

# NEWSLETTER NO. 126

DECEMBER 1997

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.

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## 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.

MONDAY 19th JANUARY 1988. Lecture on Greenland Geology by Dr. Paul Smith (Birmingham University).

*Dr. Paul Smith writes:* Caledonides are the remains of huge mountains thrown up during the Caledonian orogeny, around 400m years ago at the end of the Silurian. At that time, due to plate movements, Scotland, Greenland and Norway were close together so that the Caledonide belt after leaving the Scottish mainland, passes across Shetland and continues up the Atlantic coasts of Norway and Greenland. Until recently the Greenland Caledonides were poorly understood - a direct consequence of their remoteness, difficulty of access and the mountainous, ice-covered terrain.

The northernmost part of the Greenland Caledonides lies at 81 deg North before disappearing into the Arctic Ocean, and the talk will compare the geology of this remote area with the more familiar geology of north-west Scotland. The area is part of the world's largest national park and the nature of the fauna and (limited) flora will be examined, together with the logistics of working in one of the world's remote areas.

DR. PAUL SMITH is Curator of the Lapworth Geology Museum at Birmingham University and is also on the Academic Staff of the School of Earth Sciences. His special interests are the Geology of Northern Greenland and the Development of Fish in Palaeozoic times; he lectured to the Society on this last subject in 1995, so now he will speak to us about his researches in Greenland. He is a good friend of this Society and is one of our own members.

MONDAY 23rd FEBRUARY 7.45 p.m. ANNUAL GENERAL MEETING.

Followed at 8pm (approx.) by a lecture 'Laterites can be fun!' by Dr. Des Bowden (Society member/Newman College, Birmingham).

Laterite is a deposit resulting from intense chemical weathering of a wide variety of rocks, basalt, gneiss, slate, granite etc. Much of the silica content has been removed in solution to leave behind hydroxides of iron, aluminium or manganese - BAUXITE is a laterite with a high aluminium content. Laterites are often responsible for the red colour seen in tropical landscapes.

*Dr. Des Bowden writes: "Laterites with their associated weathering residua and landforms are found widely over the tropical world. The talk will be illustrated by reference to my researches in Sierra Leone, The Gambia and Malawi. I hope to raise awareness of an interesting topic which is often neglected by geologists and geomorphologists who live in temperate climates."*

DR. BOWDEN (who is a Society member) is Head of Geography at Newman College. He studied at the University of London, taking his first degree in Geography and his PhD on Tropical soils and related subjects. He has held a lecturing post in geography in Sierra Leone and has paid many visits there and to other parts of Tropical Africa. His researches in the area will form the subject of his lecture.

THURSDAY 19th MARCH. This additional meeting will NOT now take place.

MONDAY 23rd MARCH. Lecture: Environmental geology - examples from Finland and the UK. By Dr. Roger Dackombe (Wolverhampton University).

This lecture will examine the role of geology - and in particular 'environmental geology' - in determining courses of action when environmentally sensitive activities are being planned. These can include mineral extraction and development of water supply sources; geologists can point to the most suitable strategies to minimise disturbance and make the best use of available resources.

Dr. Dackombe has considerable experience of Finland and will contrast geological environmental problems there with those in the U.K. The two areas have significantly different geology: there are great differences in climate, in the countries' latitude, and in surface terrain, and these lead to different solutions to their environmental problems.

DR. ROGER DACKOMBE is Senior Lecturer in Environmental Science at Wolverhampton University and he is also involved in running post-graduate MSc courses on environmental geology in Finland and Hungary, to which countries he pays regular visits. His geological interests are Quaternary Sediments and Applied Engineering Geology, while his particular research interest is in the Isle of Man. He has researched glacial sediments and till sequences in the IOM, he is Geological Consultant to the Manx Government for environmental questions, and works with archaeologists from Liverpool University studying Manx archaeology in its geological context.

*This lecture is the one scheduled for January 1997 which had to be postponed because of illness.*

MONDAY 27th APRIL. Lecture on Carboniferous Corals by Dr. John Nudds (Manchester Museum).

SUNDAY 10th MAY - Field meeting to Shropshire to study the Cambrian and Ordovician strata, probably visiting Comley Quarry near Church Stretton, the Hope Bowlder unconformity, the Alternata Limestone exposure at Chatwall, and the Onny Valley section near Craven Arms. Leader: Dr. Paul Smith (Birmingham University).

FRIDAY 12th - SUNDAY 14th JUNE. WEEKEND FIELD MEETING to Hertfordshire, probably based at St. Albans. Leader: Dr. John Catt (Quaternary Geologist, Rothamstead Experimental Station, Harpenden).

This geological weekend will give us a chance to see horizons not normally available to those of us living in the West Midlands, in particular we will visit exposures from the Cretaceous, Tertiary and Quaternary periods. These will include Lower, Middle and Upper Chalk at Totternhoe and other sites, the famous Hertfordshire Puddingstone in situ and in buildings, Lower Greensand at Leighton Buzzard/Woburn Sands and a range of glacial features.

FULL DETAILS AND A BOOKING SLIP WILL BE IN THE FEBRUARY NEWSLETTER.

FRIDAY 21st - SUNDAY 23rd JUNE. Geologists Association weekend field meeting to Norfolk. BCGS members are welcome to attend.

SUNDAY 5th JULY. Whole day field meeting to Snailbeach historic site. Leader: Peter Sheldrake. This will be an extended version of the evening field meeting held last June, which proved to be too short in time to cover the various points of interest.

FRIDAY 21st - MONDAY 24th AUGUST. Geologists Association weekend field meeting to the Edinburgh area. BCGS members are welcome to attend.

SUNDAY 27th SEPTEMBER. Field meeting to Southam Quarry and Burton Dassett. Leader: John Crossling (Warwickshire Museum).

MONDAY 19th OCTOBER. Lecture: "A glimpse of Namibian geology with an excursion to Kimberley and its diamonds" by Dr. A.C. Waltham (Nottingham Trent University).

## EDITORIAL

Geological hazards are very much in fashion. ITV is running a series of four documentaries about natural disasters entitled *Savage Earth* while Channel Four has a not dissimilar series called *Raging Planet*. Also this week on television there is an Equinox programme 'The day the earth got hit' about the fireball (comet or asteroid) that hit Tunguska, Siberia in 1908 and on BBC2, called *Earth and Life*, yet another series exploring the struggle for survival against natural forces, this week's episode showing the epic fight against that common enemy, the volcano! (Did the release of vast aerosols of sulphur dioxide in association with the extrusion of the flood basalts of the Deccan of India contribute to the extinction of the dinosaurs?)

Hazards over recent years have become an essential feature of A Level Geography syllabi. (From the point of view of the Northern Exam Board hazards are: Tropical cyclones, Fires, Volcanoes, Earthquakes, Pollution, Disposal of chemical and nuclear waste, Burglary and Transmittable diseases! Could not crossing the road and over indulgence at Christmas equally be included?) (Geography is a subject with an amazing ability to reinvent itself. In my teaching career I struggled through at least five of its metamorphoses but retired in time to be spared the weakly structured and arbitrary study of randomly chosen Hazards!)

Risk management is a core concern of the business world today and even Dudley Museum has its policy on the subject. Why the media interest in disaster? Can it be an end of millennium sickness? The disproportionate interest in natural disaster is a distortion of geological reality. (When I see parents taking children to primary school by car because the roads are not safe I cannot help but believe that fear of risk is distorting much that we do.) Can the media's obsession with geological disaster be seen as a metaphor for the way we approach other aspects of our lives?

## REPORTS

Sunday 5th October. Building Stones of Worcester Cathedral and town centre: leader Dr. Eric Robinson

Worcester Cathedral exhibits the problems of many sandstone buildings i.e. rising damp and frost damage. In the north doorway the grey green colours of the Carboniferous sandstones contrast with the Jurassic limestones. In the stonework, water passes from the limestone into the sandstones which being more porous become badly weathered. The rusty coloured pillars are of Purbeck marble and on closer inspection one can see that they are crowded with snail shells. The grey green sandstone is the Highley sandstone and the pink, Triassic Holt Sandstone. In the porch recent pointing of the sandstone blocks can be seen to have damaged the stonework as water has passed from the cement into the sandstone. The square pillar in the door is of Jurassic oolite and shows acid and water damage. On some faces the adze marks of the medieval masons can be seen. In the roof, brick like blocks of calc tufa have been used because they are light and strong.

Inside the church are more pillars of Highley Sandstone showing current bedding and mineralogy of feldspar and mica. The pillars are only faced with stone and have a rubble core. Their bases are damaged by water and salt. The limestone elements are inserted for artistic effect.

Turning right inside the door the Victorian floor is composed of slabs of Carrara marble and black limestone from Belgium. The latter has a high fossil content with pentamerid brachiopods and gastropods. The white marble wears down faster than the black. Bishop Phillips' tomb is also of Carrara marble while the plinth is of Chelston alabaster. The Early English nave is of grey sandstone with red sandstone infilling.

The elaborate Victorian pulpit has a serpentine base, above which is Carboniferous limestone with crinoid ossicles. The columns are of Italian serpentine. The pink marble is from Belgium. The fine elaborate carving is in Derbyshire alabaster. The black steps in the side aisle are limestone showing the tabulate coral *Syringopora*. The warm buff coloured stone is Hoptonwood stone showing gigantoproductids from the D zone of the Carboniferous limestone. The floor of the Choir shows Carrara marble, Italian serpentine and Torquay 'marble' with stromatopora and blebs of coral. King John, carved in Purbeck marble, lies on a slab of Carboniferous limestone, while the step is in pink marble, mottled and streaked by contact with the granite intrusions of Devon. Gilbert Scott carved the altar in alabaster.

Worcester cathedral has a magnificent large crypt. The pillars are of yellow oolite which may be from Normandy or from the Cotswolds. The cushion capitals show the masons' tool marks.

The beautiful Chapter House is of yellow oolite and green Highley sandstone and some of the wall paintings remain. In the Cloister floor can be seen Bushveld gabbro, a buff limestone from France and a black Carboniferous limestone which wears badly. The walls are of New Red sandstone showing typical clay clasts in a channel feature. Repairs are being undertaken with Hollinton and Grinshell sandstones.

By studying the stones in detail the architectural beauty of the building became much clearer.

But there was more! We proceeded to study the war memorials outside. One was in Portland stone, slightly oolitic, with shallow water oysters and its characteristic dark and light staining. The amazing bronze South African war memorial stands on a rock showing burrows infilled with lime sand. Perhaps these are shrimp burrows.

Elgar's plinth is made of Yorkshire sandstone which sparkled in the sunshine with quartz and mica cemented with a silica and iron oxide material. Russell and Bromley store shows serpentine. Hudson's coffee house has slate pillars tagged on. The Record office has pale pink new red sandstone. The yellow oolite here shows 'snail creep'. In an urban atmosphere the pyrite oxidises causing blistering and cracking and the cracks fill with calcite. Opposite, the buildings of 1932 are faced with granite (from the Southern uplands, perhaps from Castle Douglas). Above is Bath stone. Waterstone's exhibit serpentine from the Lizard with its red colouration while oolite pillars weather to show trace fossil burrows. Peplow's building of 1881 is of terra-cotta i.e. moulded clay. The Guildhall has columns of oolite. Marks and Spencer's shows marble cleverly cut to produce a pattern. Woolworth's is faced with French Jurassic limestone while W. H. Smith's demonstrates rudists i.e. molluscs which grew conical valves which have a lid. Similar ones can be seen growing in the tropical seas of today. Boots is faced with slate from the Borrowdale Volcanics. Debenham's opts for the iridescence of Larvikite while the Nat West building 'Do not touch the geese' is in the more sober, but solid, Dumfries sandstone.

In one afternoon we had experienced a complete geology course. Dr Robinson urged the society to produce simple leaflets to introduce the public to the joys of Geology. His enthusiasm was a demonstration of how it can be done and we were left with a abundance of material for a leaflet on Worcester. He offered to help with our endeavours. Will the Society take up his challenge?

Kate Ashcroft

#### Sunday 12th October. Field meeting to Aust cliff and Hock Cliff led by Andrew Mathieson

Andrew Mathieson introduced us to the cliff section at Aust Cliff which reveals a selection of Triassic lying unconformably above the Carboniferous limestone which underlies the old Severn bridge's foundation. The lowest bed exposed is the dolomitic conglomerate. Above it lies Mercian mudstone with evaporite features including gypsum deposits, celestite and casts of salt crystals. Higher still are the tea green marls, sandstones, black shales with bone bed (black fish scales and coprolites) all from the Penarth Group. Debris brought down by the recent rains yielded an abundance of fish teeth, shark grinding teeth, fragments of shark dorsal bone, plesiosaur vertebra and an excess of coprolites. Above the black shale Westbury Beds lie pale creamy intertidal algal limestones, the Cotham marble, while above these the White Lias containing the first ammonites announces the arrival of the Jurassic.

In the afternoon at Hock Cliff, Frertherne, we wallowed in mud. The Lower Lias here is in horizons above those seen at Aust. The rock is mostly clay and shale but with some beds of harder limestone. Many specimens of *Gryphaea arcuata* were found together with excellent specimens of the smaller right valve with perfect muscle scars. A complete specimen of *Arnioceras semicostatum* was also discovered.

Kate Ashcroft

#### Monday 27th October Lecture "The story of Heron a high pressure/high temperature oil field in the Central North Sea" by Dominic McCormick (Shell Exploration and Production, Aberdeen)

Dr. McCormick has worked in oil geology for 18 years, 10 of these in drilling operations. He had prepared an excellent set of handouts for us all, and a seismic profile of the North Sea.

The Heron oilfield is due east of Aberdeen and is in the central graben of the North Sea. This is a high temperature/high pressure environment, is among the deepest of the oilfields, and has older basement faults and some salt areas.

Exploration involves first the study of the surface geology, then geophysical studies, especially seismic. Test drilling then reveals the time sequence, rock sequence and rock properties. Geochemical studies give the most exact detail of the oil source characteristics, and finally the stratigraphy and geological history is studied.

The decision to drill depends on porosity, percentage sandstone, oil saturation, and possible recovery factor. Reserves are calculated to decide if the area has an economic resource. What is needed is a mature source rock, e.g. Kimmeridge Clay, a reservoir rock, e.g. Triassic-Jurassic sandstone, and a seal to keep the hydrocarbons in place.

Most of the talk concerned geology from the Permian to the present, and the Permian contains much salt. To the north, the Viking graben had much east-west extension associated with North Atlantic opening, but in the central graben, compression of Kimmeridge Clay gave more oil.

Drilling bits become smaller with depth. The depth/pressure gradient is established, and the presence of seals or leak-offs established. Drilling mud cools the bit, brings cuttings to the surface and stops fluid getting into the borehole. Its viscosity, and its environmental impact, are important.

Seismic studies involve sound reflected from rock surfaces and picked up by hydrophones. With satellite positioning and sometimes two boats, 3D study is possible. The vast data base is limited only by computing power.

Steel casing is very expensive at such depth, and pressure needs to be known to decide the type of steel required. Wireline logs reveal the types of rocks, of hydrocarbons, and the oil/water contact. Flow rate of oil then decides whether the area is commercial. Core sampling is with a diamond bit. Microscope studies show porosity and the cementation of grains, and secondary overgrowth of cement will affect porosity. When an area is drained, the oil/water contact will move up, and after two years this may justify a second draining.

The present working of the Heron field is by a multi-consortium of B.P., Shell, Esso, Elf and Texaco for economy. There are no platforms nor pipelines yet.

Question time followed this very interesting talk, adding even more interest. Pipelines cost £1 million per mile. Water in levels below the oil/water contact is usually the original water with rock deposition. Drills can be "bent" via a gyro which allows steering, even to the horizontal, so that small oil areas can be connected up, and salt piercement features avoided.

Shiela Pitts

#### Report of a visit to Jan Mayen Island

I'd wanted for years to visit Jan Mayen at the northern end of the Mid-Atlantic Ridge, way to the north of Iceland. It is an active volcano, and at 2277m can support several glaciers, so it is nearly always fogbound. Because of a change to the programme of my little Russian ship 'Professor Molchanov', suddenly there was a possibility of seeing it on the way from north Norway to N.E. Greenland. Don't count on it, said the travel agent.

We were 24 passengers, mostly European, and had hardly had time to know each other before Jan Mayen was within radar range. Of course we couldn't see a thing, as we sailed round Mount Beerenburg. We lay off Walrus Bay, and suddenly the curtain lifted almost to the summit. We rushed to the boats and landed, then walked upslope and stopped for the magnificent view of the bay and its driftwood. On, up and down, along the black ash track - I longed to investigate the brilliant lime green vegetation on the slopes, but in polar bear country it is necessary to keep up with the guns.

The walk of "2-3 miles" across to the weather station was in fact exactly 10km. We had a great welcome from 18 people, in their elegant Scandinavian accommodation. Shop (got the tee-shirt) geology display, excellent coffee and chocolate biscuits - time flew until we realised about the return of the fog. We could still see white waves crashing on the black beach. The commander probably didn't want tourists lost on the summer pass of his mountain, and organised a Land Rover relay back across. We were all grateful, and I for one was tired and very happy, having achieved such an ambition.

Shiela Pitts

## CONSERVATION COLUMN

"Should old acquaintance be forgot and never brought to mind?" A famous festive question and one which is somehow strangely fitting for a column such as this which is dedicated to maintaining an acquaintance with the past.

The subject matter for the column of Christmas 1996 was the act of pouring personal Christmas goodwill onto those often neglected treasures of our own collections. To treat them to a dust-off, an admiring glance and most importantly, a label.

After yet another year of enthusiastic collecting I imagine that most of our collections have 'swelled' a little. As such this is a message worth repeating by the ghost of Christmas present (and future) and would be a worthy New Year's resolution too!

Collectiveness and Collections past, present and future

I wonder, have you ever considered what we could do together for a collection or collections? What could we do with the mixture of enthusiasm and skills that exist in a society like the BCGS?

Over the last twelve months we have collected trilobites for Dudley Museum, advised on sites and conservation issues and supported the fun and frolics of the 1997 Rock and Fossil Fair. Members have donated specimens and collections to the Museum to ensure that part of this special geological heritage is not lost, and also to prevent it from falling into uncaring ownership when they are no longer able to care for these treasures themselves. (Perhaps more of us should think about the long term welfare of our collections like this!)

The BCGS has given sets of geological hand specimens to the Museum and through the efforts of another BCGS member and friend of the Society, Spenser Mather, these are becoming schools loans collections. They contain a number of mineral, rock and fossils and will provide a much needed resource for local schools.

Two other members, Morris Hunt and Ann Nicholds have volunteered their time to the Museum to help out generally and in the case of Ann, to offer special needs (particularly Braille) skills to the Museum. There is still so much more that can be done, so if you think you can help in any way Colin would appreciate a call on 01384 815574.

The above examples are ones that I know of and are part of the generosity that BCGS members display consistently. These things make a real contribution to both community and science and we can rightly feel proud of the members involved and the goodwill that is so freely given.

As a final thought on collections, I wonder if it would be possible to have a "BCGS Collection" which we could deposit with an institution such as Dudley Museum. Such a collection could stand as a testimony to the individuals of the Society and the BCGS in the collective sense. I have discussed a few ideas with Colin already but this would be a gift from all of us to the future and we should all have a say in it, and what it might be. We really need to hear from you about this idea so please drop us a line.

It seems that the spirit of Christmas yet-to-come has offered us many conservation possibilities that could come to pass, but it's up to us to make them happen ..... until next time.

Season's Greetings.

Graham Worton



## Geological Association Field Trips

The Geological Association have published a list of their field trips for 1998. As an affiliated organisation BCGS members are entitled to attend. Contact Lynn Allen on Hemel Hempstead 0144 267525 for further details. On some trips numbers are restricted so do book in advance.

Jan 14 Sedgwick Museum Cambridge  
Feb 14 Westminster Abbey/ Cathedral; building stones Eric Robinson  
March 14 Lower Cretaceous fossils and palaeoenvironments Munday's Hill Quarry  
April 4 Writhlington Avon  
April 18 Geological Walks in Keele  
April 25 Building Stones in Guildford  
May 8-16 West of Ireland Connemara and County Clare  
May 16 Barton  
June 6 Oxford Brookes meeting  
June 9-21 Craggs weekend  
July 11 Mystery tour  
July 24-26 Geology of the Western Front  
Longer Excursions abroad  
July 25-16 August Canyonlands USA- Tony Waltham  
August 1998 Brazil  
October 1998 Tunisia

### ITEMS IN BRIEF

- Welcome to new members  
Phil Goulbourne of Oldbury  
S.A. Gina and family of Harborne  
Chris Leech of Kingswinford  
Narcyz and Tracy Piotrowski-Cunniam of Oldbury
- University of Nottingham
  - Geology of the Northern Pennines. 12-14th June based at Orton near Tebay. £98.
  - Geology of Southwest Scotland. 11-15th September based at Kirkcudbright. £160.Details and booking: Mrs Helen Torr  
University of Nottingham, dept. of Continuing Education  
14-22 Shakespeare Street  
Nottingham NG1 4FQ phone: 0115 951 6513
- Geology Today  
Geology Today is a lively magazine for amateurs and professionals with a wide range of articles, news and other items. BCGS members have a 20% discount on the annual subscription to Geology Today making our subscription for 1998 £27.00. When making or renewing subscription, members should indicate that they are BCGS members.
- New (ish) Geological Association Guides are available from the Geological Society Publishing House, Bath. Credit card orders are accepted by phone on 01225 445046. The guides are priced at £7 to members. Mention your BCGS membership when you ring.
  - No 34 The Yorkshire Coast (Rawson and Wright) 1992
  - No 54 Aberystwyth District 1996
  - No 56 Castleton Area, Derbyshire (Trevor Ford) 1997

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