



NEWSLETTER NO. 116

APRIL 1996

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.

TUESDAY 16th APRIL. Weekday visit to Winsford Salt Mine, Cheshire. This visit is FULLY BOOKED.

TUESDAY 23rd APRIL. Birmingham University School of Earth Science Lapworth Lecture. 5.30 p.m. in the Dome Laboratory (coffee in the museum from 5.00 p.m.) Structure and sequence stratigraphic evolution of rift basins. Dr. Rob Gawthorpe (Manchester University).

THURSDAY (note THURSDAY) 25th APRIL. Lecture: "Monitoring active volcanoes: procedures and prospects". By Dr. W. McGuire (centre for Volcanic Research Cheltenham & Dept of Geological Sciences UCL). Members of the Geological Society of London (West Midlands Regional Group) will be joining us for this meeting.

Chairman
A. Cutler B.Sc., M.C.A.M.,
Dip.M., M.C.I.M.

Vice Chairman
G. J. Worton B.Sc., F.G.S.,
A.M.I.Geol., M.I.Env.Sci.

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Hon. Secretary
P.D. Shilston M.A., C.Eng.,
F.I.E.E., M.I. Mech.E.

Bill McGuire writes: The importance of reliable volcano monitoring is illustrated by the number of deaths caused by eruptions in recent times; over 28,000 in the last decade and some 260,000 since 1700 AD. Population growth in underdeveloped countries, where most hazardous volcanoes are located, results in a dramatic rise in the numbers of people occupying danger zones. To counteract this threat monitoring programmes are being developed for previously unmonitored high-risk volcanoes, and the effectiveness of existing programmes is being increased.

Monitoring seismic activity and ground deformation continues to form the mainstay of volcano surveillance programmes, but increasing use is made of new techniques involving the measurement of gravity and magnetic variations, and the changing compositions of volcanic gases and ground waters. Earth observation satellites play an increasing role, gathering data on a number of topics including the composition, growth and evolution of gas and ash plumes, the detection of thermal changes which might indicate future activity, and the remote measurement of ground deformation.

DR. MCGUIRE is probably this country's foremost volcanologist. He is Visiting Professor of Volcanology at University College, London, Head of the Centre for Volcanic Research at Cheltenham, Chairman of the Volcanic Studies Group of the Geological Society, and UK Representative of LAVCEI (International Association of Vulcanology and Chemistry of the Earth's Interior).

His research interests are ground deformation and magnetic monitoring of volcanoes; volcano instability; volcanic hazards and their mitigation; volcanics and climate change. He has worked on Mount Etna for 19 years and also has research programmes in the Canary Islands and on Piton de la Fournaise volcano (Reunion Island, Pacific Ocean).

TUESDAY 7th MAY. Birmingham University School of Earth Science Lapworth Lecture 5.30 p.m. in the Dome Laboratory. Romances of the field: Victorian worlds of Geology. Dr. Jim Secord (Cambridge University).

SUNDAY 19th MAY. Field meeting to Wirksworth, Derbyshire. Leader: Kate Ashcroft (Society member).

Meet at 10.15 a.m. at the National Stone Centre (grid ref: 284553) situated on the B5035 Ashbourne to Wirksworth road, just east of its intersection with the B5023. The Centre has a large car park on the south side of the road, i.e. the right hand side if approaching from Ashbourne.

There is access to some spectacular quarries which enable one to study Carboniferous shelf limestones and to compare sedimentation features inside a lagoon, on the reef and from deeper water beyond the reefs. The overlying Grits can be studied at Black Rocks.

HARD HATS ARE REQUIRED FOR THIS FIELD MEETING.

Members must provide their own.

Hammering is restricted to loose material. All attending will be required to sign an indemnity form on the day.

MONDAY 17th JUNE. Evening field meeting to Saltwells Nature Reserve. Leader: Alan Cutler (Society Chairman).

Meet at 7.00 p.m. at the Reserve car park near Saltwells Inn, Brierley Hill (grid ref: 935869). This is about 3/4 of a mile east of the Merry Hill Shopping Centre.

The Saltwells area has a lot of geological interest. Doulton's Claypit, once worked by Doulton's of earthenware fame, shows a sequence of Carboniferous strata including sandstones, mudstones, gnanister and several coal seams. The canal cutting at Brewins Bridge shows exposures of Red Downtonian mudstones and sandstones, and Temeside Shales strata (Silurian) as well as a basalt intrusion. Finally in Saltwells Wood there are the traces of many small mines which once worked the Dudley Thick Coal.

MONDAY 1st JULY. Evening field meeting to Kinver. Leader: Alan Cutler (Society Chairman).

Meet at 7.00 p.m. in the car park at Mill Lane, Kinver (grid ref: 846833). This is near the junction of Mill Lane and Kinver High Street. Mill Lane is on the route from the Stewponney pub to Kinver.

This trip has a dual purpose. Firstly to see the Triassic sandstone at Kinver and on Kinver Edge. Secondly to see the famous Kinver Rock Houses; these were developed in the sandstone which is soft and easily worked. Some of the Rock Houses were lived in for 300 years until 1995, and now one of them is again inhabited.

SUNDAY 14th JULY. Field meeting to The Roaches, north Staffordshire. Leader: Don Steward (Stoke-on-Trent Museum).

Meet at 10.15 a.m. in the car park of the MERMAID INN (grid ref: 037605). This is about 4 miles northeast of Leek on the Morridge road. *Members of the Manchester Geological Association will be joining us for this field meeting.*

The Roaches area can be considered as the beginning of Highland Britain which runs from there northwards via the Pennines into Scotland. The area is in the Upper Carboniferous (millstone grit) series and has many exposures of these sandstones, so giving rise to their name "Roaches" (or 'rocks'). Ludchurch itself is a spectacular deep chasm with a narrow entrance, and is reputed to have been the site of secret religious services and other goings-on. As a contrast the afternoon will take us into Carboniferous Limestone country, and the visit to Brown End Quarry will show its general structure as well as the highly fossiliferous limestone strata.

ITINERARY: Meet at the Mermaid Inn, amalgamate into as few cars as possible and proceed to Roach End (996645) to park in the limited space available there. Walk over typical Moorland terrain for just over 1km to Lud's Church (987657) and inspect this historical landscape chasm feature. Return to Roach End and drive back to the Mermaid. Lunchtime refreshments there, then all cars to be driven south via Morridge to Brown End Quarry, Waterhouses (092502) on the A523 Ashbourne-Leek road, either parking at the quarry entrance or in the old station car park. A tour of the quarry will be given and then finish between 4pm and 5pm.

DON STEWARD is Senior Assistant Keeper of Natural History at Stoke-on-Trent Museum. He is a good friend of the BCGS and has been a member for many years.

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SATURDAY 7th - FRIDAY 13th SEPTEMBER. British Association Annual Festival. Held for 1996 in Birmingham. Details available from BAAS Office:

Fortress House
23 Saville Row
London W1X 1AB
phone: 0171 494 3326

SUNDAY 29th SEPTEMBER. Field meeting to Alderley Edge, Cheshire, for Triassic strata and an underground visit to one of the copper mines. Leader: Tony Browne (Manchester Geological Association).

MONDAY 7th OCTOBER. Lecture: Underground limestone mining in Shropshire by Dr. Ivor Brown (Consultant).

MONDAY 25th NOVEMBER. Lecture: Ancient miners, modern collections by Dr. R. Ixer (Birmingham University).

JANUARY 1997. (lecture to be announced).

MONDAY 17th FEBRUARY. Annual General Meeting. Followed by two short lectures by Society members who have visited the locations recently:

Easter Island by Sheila Pitts
Geology of Gibraltar by Paul Shilston.

Reports

19th February 1996. "Tales of a travelling Geologist" by Graham Hickman.

Back in 1978 a young man joined BCGS as a junior and very active member of the Society. He was to move on and away from these shores to work for British Petroleum, for whom he still works. That same year, I joined the Society and, being a compulsive letter writer, when Graham went abroad I wrote to him. Eventually we lost track of each other but, as I haven't thrown a letter away in 25 years, somewhere in the loft are Graham's letters from Egypt suitably adorned with his own artistic headings of pyramids and palm trees.

Oil exploration in the Gulf of Suez, Western Desert and Nile delta had already yielded much oil during the mid 1970s. The Gulf of Suez is a classic rift system, part of the Red Sea-East African system. The Gulf of Suez forms a series of half grabens with polarity flip and transfer zones between them. The Rift system contains source rocks, reservoirs and traps for oil. The sediments are dominantly Miocene and Pliocene in age.

Although Sinai has Precambrian rocks at its southern tip, it has rocks of Lower Palaeozoic age and Jurassic, Cretaceous and Eocene elsewhere. Major anticlinal structures of the type to contain oil occur in the northern Sinai desert. Mt. Sinai is of granite. There are dyke swarms trending NNE SSW on the tip of the peninsula and on the western shore of the Red Sea. These dolerite dykes (the result of tectonic events 600-1000m years ago) are up to 40 feet across and form the ridges of the hills. Sometimes they intrude into metamorphic rocks.

The Dead Sea and Gulf of Aqaba lie on a linear wrench system with a dextral movement. The scarp edge of the Gulf of Aqaba is 500m above sea level and the Gulf is one km deep. We

were assured that the Gulf gave rise to the best diving in the world but Graham had only one slide to prove his point. Despite its beauty it is difficult to navigate because of rocks and there are many shipwrecks. Dead Sea satellite photographs showed pans for the extraction of salt. The Sea is fed by fresh water from the River Jordan but evaporation causes it to be salt enriched and very uncomfortable to the eyes.

People settled the Nile valley early using mud to make bricks. The sphinx is the closest rock outcrop to Cairo, the base being an outcrop of Eocene nummulitic limestone. The nose is in the British Museum and the Egyptians want it back.

Half an hour's drive from Cairo are Miocene silicified fossil trees up to 30 ft. long, probably now destroyed by factory development. Graham used 4 wheel drive vehicles and showed a shot of a vehicle stuck in the sand near Lake Faiyum. When the vehicle was dug out the battery was flat so had to be cranked.

North of Faiyum, to the south west of Cairo, and 20 to 30 Km from the road is a Greek-Roman town wall of mud bricks, circa 300 A.D. The entire mound of the town is covered in fragments of broken pottery shards, samples of which Graham brought. There was fossil evidence of fish vertebra, turtle fins and crocodile bones.

Graham then moved from dead crocodiles to live alligators as his attention turned to North America. The oldest rocks in Texas are Precambrian and Palaeozoic and are part of a buried fold belt of the Appalachians, covered by Carboniferous, Permian, Cretaceous, Pliocene and Miocene sediments. The oil is found in the coastal and offshore areas and is exploited in offshore water depths of more than 200 metres. The Permian basin also has oil in W. Texas. Most of Texas is very flat but in the west, El Capitan, part of the Permian rift system, rises to 8000 ft. The Carlsbad Caverns form a tremendous cave system in the Permian reef.

A reconstructed oil derrick at the site of the famous Spindle Top oil discovery (1901-1902) has become a museum near Beaumont (East Texas). Oil was discovered on a surface expression of a salt diapir. This started the Texan oil rush as people poured in to look for other gentle hills and nearly all proved to be the site of an oil field. Jurassic salt dates from the early rifting of Tethys. The salt moves up and produces diapirs with which oil is associated.

Visits to New Mexico showed interesting volcanic features associated with Tertiary mountain building phases. In Arizona is the Baringer meteorite crater formed 20-22000 years ago by the impact of a nickel iron meteorite. 30 tons of material has been found but most would vaporise on impact. The original meteorite was estimated to have weighed 200 tons. The crater is three quarters of a mile across and 500 ft. deep. The edges are elevated and NASA sends astronauts there for training. In Northern Arizona, Monument valley shows weird erosional features cut into the Permian sandstone capped with limestone. There is a Triassic fossil forest in the Arizona State Park where mud slurry buried the trees. The soft material has been washed away leaving the silica replaced fossil wood on the surface. The Grand Canyon was probably eroded by glacial melt water. The giant sculptures on Mount Rushmore were carved by thirty people hanging from ropes and walkways to hammer and chisel the fine detail following dynamiting of the rock face.

The evening closed with Graham explaining his seismic cross sections and showing rock specimens and pottery shards. It was an interesting and information packed evening.

HILARY GILTRAP

18th March. Mass Wasting, Climate Change and Civil Engineering: Recent Catastrophic Events in North Wales. Lecture by Dr. Ken Addison (Wolverhampton University/St. Peter's College, Oxford).

Dr. Addison began by explaining his preference for the term 'Mass Wasting' as opposed to 'Mass Earth Movements', and that the term 'Catastrophic' was meant to indicate an irreversible event which, although not necessarily resulting in loss of life, could have considerable effects on human activity.

Attempts to classify mass wasting indicated the complex nature of these occurrences. Although discrete types were identifiable, ranging from, for example, creep (typically with low water content situations) to, for example, 'flow' (typically with high water content), in practice very few types of mass wasting consisted of a single type, but rather tended to change from one form to another. As such they were known as compound translational failure. For example, the Aberfan disaster of 30 years ago started off with a debris slide, which evolved into creep, before reverting back to a debris slide having been re-liquefied from a burst water main.

Examining the forces acting on a slope, Dr. Addison explained that the shear stress on the material in the slope was dependent on the cohesion within the material, the force from gravity on the material acting down the slope, and the material's angle of internal friction. Water within the material tended to have an uplifting effect and a downslope effect, both of which encouraged mass wasting. Further details of this could be found in Selby's books, 'Hill Slope Materials and Processes' and 'The Earth's Changing Surface'.

The first two sites discussed by Dr. Addison were Dinas Dinlle and Glan-y-Mor-Isaf, both on the coast. The glacial sediments exhibited sequences of slope failure, starting with the development of tension cracks as a result of the movement of material on the seaward side, which then tended to develop into slumping. This simple marine erosion could well be accelerating as climatic changes result in sea level rises. At present a large slide was occurring every 2-3 years, with the resulting material being removed by tidal action. Evidence from a re-exposed submerged forest suggested that most of the erosion during the 4500 years since the trees were buried had occurred during the last 100 years, with the Irish Sea Basin having previously been very quiet. The only other explanation for the change in erosion rate would be for vertical displacement to have occurred between Neocene-Neolithic forest beds and the glacial sediments. This was also plausible, given the proximity of the fault line which had caused the Shrewsbury earthquake a few days earlier. Following a period of marine erosion, these cliffs tended to form a series of arcuate embayments, in softer channel deposits, alternating with headlands of more consolidated material. The headlands tended to shelter the cliffs for a while, and the next cycle of rapid erosion would begin once they collapsed. The same cliffs also showed signs of tension cracking, mud slides and mud flows.

To examine catastrophic failure in mountain environments, Dr. Addison referred to Nant Ffrancon and Great Orme. The mass wasting at Nant Ffrancon occurred in Quaternary sediments, along with reworked talus, tufa and buried soils. As well as block ejection and rockfalls, more dramatic debris flow occurred as a result of liquefaction of the material (as seen in Spitzbergen, for example). Such flows were not as rare as sometimes thought (indeed, the risk was increased in parts of Snowdonia as a result of the action of walkers and climbers), and merely the cash costs of the large 1983 flow were put then at £9 million.

Great Orme's limestone formed a shallow saucer-shaped syncline, whose beds could be seen in the cliffs alternating between exposed harder beds and vegetated softer beds. The resulting

stepped ledges each held a wedge of unconsolidated material. Mass wasting activity on Great Orme had occurred disproportionately on the north coast. It was noted that, although standard rainfall figures did not indicate sufficient quantities of water to pose a risk of frequent debris flows, this could be misleading as the hourly amount of rain measured could in fact fall in a much shorter space of time. Using a sequence of slides, Dr. Addison demonstrated the progressive development of the main debris flow of 1993, which was diverted to follow the path of the Marine Drive road. Once this occurred, the damage caused became far greater than if the flow had spilled directly down to the sea, with the road in effect acting as an impermeable layer which tended to perpetuate the flow.

Dr. Addison discussed some of the implications of the nature of mass wasting for civil engineering. Whether in the coastal or the montane examples, different interest groups meant that there was rarely a consensus about the best course of remedial action. It seemed clear, however, that the attention given to drainage in areas liable to mass wasting was sometimes far from adequate, so that catastrophic events were likely to continue to impact on human activity particularly if global warming were to result in an increased availability of water.

ALDO MUSSI

Editorial

I simply cannot believe it! B.C.G.S. has gone on the Internet! My mental picture of the Internet is of solitary lonely figures surfing in search of communication without personal contact, of isolated individuals trying to express themselves without the personal responses that teach us to modify our views or at least the way we state them, or sad individuals searching for pornography! I know that librarians and the like rely on the net as a source of information and I'm told that face to face meetings on the net can be arranged. Paul hopes that we can get new, younger members this way, tapping sources not reached by more traditional modes of communication. So watch out for the influx of computer literate young men joining the Society. Time will tell!

I still cannot believe that, this morning, I received a letter from Paul asking for a photograph of me, as a Society official, to go on the Internet. How is so much trivia classified so that it can ever be retrieved? Where will the picture go? Who will find it? What useful purpose will it serve? Is my image so important that it can float through ciber space? Where is the relationship between my face and the editing of the newsletter? And in what form will it travel? And what's the significance of my face? If I'm to figure on the Internet will it be long before all the world's people will be recorded in this way, to be annually or hourly updated, together with DNA details, credit rating, bank account statement and, of course, identity number?

I'm not being critical of the Society's action but am simply bemused by new technologies! No doubt the people who saw the first photographs or experienced radio or television in the early years felt much the same! The more I try to keep up with technologies the more they seem to leave me behind. However, Amir Kanwar is very keen to demonstrate the system to the committee and we are very grateful for his help and enthusiasm. But where will it end?

B.C.G.S. joins the Information Superhighway

On Wednesday 13th March 1996 the BCGS joined 'The Information Superhighway'.

For those who know nothing about it, basically the Society's programme of lectures and field meetings are available to anyone in any part of the world, provided they have access to the Internet.

It is hoped that this new means of promoting the Society's activities will enable a wider audience to be aware of our efforts and perhaps allow some of them to participate. I hope to forge links with other societies, as they become available, so that their programmes can be made available to us. This has obvious implications for holiday planning

Keele University Geology Department has an excellent 'presence' on the net and they have kindly included our site on their list of Earth Science Societies.

In addition I shall be trying to tap into the already vast number of Internet resources specifically related to geology so that hopefully some of the information can be disseminated to our members.

Those who have access to the Internet will find our 'presence' at the following site:
<http://www.netlink.co.uk/users/bcgs>

The Society's **Email address** is:

bcgs@netlink.co.uk

There are a lot of ways that we can increase the information we provide about our Society and the local area, this could include a 'Field Guide to the Black Country' aimed at tourists, guides/reports of our Site of Special Scientific Interest (SSSI) and much more.

If anyone has any comments, suggestions or would like to help develop what has been started, then they can contact a committee member or myself. My Email address is:

amir@kanwar.demon.co.uk

or by 'snail mail' (Royal Mail):

19 Corporation Street, Walsall, West Midlands WS1 4HW.

AMIR KANWAR

News in Brief

1. Welcome to new members.

Catherine Eales - Oldswinford

Joyce Jones - Walsall

Graham Mogford - Wolverhampton

2. Annual General Meeting

At the AGM held on 19th February the following officers, committee members and hon. auditor were elected to serve for 1996:

Chairman: Alan Cutler	Vice-chairman: Graham Worton
Secretary: Paul Shilston	Treasurer: Judith Shilston
Committee members: Sue Fairclough	Chris Jowitt Peter Smith
Hon. Auditor: Mr G. Hubbard ACA	

3. Roads and Geological Conservation

I have a copy of the discussion document published by English Nature. Do ask if you wish to borrow it.

4. New Civil Engineer

New Civil Engineer, 25th January 1996, had an interesting account of the design for underground nuclear storage at Sellafield and plans to build an underground research laboratory to test conditions. The latter is the subject of a recently ended public enquiry.

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