NEWSLETTER NO. 111
JUNE 1995

The Black Country Geological Society

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, Dudley. Phone: (01384) 458070. 7.30 p.m. for 8 o'clock start.

EVENING FIELD MEETINGS TO THE LICKEY HILLS

The Lickey Hills are an interesting and varied geological area with good exposures of Cambrian Lickey quartzite, a spectacular unconformity with the Silurian Rubery Sandstone, substantial exposures of Triassic strata, and the Lickey Gorge which is probably a glacial overflow channel.

As the Lickey Hills are relatively local we are holding two Monday evening field meetings (7 pm - 9 pm) to cover the best parts of the area. Each evening will be a self-contained visit but if you can come to both - so much the better.

THE MEETING PLACE IS NOT THE SAME ON THE TWO EVENINGS.

MONDAY 12th JUNE. Evening field meeting to the Lickey Hills (part 1). Meet 7 pm at the Lickey Hills Visitor Centre car park, Warren Lane (grid ref: 998754). This will cover the Lickey Gorge, the southern part of the Cambrian Quartzite Lickey Ridge (often called 'Bilberry Hill'), the overfold quarry and exposures of the Triassic Kidderminster Formation (formerly 'Bunter Pebble Beds').

MONDAY 26TH JUNE. Evening field meeting to the Lickey Hills (part 2). Meet 7 pm at the Monument Lane car park on Beacon Hill (grid ref: 986759). This will cover the general geology of the area viewed from Beacon Hill, then Clent Breccia (Permian) of the car park, Keele Clay with sandstone beds (upper Carboniferous) of the golf course, the unconformity at Rubery between Rubery\Sandstone (Lower Silurian) and Lickey Quartzite (Lower Cambrian) and an exposed fault in the Rubery Sandstone at Leach Green Lane.

MONDAY 19th JUNE. Lecture: "Alaska and the Yukon - glaciers and gold" by Paul Shilston (Society member).

PAUL SHILSTON writes: "This talk derives from a 3 week visit to Alaska and The Yukon in 1993. It will follow two quite different themes - the superb glacial features in Alaska left after the Ice Age and the 1897-8 gold rush trail to Dawson City in the Yukon.

Alaska is on a plate boundary and has had its share of earthquakes and volcanic activity so we will first look at Mt. McKinley National Park and the Wrangell Mountains. Then there are spectacular views of the existing glaciers - much reduced from their Ice Age extent but still impressive - followed by the aftermath of the ice including muskeg country, kettleholes, river terraces and massive river bluffs resulting from the subsequent changes in sea level, deposits of glacial till and river gravels and wind blown deposits.

For the Gold Rush trail we follow the treasure-hunters from Skagway, crossing the watershed to the Yukon River, then down the river to Dawson City and finally to the goldfields. There are many points of geological interest on the way - not that the miners would have appreciated them - and the talk will also describe the occurrence of gold and how it is collected.

SUNDAY 24th SEPTEMBER. Field meeting to Lathkill Dale and Stoney Middleton, Derbyshire. Leader: Dr. Cynthia Burek (Open University).

Meet at 10.30 a.m. at Shining Bank Quarry (grid ref:232648) about 5 miles south-east of Bakewell. Travel up the A6 road through Matlock, then through Rowsley; about 1 mile after Rowsley turn left along the B5056. Go along the B5056 for about 3/4 mile, then just before the bridge over the Lathkill River there is a track to the right leading to the quarry entrance.

This field meeting will look at the Quaternary of north Derbyshire and in particular the history of glaciation in the area, studying glacial till and wind-blown loess deposits and looking at landforms caused by glacial action. The first venue, Shining Bank Quarry (entrance at 232648), has the best exposed lodgment till in the region, with Lake District erratics and striated bedrock. In Conkesbury Quarry (211651), worked for barytes, the till is absent but there is a deposit of loess.

Lunch will be taken in Bakewell (or bring sandwiches).

After lunch we will visit Hassop Col viewpoint (243735) to consider the influence of local topography on ice movement, then to Darlton Quarry (217758) where a till infills a former tributary valley of Middleton Dale, now hanging above it. Finally to Bee Low Quarry (090791) to assess the effects of glacial erosion on the upland landscape.

DR. CYNTHIA BUREK is with the Open University. She studied the subject of this field meeting for her PhD thesis.

This is a joint field meeting organised by Manchester Geological Association.

MONDAY 9th OCTOBER. Lecture: "The geology of the Solar System" by Dr. Bob Owens (National Museum of Wales).

MONDAY 30th OCTOBER. Lecture: "Geology of the Canary Islands" by Dr. John Stanley (Keele Uiversity).

MONDAY 27th NOVEMBER. Lecture: "Thrust tectonics and piggyback basins in the western Spanish Pyrenees" by Dr. Jonathan Turner (Birmingham University).

MONDAY 15th JANUARY 1996. Lecture : "The Great Dyke of Zimbabwe" by Dr. J.I. Langford (Birmingham University).

REPORTS

GAIA - There is life, Jim, but not as we know it! by Graham Worton on Monday 20th March 1995

Graham's lecture briefly introduced some of the more recent ideas about planet earth and the life it supports.

In simple terms the earth is a physical and chemical system in which energy, ususally as heat, and chemicals are continually transferred around the globe and change the surface of the planet. Many complex and intimately related processes and cycles exist from the building and eroding of mountains to the gases and water vapour continually exchanging between the oceans and the atmosphere.

Traditionally, life has been viewed as having a passive role in this physical earth system, adapting to the environments that are produced by the physical, chemical and mechanical processes of the earth.

Life is also traditionally viewed as beginning with very simple animals in the Precambrian some 3500 million years ago. With advancing time, the organisms gradually evolve to become more complex and culminate in the pinnacle of evolution that we call man.

Such views are increasingly being questioned. Modern studies suggest that life as a whole is a major factor in changing the face of the planet itself and exerts powerful controls over the distribution of heat, moisture and chemicals around the earth.

Recent detailed studies of fossils, in particular those of the Burgess Shales of British Columbia, suggest that life has, even from the early times, been a very extensive web of creatures and that it is possible that the 'tree' which appears to get ever-more branches and increasingly complex over time, may actually get branches 'lopped' off with marching time with periodic mass extinction. This causes a new stable system of environment and living things to occur, which then evolve together along a completely different route and to different ends. Such phenomena are seen to occur in so called 'chaos theory' geometry, where a system grows increasingly complex and then goes through a major self re-adjustment to a new stable state. These ideas are not new and by combining these diverse areas of expertise we can adapt a new way of looking at the earth and how it works to take us forward.

The lecture concluded with an attempt to do this by using examples to illustrate how pollution (which we probably consider to be escape or spillage of chemicals into an area where they are not supposed to be, or where their presence causes harm) may be natural.

Possibly the greatest pollution event ever is that caused by green plants which changed the atmosphere by polluting it with so much oxygen that it would never recover. However, if this production of oxygen had continued then the oxygen would have reached levels highly toxic to life and where even wet wood would burn spontaneously.

So what stops this from happening? GAIA theory has been proposed which suggests that life in its widest sense looks after itself with control systems to limit such happenings (a bit like us losing heat by sweating when we get hot).

There may be control systems of living things that we know nothing about and Graham continued the lecture by stating that we should respect all living things and control damage in areas where harm is all too obvious, such as in rain forests and coral reefs. Perhaps GAIA's control systems can be over stressed and mankind may become an intolerable de-stabilising force which may have to go! Or perhaps man has evolved to be a consciousness, a means of getting information around the body of the earth to help to limit and repair damage to the earth's ecosystems. Who knows?

In Dudley plans have been tabled to build a 'Castle Earth Science Centre', a fortress of conservation promoting respect for earth sciences, human history and biology alike. The centre has great vision and potential if only we can make it happen.

The Chairman thanked Graham for his "brave and lucid account of disparate theories".

GRAHAM WORTON

<u>Field meeting to the area around Brampton Bryan, Worcestershire on April 22nd. Led by Dr. Helen Boynton</u>.

On Wenlock Edge the wood's in trouble,
His forest fleece the Wrekin heaves;
The gale .....

Striking westwards the rhythmic rolling stirred the usual Housman lines, half learned aeons ago. I rubbed my sleepy eyes ...

If it chance your eye offends you
Pluck it out, lad, and be sound.

to see the cold blobs of teeming sleet spend their few moments of life down my windscreen. Through Bewdley - over the Severn -

Farewell to barn and stack and tree,
Farewell to Severn shore.

slanting by the twisted spire of Cleobury Mortimer at last the lad is in Shropshire. Then over the Clees, now snow capped with last spring ice, -

From Clee to heaven the beacon burns,
The shires have seen it plain ....

to Ludlow town ....

When smoke stood up from Ludlow
And mist blew off the Teme.

turn right at the by-pass through steaming sleet which turns to snow on every low hill; Brampton Bryan's not far now. Oh, there they are on the map!

Clunton and Clunbury
Clungford and Clun
Are the quietest places
Under the sun.

Sleety, raw cold Brampton Bryan invades me. The paradox of the country village - the beauty, the peace, the apparent harmony with nature (shades of Gaia!), but also the awful ennui so unsettling for Madame Bovary in rural France.

Our first site was allegedly Caractacus's last stand - Coxhall Hill. A small hill, deliciously slimy in ice cold sleet and wind, has yielded numerous graptolites from the Silurian Wenlock Shales. In my little patch it seemes that the worm holes were far more abundant than graptolites although it was not hard to spot the latter. Didymograptus murchisoni and Diplograptus multidens were there to be found though not by me. Dr. Helen Boynton, our leader, urged us to spot the fan-shaped graptolite, Dictyonema flabelliforme, and a few fragments were found, mostly by the children. This private quarry is accessible to responsible geologists (aren't we all?) by request to the owner who lives in Brampton Bryan.

The Pedwardine inlier of Precambrian grits and conglomerates, just to the south of the village, was next on our itinerary. It was quite a small exposure consisting of a few low rocks in a field swept by sleet laden frigid winds. A few taps served to reveal the conglomeritic nature of these much weathered rocks before we beat a hasty retreat to the relative warmth of the cars.

A short distance away, at the edge of a small eastwards draining gully on Upper Pedwardine Farm (367708), was an exposure which Dr. Boynton called 'a classic exposure site' as it shows an important unconformity between Tremadoc (Cambrian) below and Upper Llandovery (Silurian) above. The junction could be clearly seen in the gully side.

At this point we beat a lunch time retreat to the Royal George Inn at Lingen.

This is an area of so much interest. Geologically it is complex and full of fascination. If that can be combined with a study of the flora and fauna, ecology and history of the area, so much the better.

I know that I shall return again and again to one of my favourite parts of Britain - preferably in more clement weather.

I can stand - even enjoy - the cold but 'at my age' the combination of saturation and numbing cold is far from conducive to good health, for

Now of my three score years and ten,
Twenty will not come again
And take from seventy springs a score,
It only leaves me fifty more.

Sorry, it was just irresistible!

GORDON HENSMAN

The Royal George put on a welcome lunch of hot soup and a ploughman's so that we were somewhat reluctant to set off again. We went on to visit exposures higher up in the Silurian, in the Ludlow series.

The first site after lunch was at Wordle's Farm (360695) where there is an old quarry which worked a limestone deposit. The general area of the site was in Silurian mudstone, but the locality featured an old channel cut

through the mudstone which had been infilled by a boulder bed containing corals. The limits of the channel could be traced and among various coral fragments, fragments of Favosites spp. were found.

The next locality was further up the Boresford Valley to a quarry (350700) in the Lower Leintwardine formation (Silurian, Ludlow series). The site represented a submarine canyon at the edge of a continental shelf, with channel infill deposits which could be clearly seen in the quarry face. Dr. Boynton said that the quarry had produced few fossils, and although a few fragments of something were found, nothing was very convincing.

The final visit was to the north end of Brampton Bryan Park (351721) where there was an old quarry in the Whitcliffian formation (the highest member of the Ludlow series). Brachiopod fossils were found here in some quantity, in particular Salopina and Protochonetes.

So during the day the party had moved from the Precambrian to the top end of Silurian Ludlow series, seeing a range of exposures in the process. Our thanks go to Dr. Boynton and to the Shropshire Geological Society for giving us such an interesting day.

PAUL SHILSTON

We were very pleased to welcome long-standing member Graham Hickman, his wife Kerry and children, who came up from home in Bucks specially for the field trip. We hope to see them again soon.

Mineral Exploration and the Environment - studies in the Pacific and the Andes by Professor Howard Colley of Oxford Brookes University

Professor Colley demonstrated that mining destroys the landscape. He showed that a rural landscape in Fiji had been turned into a town. He showed how, in order to drill, roads have to be built and how this can provide a way in for commericial farming and logging to destroy the tropical forest.

In Chile mining of porphyry copper, which is very low grade, involves digging huge holes from which 95%-99% is waste. Such mining involves taking out 150,000 tons of rock per day. Storing the waste poses problems as the piles of rubbish may be unstable on steep slopes and crushing it and pumping it out to sea provides further pollution.

In Cornwall the tin mining was underground and a century later the mines provide a romantic background to tourism, but underground the sulphide minerals break down being affected by acid waters, and rivers like the red river near Cambourne pollute the sea.

Exploiting minerals provide benefits to the third world. Professor Colley quoted the economic returns to Fiji of £18m from minerals revenue, and also benefits from improved energy and water supplies. In Papua New Guinea the enormous rewards went to the central government. The local people benefited little, so a separatist group started a civil war and government troops were sent into the mining area.

The Emperor mine in Fiji is owned by a multinational company registered in the Isle of Man. Local people are subject to decisions made in far away tax havens.

In Chile the copper is extracted from the powdered rock by froth flotation. Air bubbles are forced through a mixture of powdered rock and chemical reagents. Chemicals and waste dumped in the river result in a frothy scum 70 km from the plant. Local entrepreneurs try to extract minerals from waste to sell back to the mine, but they lack the safety controls of the big companies and are working with very dangerous chemicals.

Smelting of copper in the High Andes creates great air pollution in the stable air conditions of desert temperature inversions.

Gold extraction involves the use of cyanide to leach the gold out, or mercury. The multinationals are careful because they need to preserve their image but the small local syndicate replicating the extraction techniques may be oblivious to the need for care.

Training in Geology, Professor Colley argued, can produce people adept at monitoring and protecting the environment because the techniques of mining can be applied to the cleaning of sites. The new geologist needs skills in water geochemistry, soil science, environmental awareness and geotechnics as well as in the traditional disciplines. There are now more jobs in land restoration and conservation than in mining, and the mapping being done by the BGS is now of a different nature preparing maps of engineering Geology, e cohesiveness of soils etc. Mining and quarrying companies now think environmentally and require newer skills although the oil industry does not seem to have moved in this direction.

KATE ASHCROFT

EDITORIAL

I have found it increasingly difficult to get to meetings over the last year. My route has almost invariably been blocked by oil cans, orange cones and diversion signs. Indeed to a visitor to the Black Country the region has appeared to have had diversion signs randomly distributed in an attempt perhaps to disorientate and thus ensnare intruders. Fortunately the natives proved friendly, or I might still be lost in a jungle of housing estates. On the occasions when I've found my way to the Ward Arms withour major errors, the homeward journey has at times involved visits to areas of the Black Country which I suspect may never have been mapped or registered for uncil Tax.

The explanation for my confusion has been the enormous land reclamation scheme undertaken by the Black Country Development Corporation. Imagine my surprise when on a recent trip I encountered a major highway passing through the region with bold signs indicating the way to the geological mecca of Dudley.

The work has been done with the help of firms with a wealth of local knowledge, firms such as Johnson, Poole and Bloomer. We can be proud that our vice-chairman, Graham Worton, has been involved on site and has such a commitment to the area and to the environment that the area has been made a better, cleaner place. Other members involved in the operation are Adrian Collings of Ove Arup, Stuart Homer of the B.C.D.C. and Steve Hughes of Douglas Technical Services. There must be others unknown to me. Geologists <u>are</u> active in practical ways in improving the environment. (This scheme of reclalamtion is only the latest in a process that has been going on over many years. Douglas Warren tells me that Dudley was the first authority to fill up limestone caverns using sand as infilling). It is good to know that restoration of polluted land in urban areas should mean less destruction of green-field sites.

THE CONSERVATION COLUMN

Ths Society maintains its active role in local conservation and the past two months have seen Alan Cutler appointed as the regional Working Group Officer for the RIGS initiative by English Nature.

Alan will chair and convene meetings of those responsible for geological conservation from the Midlands region, which reaches from Nottinghamshire to Hereford and Worcester, across to the Welsh Borders and up to North Staffordshire.

The first meeting was recently held at Dudley Museum as a good central venue, with a record of excellence and leadership in the field of earth science conservation through the efforts of BCGS and Dudley MBC.

Colin Reid has been mudging[1] along the visionary "Code of Practice for Geologica Conservation" within the council itself and a working group consisting of Alan, Colin and Graham, has been reviewing sites and liaising with companies and councils over the "Dudley Volcano" site at Tansey Green and the Barton Hill Quarry site in Walsall.

Graham hopes to organise some practical 'digging' type work now the summer is with us and the Society will convene an inaugural meeting of interested Society members to explain more fully the Society's role in Geological Conservation in September.

Perhaps the most important of BCGS' recent conservation activities was the visit by the Council of English Nature to view the activities of the Voluntary Sector in the Urban domain. Colin and Alan explained the importance of urban geological sites in the field at Wren's Nest and Saltwells Wood and even had the council members 'fossiling'.

The ultimate success of this meeting however, has been the re-instatement of the Castle Hill earth heritage/conservation centre concept in Dudley's Millenium Fund bid. This ensures that geology and its conservation remain as high profile, important and valued aspects of the Council's environmental and leisure work.

GRAHAM WORTON

[1] Both Graham and Colin claim to know the meaning of this term which is unrecorded in my dictionary. Ed.

NEWS IN BRIEF

1. Geological Weekend in Derbyshire

   Manchester Geological Association is running a weekend in Derbyshire based at Matlock Bath, visiting the Bakewell and Matlock areas. BCGS members are invited to attend. Visitors should arrange their own transport and accommodation. There is an attendance charge of £2 for the whole weekend. Those interested should contact the organiser who can also provide a list of accommodation addresses:

   Jim Spencer, Manchester Geological Association
   3 Merlyn Court, Austin Drive, Didsbury, Manchester M20 6EA
   Home phone 0161 434 7977.

2. 'Monsters of the Deep' continues at Dudley Museum until September, Mondays to Saturdays 10 a.m. to 5 p.m.

3. Welcome to new members

M. Single and family of Walsall.

4. Back copies of 'The Quarterly Journal of Engineering Geology' and 'Geoscientist' are available (free, I believe) from Douglas Warren. Phone 01384 253804.

5. The permanent exhibition of fossils from the Fraser Collection has opened at Wolverhampton Museum and Art Gallery. Entitled 'Dr. Fraser's Fossils', it is designed primarily for children. The fossils on view are splendid. There is a talking geological clock, a display of fossils on the sea bed which lights up to reveal a living coral reef. Technical terms are reduced to a minimum. There is a reconstruction of Dr. Fraser's study and the exhibition is aesthetically very pleasing.

Editor

Kate Ashcroft
48 Worcester Lane
Sutton Coldfield
B75 5NB

Tel: 0121 308 6783

Secretary

Paul Shilston
16 St. Nicolas Gardens
Kings Norton
Birmingham
B38 8TW

Tel: 0121 459 3603

GEOLOGICAL WORDSEARCH

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Gordon Hensman

FIFTY GEOLOGICAL TERMS CAN BE FOUND IN THIS SQUARE

WORDS MAY BE HORIZONTAL (FORWARD OF REVERSED), VERTICAL (RIGHT WAY UP OR UPSIDE DOWN), OR DIAGONAL.

ANSWERS TO CROSSWORD IN THE LAST NEWSLETTER

ACROSS

1. Nitrate 5. Pangaea 9. Stratovolcanoes 10. Epic 11. Pilot 12. Thin 15. Thalweg 16. Seismic 17. Laminar 19. Rebound 21. Core 22. Adopt 23. Soap 26. Pribilof Islands 27. Died out 28. Element

DOWN

1.Nascent 2. Terminal Moraine 3. Ante 4. Envying 5. Pillows 6. Neap 7. A Roche Moutonnee 8. Arsenic 13. Twins 14. Limbo 17. Lycopod 18. Redcoat 19. Reptile 20. Deposit 24. Silo 25. Floe

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