13.30pm to 17.00pm, although we'll need to confirm the opening hours for the festival over the next month or two. Please can you complete the form below and return to me asap, indicating which sessions you can help with, and whether you have a preference for being a cashier or steward? If you are only available for part of a session please put your name forward anyway, indicating when you could help out.

BCGS Stand

As well as volunteers for the above, we're also looking for members who'd like to help man the Society's stand at the event. Basically we'd like members who can talk to the public about what the society does, take details of prospective new members and help to sell specimens or any other items donated by members for the event to raise funds for the society. Which brings me onto the last request…….

Request for Specimens etc

Do you have any rock or mineral specimens kicking about at home that we could sell to raise some money for the society? Ideally we'd like to know where the specimen is from and what it is as it's nice to pass the information onto the new owner. However, don't worry if you don't know, we'll have enough geologists at the fair to identify things if we need to!!! In some cases you may also wish to put a minimum sale price against the item. As well as specimens we're also looking for any other unwanted items with a geological theme such as books or maps that you don't need anymore. Again, if you have a minimum price please tell us or we will sell the item based on similar things we see on stalls at the fair. If you have any items for sale, please bring them along to the festival on Saturday morning. If you have any queries on this or any of the above please call Sarah Worton, on 01384 235946.

All volunteers get free admission to the festival, and drinks on the day.

Name(s)

Contact phone number

I/we can help as a volunteer(s) on (pls circle): SAT am; SAT pm; SUN am; SUN pm

Do you have a preference to be a cashier or steward?

I/we can help man the BCGS stand on: SAT am; SAT pm; SUN am; SUN pm

Please return to Sarah Worton, Secretary (see address in 'Contact Us')

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 25TH JUNE 2006 *(Field visit)*

Leader: Mike Williams COACH TRIP TO BIG PIT, BLAENAVON.

Big Pit stands on the eastern rim of the South Wales Coalfield, where coal outcrops on the hillsides. Iron Ore and limestone were also found here so it was natural for an ironworks to be founded at Blaenavon. The Ironworks were established in 1789 and the remains are now open for visitors and Blaenavon has been declared a World Heritage Site. It is now part of the National Mining Museum of Wales.

There are still plenty of spaces left on this trip, so if you would like to join us please contact Mike Williams on **01902 822505**

FRIDAY - SATURDAY 1ST – 2ND SEPTEMBER 2006

WREN'S NEST CONFERENCE

This conference is being held at Dudley College (Mons Hill Campus) and will be considering ***Community Conservation and Celebration.*** If you are interested in attending this important occasion please indicate your interest to Graham Worton at Dudley Museum & Art Gallery, or Alan Cutler on 01384 443644.

SATURDAY – SUNDAY 16TH – 17TH SEPTEMBER 2006

DUDLEY ROCK & FOSSIL FESTIVAL 2006

This will be held in Dudley Museum & Art Gallery and Dudley Concert Hall from 10am – 5pm on the Saturday and 10am – 4pm on the Sunday. The many exhibitors will be mounting superb displays of fossils, crystals, gemstones and equipment. There will lots of other things going on, particularly for children, and, as usual, our society will have a stall which will require members, so please try to keep this weekend free. See www.discoverdudley.org.uk/rockandfossil and see page 2.

WREN'S NEST NATIONAL NATURE RESERVE 50TH ANNIVERSARY

You can use the same website above, or pick up a leaflet at Dudley Museum & Art Gallery or libraries about this event. The actual day is on Wednesday 27th September, but you may be interested in the *Wren's Nest Conference* on September 1st and 2nd at Dudley College (Mons Hill Campus – see above), and *Rock and Fossil Festival Field Trips,* on the Wren's Nest on 23rd and 24th September. Most of these events require booking and some have a charge attached. The *Dudley Winter Ales Festival,* in Dudley Concert Hall is from 23rd to 25th November. This will feature a special brew: *Wren's Nest Trilobitter;* there is a joke there somewhere about most specimens being found legless!! See www.dudleycamra.org.uk

MONDAY 25TH SEPTEMBER 2006 *(Indoor meeting)*

Mike Fereday: (North Staffordshire Group of the Geologists' Association)

"The Geology of the Chaine de Puys, France."

MONDAY 30TH OCTOBER 2006 *(Indoor Meeting)*

Dr. Jacqui Malpas: "The Brymbo Fossil Forest."

This is the newly discovered Carboniferous fossil site. It is reputed to be the best in the U.K.

MONDAY 27TH NOVEMBER 2006 *(Indoor Meeting)*

Members Evening: There is plenty of time to think about your possible talk, demonstration and display. Gordon is confident that it will not snow this year!

MONDAY 29TH JANUARY 2007 *(Indoor Meeting)*

Neil Rushton: (Team Leader Engineering Advice Telford and Wrekin)

"Landslips in Telford."

Neil spoke to the Shropshire G.S. on 11th January 2006.

MONDAY 26Th FEBRUARY 2007 *(Indoor Meeting)*

Dr. Cynthia Burek: (University of Chester)

Dr. Burek will probably talk on *"Women in Geology"* Further details later.

EDITORIAL

In the late seventies or early eighties I attended a lecture by a geologist who worked for *NIREX,* the body responsible for finding a safe repository for nuclear waste. The idea was that it could be safely disposed of underground, in geologically stable rock which had suitable properties with regard to hydrology and potential gas pathways. Several promising sites were identified and the next stage in the procedure was to drill and carry out a detailed geological investigation. Local protests were intense, and NIREX were unable to proceed after some well publicised public enquiries. The press interpreted this as a victory for environmental groups, but no one really 'won'; nuclear waste remained in temporary storage, and at that time some low level material ended up in the sea.

In 2006 the *Committee on Radioactive Waste Management (CoRWM)* has advised that the best way to dispose of the UK's nuclear waste is at depths of between 0.3 and 2 kilometres in geological stable environments, indeed little has changed for the past 30 years. They have also said that only about a third of the UK would be geological suitable, without being more specific. With the decay time scales involved, and with rising sea levels associated with global warming, presumably lowland Britain would be unsuitable, as would all the aquifers, but there would be potential areas in some of the older rocks in the more highland parts of the country.

The problem is that there is 470,000 cubic metres of nuclear waste which is still temporarily stored at 34 locations waiting for a permanent solution. I calculate this volume would cover a football pitch to a depth of between 30 and 40 metres. But, unfortunately, we seem unable to detach this solution from a view about nuclear power generally. If you are in favour of the nuclear option you might see the establishment of a permanent disposal site as evidence for the safety of nuclear power stations, whereas if you believe that we should not expand this method of power production, you might see a permanent underground repository as the 'thin end of the wedge', and so to be resisted.

It seems vital that the solution of the present problem is completely detached from any planning for future power supplies, and that message can only come from central government. Hopefully we will not have to wait another 30 years for the problem to be resolved.

SOURCES: *New Scientist/6 May 2006.* *www.newscientist.com* *www.corwm.org* *www.foe.co.uk* *www.nirex.co.uk*

Bill Groves

MEETINGS REPORTS

MONDAY 27TH MARCH 2006 *(Indoor Meeting)*

**The Cretaceous/Tertiary (K/T) Boundary Event;
a talk given by Dr. Peter Floyd from the School of Earth Science and Geology at Keele University following the AGM 27th March 2006**

Dr. Floyd began by putting the K/T boundary event into context, explaining that mass extinctions are not uncommon in the geological record. There have been about 23 of them. The most severe, in the past, being the Permian/Trias (P/T) event 225 million years ago; (-Ma) years ago, when about 95% of all species disappeared. The P/T event coincided with the extensive vulcanism which produced the Siberian Traps. Huge amounts of CO_2 went into the atmosphere (sound familiar?) and the temperature rose by about 6^0C. Almost half this rise is accounted for by the atmospheric concentration of CO_2 rise and the other half may have been caused by the release of methane gas from methane hydrates present in the deep oceans (this release itself was due to the temperature rise).

The much more recent Cretaceous/Tertiary (K/T) event 65 -Ma has two competing theories to explain it: asteroid impact and vulcanism.

Asteroid impact:
Impacts have been happening for billions of years and continue to occur with gradually reducing frequency. Impact craters are found over the surfaces of many objects in our solar system. For example the moon has craters estimated to have been formed 4.4 billion years ago (-Ga). The southern hemisphere of Mars is very cratered and here on Earth we have the 1.2km diameter Meteor Crater in Arizona which is a mere 50,000 years old. This is one of about 135 impact sites identified on Earth.

An impact event has three components: compression, evacuation and modification.

Compression: the compression caused depends on the mass of the object. Larger objects can create megabar pressures and high enough temperatures to cause diamonds to form, and even relatively small impacts result in brecciated ground, glass spherules and shocked quartz. These results can provide evidence of impact when subsequent modification has obscured the crater.
Evacuation: refers to the ejection of debris which leaves the crater.
Modification: occurs after the event when for example the crater walls slump and/or material fills in the hole.

Having given us this background Dr. Floyd moved on to the K/T event itself. In 1980 (was it really that long ago?) in the journal Science, Alvarez et al reported an iridium anomaly. Iridium is a very rare metal similar to platinum that occurs in very low concentrations in continental crust on Earth. The Alvarez group found concentrations of iridium several orders of magnitude higher than normal, together with glass spherules and shocked quartz, in a very narrow clay band at the K/T boundary, in locations across Europe (Italy, Spain, France and Denmark). The glass spherules and shocked quartz provided evidence of impact and the iridium anomaly suggested a meteorite as the impacting object. More recently, oceanic and terrestrial sites, 65 million years old, were found for glass spherules. Then shocked quartz, which requires temperatures of 600^0 – 700^0C to form, was found on the Yucatan peninsula and in the nearby sea, and evidence was found for the Chicxulub crater, which had originally been about 100km across (nearly an order of magnitude bigger than Meteor Crater, Arizona). The Chicxulub crater was caused by impaction into limestone. Heating limestone releases CO_2. Thus the impact would have evacuated huge amounts of material more than 15km into the atmosphere and released large amounts of CO_2 from the limestone.

The sequence of events following impact is thought to have been: an initial fire-storm, then darkness due to the debris in the atmosphere, followed by cold because sulphur compounds thrown into the atmosphere reflect light causing cooling; then acid rain because sulphur dioxide is relatively quickly washed out of the air; and finally increased temperatures because the residual CO_2 causes greenhouse warming. This sequence of events would clearly be catastrophic for living organisms.

Recent research (e.g. Keller et al 2003) has cast some doubt on the impact theory because they found several spherule horizons and they contend that the iridium anomaly at Chicxulub is well below the K/T boundary; i.e. about 30,000 years earlier.

Vulcanism:
To create strong enough effects to cause the K/T event an enormous amount of vulcanism would have been required. The plume of ash, dust and gas would have to reach more than 15km high into the stratosphere and would have maximum effect on the earth's climate if the plume were injected in the equatorial region where the jet stream distributing it round the world is strongest. To give an idea of the scale required, Mount Pinatubo which erupted in the Philippines in 1991 had a 30km high plume which was distributed through the atmosphere by 1993 and caused a short-term cooling at the surface of about 0.5^0C.

Is there a candidate volcanic event that occurred 65mya? Yes: the Deccan Traps in India (die Treppe is German for step). These vast lava flows occurred episodically over about 10 million years so each identifiable lava flow forms a distinct step in the Deccan sequence. The most severe eruption occurred about 65 -Ma laying down basalt flows one to two kilometres thick. These flows were accompanied by an estimated 30,000 billion tonnes of CO_2, 6,000 billion tonnes of sulphur and 60 million tonnes of halogens: enough emissions to cause a 'nuclear winter' and extinguish many species. The mantle plume/hot spot, 200^0 – 300^0 C hotter than the surrounding mantle, which caused the Deccan Traps is currently under Reunion, an island in the Indian Ocean and the position of the Indian subcontinent 65 -Ma.

In conclusion it seems likely that 65mya there was a most unfortunate co-incidence of a huge impact and massive-scale vulcanism. These events led to a mass extinction of species, reptiles no longer ruled the planet and their disappearance allowed the mammals to evolve and occupy the empty niches. We of course are mammals and without the K/T extinction we might not have arisen.

Martin Normanton

MONDAY 24TH APRIL 2006 *(Indoor Meeting)*

CONVERSAZIONE

"Scientific Evolution or Creationism/Intelligent Design - are they Equivalent Theories?"

Chairman; Alf Cole.

This is the first time in the history of the Black Country Geological Society that we have had such a meeting. It is part of our efforts to offer our members additions to our usual programme of lectures and field meetings. The topic chosen for discussion is the focus of a great deal of interest in the press and other media generally.

Gordon Hensman, our Meetings Secretary, started the meeting with an outline of both theories and explained their relevance to education in this country. For example, in Sandwell, Dartmouth High is about to become a City Academy and the present governors are reported as being concerned that the teaching of both theories as equivalent would be part of the curriculum. In Middlesbrough there are already three City Academies, financed in part by the Reg Vardy second hand car business, where creationism is already taught.

Gordon then explained what he thought were the major differences between the two theories.
Creationism is a literal belief in the first chapter of Genesis in the Bible which states that God created the Cosmos in 6 days and rested on the 7th. Intelligent design developed out of creationism when it was realised by some that the mechanism of evolution - i.e. random mutations giving rise to the survival of the fittest (most well adapted), - had too much evidence to

dismiss. However, they felt that there was still a guiding hand of God, directing development and change in both individuals and species, in addition to natural selection.

Gordon pointed out that Darwinian Evolution did not prove or disprove the existence of a controlling force - God. The theory simply did not set out to do so. Many thinkers from Aristotle to the Chinese, and more recently Lamark in France with his notion of acquired characteristics had conceived the idea of the evolution of life from simpler forms to more complicated ones. However, it was Charles Darwin influenced very much by his grandfather Erasmus Darwin (member of the Lunar Society), who had produced the mechanism whereby evolution worked. His was a thoroughly scientific approach and the amount of data which has accumulated over the last 150 years or so is enormous and is not easy to dismiss. This is also true of the 3 main dating methods used in the science of geology. 1. Relative dating, 2. Relative Radiometric dating, 3. Carbon dating -- all solidly based on observable fact. They could not be dismissed out of hand as Creationists believe. In short Creationism/Intelligent Design are based on belief in a religious book- the Bible. Scientific Evolution was based on observable data and fact. Therefore the two theories were not equivalent.

The discussion which followed was notable for some valuable contributions from members. However, although attempts were made to steer the discussion back to the differences between the two theories and the approaches both used, it was difficult to keep away from the issue of the existence of God. Some speakers such as Councillor Rebirtha Hart-Davis and Barbara Russell affirmed their "unshakeable belief" in their special relationship with God, sidestepping the question under discussion. Some other speakers tried to rationalise religious belief in various ways such as the natural fear we have of dying leading to a reluctance to accept that we do not survive our physical bodies.

Other speakers, notably our Editor of the Newsletter Bill Groves, pointed out that geology was also full of uncertainties. The enormous gaps in the fossil record of the evolution of many species led to a lot of fanciful conjecture amongst geologists and they all depended on the belief in the existence of "natural laws" which operated all over the universe - we think!

A former Chairman and keeper of geology at Dudley Museum & Art Gallery, Graham Worton, said that although he had a religious conviction, he knew that it was a matter of faith, whereas scientific evolution contained many observable and repeatable facts which could not be ignored. Going out into the field and observing the evidence in a quantifiable accurate scientific way demonstrated the approach of geology, creationism depended on the acceptance of unverifiable ideas.

The meeting ended with a show of hands, indicating that the overwhelming majority would not accept that the theories were equivalent.

Gordon Hensman

FROM OUR MEMBERS

From Graham Hickman

The importance of knowing where you are - merits of a Hand Held GPS

Within the last few years Satellite Navigation systems have become very popular and fitted into our cars to help us navigate. These are all based on the GPS (global position system) which was developed and run by the US military. It is based on 24 orbiting satellites which transmit unique travel time radio signals that are received by the GPS receiver unit. Providing the receiver can 'see' at least three of these satellites, it is able to 'triangulate' the position and provide a precise location. The error in XY location is now only a few meters since the US government discontinued the signal degrading by added noise into the position calculations. Best of all the GPS signal is available world wide for free (thanks US tax payers!).

For geologists knowing where you are is especially important, how many times have you gone looking for that outcrop you visited 5 years ago and can't quite remember where it was? Or you get home with some rock specimens and can't figure out from your scribbled labels which location

they came from? With a hand held GPS you can get an accurate latitude, longitude, OS grid reference and elevation.

The GPS does not replace a map as the small screen is often difficult to zoom in and out of to identify other features, but it certainly compliments the map and adds interest. For instance, earlier this year I was on the southern coast of the Isle of Wight, near Atherfield Point. The GPS location for the beach plotted approximately 100m inland on the map I was using, giving an indication of the considerable amount of erosion which had occurred since the map had been published in 1980.

GPS technology is being applied to numerous applications beside the obvious needs in navigation and military tracking. I was given my first hand held GPS in 2001 and have found numerous uses for it. The one I have now comes with a map which can be uploaded from a PC and provides a moving map when driving in the car. It is also very useful for estimating an arrival time for the destination 'waypoint' I have entered as a 'Goto', providing you keep moving. Locations of interest can be saved and stored to the memory and downloaded to the PC when back home.

If you like electronic gadgets and maps you will love a hand held GPS. If I need to take a map anywhere I'll always take the GPS along as well.

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From Gordon Hensman

It is suggested that the Conversazione/Debate be held annually. We would be delighted if suggestions for topics could be submitted in the usual way to the Committee. Suggestions for speakers will also be welcome.

The death of our Andrew Rochelle our Field Meetings Secretary last January, has prompted thoughts that the Society might commemorate members who are no longer with us in some way. Any thoughts on this? Please let us know what you think.

What about a Letters page! Many of you must have a query about something in geology. If you are wary of showing your ignorance then use a nom de plume! And don't be afraid of disagreeing with the answers given – it is the stuff of science!

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From the Editorial Team

Gordon's suggestion for a letters page is a very good idea. There are plenty of issues in this Newsletter that request your input, and we will respect any member who does not wish their name to appear in print. Contact information appears at the end of this Newsletter.

NEW DISPLAY PANEL AT WREN'S NEST

This is the new explanation board that has been put up at the Wren's Nest National Nature Reserve. It is at the top of the long flight of steps, on the western side (GR: SO936921). As can be seen from the photograph, you are looking north-westward towards Upper Gornal and Woodsetton. It has a clear and attractive explanation of the area. Its robust construction and tough cover make it ideal.
In the middle distance there is a good view of the ridge caused by the 'Patch Reef' in the Nodular Beds, while the trenches either side are where the Quarried Limestone beds have been removed

BLACK COUNTRY FOSSILS

Alethopteris lonchitica is the name of this Carboniferous plant, but as you can see it is a seed fern or *pteridosperm.* It has been in the collection at Dudley Museum & Art Gallery for at least 94 years, and is on display in its Upper Gallery. It was found at Russells Hall where the hospital now stands, and is from the Upper Carboniferous, (Westphalian) Coal Measures. The whole specimen represents a *frond,* and each individual leaf is a *pinnule,* so this is a specimen of fronds with pinnules. The scale is in centimetres but in the Carboniferous Coal forests fronds could be found up to 7 metres long.

Bill Groves

BOULDERDASH!

Our quest to locate erratics continues, and the area of the Black Country that has most examples is around Wolverhampton, particularly to the immediate south and west. A good place to visit to see good erratics without too much searching is *West Park, Wolverhampton.* It is a large Victorian park, (Grid ref. SO 905993) and in an area next to the Conservatory, over 30 erratics are set out. They were put there when the park was built in the late 19th century when geology was such a popular science. It is likely that many came from sites in the city as it was a time of considerable building.

The picture shows one group of erratics. The two on the right are of a crystalline rock and take on a typical spherical shape. The upright one is hard slate which is reflected in its shape, and the smallest erratic was schist/phyllite. Some of the crystalline boulders are over 2 metres in diameter, and the upright stone in the photograph is about that height.
Most of the rock types on display seem to be igneous, but there is a wide variety, including a boulder of conglomerate.

Bill Groves

GEOBABBLE

Knowledge of languages is a great help when dealing with geological terms, and the most useful languages of all are of course the classical ones – Latin and Greek. A classical scholar would be able to hazard a guess as to the meaning of a term, purely by breaking the word down into its component parts and fitting together the meanings. Take the innocuous geological term *alluvium*. It is a noun meaning sedimentary particles deposited by a river or other running water, and its derived adjective is *alluvial.*

It is ultimately derived from the Latin *alluvius,* meaning 'washed against' but has probably come to us in the 16th century via the French *lavere* – to wash. Many words connected with water have come by this route including *lavatory.*

Another word in this area that serious geologists no longer need to use is *antediluvian. Ante* is a common prefix meaning 'before' and *diluvium* is Latin for flood. We get the word *deluge* from this source. *Antediluvian* means the period of the Earth before the Biblical flood, but is now normally used to denote something that is very old, old-fashioned or outdated. However, a simple search on the internet for references to this word indicate that the myths of an antediluvian age, lost civilisations with people living to 900 years and many other weird 'facts' are given credence by many, mainly American, websites. They seem to have a very antediluvian idea of Earth history.

Bill Groves

CONTACT US

As ever we would love to hear your news and views, particularly for the new *'from our members'* spot, so please put pen to paper or fingers to keyboard and give us your thoughts. We are often able to print photographs that are sent by email or colour print. Notices that appear in this Newsletter will remain in future editions until the date of the related meeting or event has passed. In order to include material in the August Newsletter, please send or give it to one of the Editorial Team by ***Monday 7th August 2006***

EDITORIAL TEAM		
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