



NEWSLETTER NO. 139

JANUARY 2000

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.

PROGRAMME 2000

MONDAY 28th FEBRUARY 2000 AGM at 7.30 pm. followed by "Canadian Appalachians - Ocean Closure and Links with the British Isles" by Dr John A. Winchester, Department of Earth Science, University of Keele

MONDAY 27th MARCH 2000 Dr Hugh Torrens, Society Member. *Please note change to the lecture.*

"300 Years of Remarkable History of Geology In and Around the Potteries" This lecture will cover the history and variable importance of geology to local mineral extractive industries; coal, iron, oil and (many sorts of) clay from 1686 to present. It will investigate who made the major contributions to our knowledge of local Potteries geology.

17th APRIL 2000 *Please note revised date.* Dr Frank Moseley, "Military Geology in the Middle East." Dr Moseley was a WWII R.A.F. pilot, an athletics and rugby champion, Geologist at the Universities of Sheffield, Keele, Cambridge and Birmingham, and former Army Reservist. His assignments included East Africa, Libya, Yemen, Oman and Cyprus. Geological knowledge has always been important to army operations but hydrogeology was crucial to the campaigns of WWII in the deserts of the Middle East. Major Shotton (later Professor Shotton) was put in charge when "dousing" proved "inferior to chance". Since the war a dedicated group of army reservists has provided advice with engineering tasks mostly in Libya and Saudi Arabia

SUNDAY 21st MAY 2000 Field Meeting: Black Country Geology Part 2. Leaders: Graham Worton and Alan Cutler. Meet at 9.45 am at the monument (which is a large metal cross) at the summit of Barrow Hill, Pensnett (NGR SO 915 815).

Chairman

A. Cutler B.Sc., M.C.A.M.,
Dip. M., M.CIM

Vice Chairman

G.J. Worton B.Sc., C.Geol.,
F.G.S., M.I. Env. Sci

Acting Treasurer

S. Fairclough B.A., PGCE

Acting Hon. Sec.

S.H. Worton B.Sc., PhD.
F.G.S., Grad. M. Inst. W.M.

Here the views of the Black Country and the surrounding hills are magnificent. We will recap on the story described in the 'Introduction to the Black Country Part 1', that is from the Silurian to the Productive Coal Measures. We will then descend for a brief encounter with the Etruria Formation in the Barrow Hill dolerite quarries before moving on to Ketley Quarry at Kingswinford (NGR SO 898 893). At Ketley Quarry we will examine the change from the red marls deposited in Etruria Formation times to the yellowish cross-bedded sandstones and grey measures of the Halesowen Formation.

Lunch will be taken at the canal-side public house, 'The Samson and Lion' at Buckpool (NGR SO 900869) where refreshments will be available.

The afternoon will be spent examining the geology of Buckpool as exposed in the roadside and in the fields and streams in the parkland opposite the 'Samson and Lion' public house. This is a classic site for Black Country Geology, being first figured in J. Beete Jukes memoir on the South Staffordshire Coal-Field in 1859. This area is the very edge of the exposed coalfield and the effect of large earth movements on the Western Boundary Fault are very well displayed here. The various exposures show the sequence of strata from the Enville Formation (uppermost Carboniferous), through the Clent Formation and Bridgnorth Sandstone Formation (Permian) to the Kidderminster Formation (Triassic). The site also features enigmatic landforms which introduce an element of the re-sculpting of the landscape during glacial and interglacial periods.

SUNDAY 18th JUNE 2000 Field Meeting: *The Landscape of North West Shropshire*. Leader: Gordon Hillier, Shropshire Geological Society. This is a joint meeting between Shropshire, Manchester and The Black Country Geological Societies. The aim of the excursion is to provide an overview of the geology, geomorphology and archaeology of the country around Oswestry - from the Ordovician to the Triassic (with a cover of glacial sediments). The variety of rocks, especially the Carboniferous, and their influence on the landscape and upon man's activities throughout the ages will be demonstrated.

SATURDAY 1st JULY **Black Country Geological Society 25th Anniversary Weekend**
Field Meeting to the Lickey Hills - Itinerary to be confirmed. Leader: Paul Shilston - Black Country Geological Society.

EDITORIAL

A new Keeper of Geology at Dudley Museum has been appointed: We wish Graham Worton the fulfilment of all his hopes in his new and very challenging post!

Graham is drawing to our attention the past work of the Society. I would like to stress that we must not rest on our laurels but must put every effort into using the talents of the membership and we can only do that if we make an effort to welcome and get to know the people who come through the door at meetings and attend field trips so that we know of the strengths, knowledge and expertise which they are willing to make available to us. An attractive programme of indoor and field meetings is essential to the ongoing health of the society.

Peter Oliver drew my attention to an item from "Earth Science Conservation in Great Britain - A strategy," published by the Nature Conservancy Council in 1990 reprinted in the Hereford and Worcestershire RIGS group newsletter. *"Approach to site conservation:* In describing approaches to site conservation, it is helpful to distinguish two contrasting types of site. They are not mutually exclusive, but each group requires a broadly different approach. The two types have been classed 'exposure' sites and 'integrity' sites. They can be defined as follows.

- (i) 'Exposure' sites: sites whose scientific or educational value lies in providing exposures of a deposit which is extensive or plentiful underground but which is otherwise accessible only by remote sampling. The usual situation is that the deposit or structure in question is widespread underground and is almost certain to contain similar features to those visible at the site, but in practical or economic terms the deposit is not available for study other than at the site. Such 'exposure' sites are numerically the most common category of sites and include most quarries, cuttings, cliffs, outcrops and mines.

(ii) 'Integrity' sites: sites whose scientific and educational value lies in the fact that they contain finite and limited deposits or landforms that are irreplaceable if destroyed. The usual situation is that the landform or deposit is Quaternary in Age and of limited lateral extent, although many geologically older examples also fall into this category. Examples include glacial, periglacial, fluvial, and coastal landforms and their associated deposits, cave and karst sites, and unique mineral, fossil, stratigraphic, structural or other geological deposits and features.

The importance of distinguishing these two categories is that conservation of each group usually demands a quite different approach. 'Integrity' sites are, by definition, finite and irreplaceable. The approach to their conservation is to maintain the integrity of their deposits or landforms. This approach is therefore weighted heavily in favour of preservation and of restricting man made changes. In contrast, the conservation of 'exposure' sites depends almost entirely on preserving the fact of exposure; the actual material that is exposed at a face does not need to remain, provided equivalent material can be exposed to provide equally good or better exposures. Quarrying may, for example, be welcome because it creates fresh exposures. Similarly, continuing marine erosion is often indispensable to the conservation of coastal sites. 'Exposure' sites may be created where none existed before, and man's activities are in general far more compatible with their conservation than is the case for 'integrity' sites.

It must be stressed that 'exposure' sites are no less important than 'integrity' sites; in fact they are critically important because of the difficulty and expense of creating new sites to replace them.

Any given site may not fall exactly into one or the other category, although experience shows that in general it will do so. For sites that are difficult to categorise, the concepts of 'exposure' and 'integrity' remain helpful in determining their approach to conservation, highlighting conflicts in priority and assisting in developing a coherent approach." If in doubt about the validity of these definitions, try applying them to a site which you know well!

REPORT

The Ice Age Flora and Fauna of Britain by Dr Charles Turner of the Department of Earth Sciences at the Open University

Dr Turner began his talk with a brief look at the stratigraphic column so that we could place the period of the Great Ice Age within Earth history. This great cooling took place within the last two million years when the climate of the British Isles fluctuated between cold - **glacial** - and temperate - **interglacial**.

This, he said was by no means the first Ice Age; there were possibly two or three in the middle Precambrian and there is good evidence for glaciation in the Ordovician. There was a major glaciation in the Carboniferous/Permian when the greater proportion of the land-mass was in the region of the South Pole.

By the late Mesozoic/early Tertiary, the major land-mass was in the Northern Hemisphere. It has been suggested from fossil evidence that during these times the climate changed relatively slowly, abrupt change being the exception rather than the rule. During the Quaternary, however, there is evidence of repeated rapid climate change. The first major glaciation of Europe may have taken place about 2.6Ma. Botanical studies show that some temperate tree types became extinct at that time.

Dr Turner then spoke of the possible causes of Ice Ages, for example, the **Milankovich effect of Cycle of Climatic Change**. In this, it is thought the other planets in the Solar System cause periodic changes in the Sun's orbit, thus altering the insolation. These changes can be summarised thus:

- 1) the variation in the eccentricity of the Earth's orbit ($10^5 - 4 \times 10^5$)
- 2) variations in the obliquity of tilt of Earth's axis (4×10^4)
- 3) the precession of the equinoxes (2.0×10^4)

He pointed out that these period were not long in terms of geological time.

At least three major and as many minor ice advances have taken place in Britain in the last 500,000 years. One of these flowed down the Yorkshire coast as far as Norfolk and an ice sheet in Shropshire blocked off the exit of the River Severn. The latest glacial stage of the Quaternary lasted from about 80,000 to 10,000 years ago but the main period of advance took place 15-20 thousand years ago.

We were then shown slides, one of frost polygons - regular formations that, as yet, are not fully understood, followed by one demonstrating 'frost heave' - a type of mass movement in which soil is moved upwards by the migration of water which expands on freezing.

Dr Turner emphasised the importance of the Gulf Stream, a system of currents that cross the Atlantic from warm tropical waters, on the flora and fauna of Britain. At some time between 20,000 and 16,000 BP (Before Present) the existing Polar Front (main boundary line between Polar and tropical air masses) altered and this caused a deflection of the Jet Stream. At this time too, sea levels were low because of water locked up in ice and there was a large ice-cap in Northern Britain. A land bridge formed across the Bering Strait and Britain was joined to the land-mass of Europe, enabling migration to take place.

The vegetation would have been mostly tundra type, boggy with grasses and shrubs typical of Arctic conditions. Solifluction and cryoplanation were two processes likely to have been in operation because of the bareness of any slopes, giving rise to a great deal of gravel. Ice Age gravels have been found at Four Ashes, near Wolverhampton.

Dr Turner explained how pollen grains are used to give clues to the vegetation at a certain period of time. Trees, shrubs, flowering plants and grasses all have distinctive pollen grains that, although very small, are very durable. They are also produced in large numbers and are frequently well dispersed by wind and water. It is possible, he said, to distinguish between the pollen of trees that grew in a temperate climate from those that grew in a sub-polar climate. He then showed us some slides of pollens and of pollen analyses and told us that by reconstructing vegetational change it is possible to reconstruct climatic change. By this means it is possible to show how Britain's vegetation had changed from a cold, tundra phase, through a pine and birch period into a forest containing such trees as alder, hazel, hornbeam, beech, elm and oak and then reverted, through pine and birch back to tundra.

Dr Turner's most interesting talk and his slides, especially those of pollen grains, made me think about the care and patience that are needed in this discipline. It is amazing how much information can be gleaned from the smallest of specimens.

Barbara Russell

CONSERVATION COLUMN

Happy New Year! (or new millennium depending on your point of view). In any case this is the time of year when most of us reflect on what is past and make resolutions for the future. Looking back across the last 25 years of the BCGS, it occurs to me that we have a great deal to celebrate. It is also an appropriate point in time to remember those members whose voluntary efforts have made such a contribution to keeping geological opportunities alive and vibrant in our special area. Most of us have done something such as assist at a fossil hunt or help with site clearance. A few stalwart members have, by acting on their concerns with passion, enthusiasm and above all perseverance achieved much to preserve our geological heritage.

The past 25 years

Perhaps the more notable of our achievements have been:

- Saving rock faces of special geological importance from destruction (eg Pouk Hill, Walsall in the early days of the society),

- Bringing to the attention of the geological community the plight of the Dudley Collection and subsequent salvage and conservation work on it,

- For the first time formalising and extending the geological records in detail using GCG forms, in so doing providing a first database for the Geological Records Centre at Dudley Museum,

- Holding a Geological Curators' Group meeting in 1985 which led to the permanent appointment of Colin Reid at Dudley Museum and allowed geology to flourish in the area.

The BCGS were the only voluntary body involved in a total of seven schemes promoting conservation activities prior to 1990. We were used as a model for the RIGS Scheme which was launched in 1990 and have continued to influence national policy relating to Earth Heritage conservation,

- Continually lobbying the Black Country Authorities until they accepted geological sites into the planning system for wildlife (the SINCS system) and subsequently reviewing and extending these site details and listings as the Unitary Development Plans undergo review

- Continually recording and collecting from new and established sites and developing geological trails such as the Hay Head Trail at Walsall,

- Making Rock and Fossil Fairs possible,

- World Heritage proposals

There are many individual conservation projects that are equally worthy of mention and undoubtedly many individuals whom I have failed to mention for which I apologise. All deserve our admiration for the record I am able to relate.

The future

The future is very bright. We expect to hear from English Nature in early spring concerning progress for the Geoparks applications.

The UK Association of RIGS groups will shortly be meeting at Dudley. Alan Cutler is our representative on the executive committee and will report back to us. As the infant organisation grows and takes shape I will endeavour to report on the progress, objectives and achievements. The next RIGS conference will take place from 31 August to 2nd September 2000 in Penrith in the Lake District and promises to be a lively event judging by last year's conference. There is now a RIGS website which allows RIGS groups to publish short accounts of projects and issues. We will of course be looking into this 21st century opportunity.

There will be another national Rock and Fossil Fair in September/October 2000 and we will certainly need all your help to make this a wonderful event. There is a tremendous amount to get involved in during the century ahead!

Until next time..... Graham Worton.

Botanical Revolution for the Millennium

The 16th Botanical Congress in St Louis, Missouri has abolished the single plant kingdom of the textbooks and established four separate kingdoms in what can be described as a revolution in biological classification. This is the result of work by 200 scientists from 12 countries who for the past 5 years have reconstructed the evolutionary relationships between the Earth's entire flora using DNA technology.

The Green Plant Phylogeny Research Co-ordination Group has found that the invasion of the land by plants more than 450 million years ago was led by aquatic plants emerging from freshwater and not by marine plants emerging from the oceans. The study has indicated one common ancestor for all the flowers, grasses, trees, ferns, shrubs and mosses of the world.

The new classification shows that the single plant kingdom of old now consists of four kingdoms:

1. Green Plants 2. Red Seawater Plants, 3. Brown Seawater Plants and , 4. Fungi. Together with the Animal Kingdom we now classify all life into five Kingdoms.

Genetic studies of flowering plants have shown that the simple division into monocots (grasses) and dicots is no longer valid. For example some traditional dicots, such as magnolias and water lilies are now classified as belonging to the

3. Copies of Down to Earth and English Nature's Annual Report are available at meetings.
4. The new website is up and running. Many thanks to Amir Kanwar for his efficiency and willingness to assist us.

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New Web site: <http://www.bcgs.org.uk>

BLACK COUNTRY SITES No 4 : BEACONHILL QUARRY SEDGLEY

Sedgley Beacon with its tower and attendant radio masts form a prominent skyline feature of the Black Country. The beacon is the westernmost of three arched limestone ridges that have been thrust up through the central part of the Black Country Coalfield. Near the crest of the ridge is an old quarry from which the 'brown lime' or 'black lime' was worked in previous centuries. Here Sir Roderick Murchison studied the rocks when researching the nature of the Silurian rocks of Britain in the 1830's. He describes them in his famous 'Silurian System' in 1839 and used their fossil content to prove that these rocks were the same as those found at Aymestry in Shropshire. Exposures of the beds immediately overlying the 'Aymestry Limestone' (Whitcliffe Formation) and spoil containing fossils can be found around the old quarry. The rocks seen here are yellowish silty mudstones and thin limestones of a shallow marine possibly lagoonal environment where the seas were receiving heavy sediment inflows from nearby land.

The quarry is best approached from the carpark at the end of Beacon Lane (NGR SO 923 943). Follow the footpath from the carpark to the open fields keeping the stone tower and masts on your right and you'll see a raised grassed mound some distance ahead. This is the covered reservoir from the top of which commanding views of the surrounding coalfield and more distant hills can be seen. To the north west, and a little way below you, you will see the old quarries and their spoil heaps. A little searching amongst the spoil will be rewarded by finding examples of the fossils of the Aymestry Limestone strata once worked here.

