NEWSLETTER NO. 138

DECEMBER 1999

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 31st JANUARY 2000 "Brains Trust" An opportunity for you to bring along your queries, specimens, problems etc. to our panel of experts. Written questions submitted in advance to the Secretary will be welcome. If anyone has a collection of up to four particularly interesting transparencies bring them along and we can arrange to show them during the evening. Non-members welcome.

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, "James Ryan of Dudley (1770 - 1847) and the problems of introducing new ideas (both scientific and technical) in British mines in the early nineteenth century". Dr Torrens of the Department of Earth Sciences, University of Keele, writes that James Ryan settled in Dudley by 1808 and died there in 1847 and it is about time that the spotlight was shone on his achievements as he is so little known.

APRIL 2000 *Date to be re arranged.* 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.

NEW APPOINTMENTS

I am delighted to report that Sue Fairclough has taken the post of Acting Hon. Treasurer and Sarah Worton that of Acting Hon. Secretary of BCGS. We are sorry to have lost the existing incumbents during the year and are most grateful to Sue and Sarah for plugging the gaps. Both posts are open for election at the AGM. Perhaps if we treat these people kindly they will be willing to stand for election in February! Don't forget that the AGM meeting has an early start!

EDITORIAL

According to the hype we are about to enter a new millennium. I must admit I am excited at the prospect of living across one of the major divides in human history, not only a new Year, but a new Century and a new Millennium and I am obstinately deaf to the valid arguments that the date is a miscalculation and that January 2001 is the date of significance. (In any case the date of Christ's birth was miscalculated by at least four years in the sixth century when our calendar was adopted.) Geological time divisions are equally difficult to define. Stratigraphical divisions are defined by changes at their base and, for example, Dr. Turner pointed out in discussion following his recent lecture that the changes marking the base of the Wolstonian would occur rapidly in the seas but would affect the land much more slowly. Most changes, geological and historical, are transgressive but in geology, in an attempt at precision, we use fossils to define zones while kings and rulers mark the Stages in human history. Time is very funny stuff! Do the laws of superposition of strata have parallels in human history as conquerors superimpose language and law on the vanquished? Geological time lines get finer and finer as the present is approached and similarly we measure the past in centuries and today in minutes. Our perceptions distort time. A few minutes of music on a telephone enquiry line are longer than a complete Beethoven Symphony at a concert! We see a thick bed in a coastal section and question whether it is the result of a sudden storm or of years of steady deposition. Geologists with a working time span of 4500 million years have little cause to get excited over a mere 2000th anniversary - but we might as well enjoy it while we can. Have fun!

REPORTS

Lecture : Catch a Falling Star: Meteors, Meteoroids and Meteorites by Barbara Russell, Society Member, 20th September 1999

The study of meteorites, extraterrestrial objects that have survived the passage through Earth's atmosphere, is of interest to both astronomers and geologists. The theories of the origin of the Solar System are based on numerous scientific clues and meteorites are pertinent to the problem because they are probably the most ancient and primitive pieces of planetary matter to which we have access at the present time.

Meteoroids enter Earth's atmosphere more or less all the time. Most are so small that they burn up in the atmosphere and are seen only as a bright streak of light across the sky - a meteor or *'shooting star'*. The meteoroids that reach Earth are known as meteorites; most of them have little chance of being found as they so closely resemble native terrestrial material.

If a meteoroid is seen to travel through Earth's atmosphere and actually land on the surface it becomes a FALL. Only about eight falls are recognised each year.

However, several hundred meteorite fragments are collected each year; these are FINDS. Meteorites can fall anywhere, but various factors influence the chance of recovery. Few will be found in heavily vegetated areas, while deserts may yield many specimens. Antarctica is proving a useful source of meteorites, partly because the snow makes even small rocky particles easy to spot and glacial processes tend to concentrate the samples.

It is usual to place meteorites into one of two broad categories - IRONS or STONES. A half way sample is called a STONY -IRON. These classes are subdivided into some 80 different groups. As the names imply, the irons are predominantly iron, or more precisely nickel-iron, and the stones are composed mostly of silicate material

It is the iron meteorites that are the ones most commonly seen in collections, although they form only a few percent of falls. Besides the iron-nickel alloy, irons often contain minute quantities of cobalt and precious metals. The irons are in three main groups, octohedrites, hexahedrites and ataxides, with further subdivisions based on their fine chemical structure. The octohedrites exhibit the classical Widmanstattan structure, a series of lamellae of two different minerals.

One mineral is kamacite, a low-nickel alloy (6-7%) and the other taenite (30-50% Ni); kamacite is more vulnerable to attack by acid than is taenite. This pattern is useful in distinguishing between terrestrial and extra terrestrial Ni-Fe, as it is not usually found on terrestrial samples; it is thought to be the result of long, slow cooling. The hexahedrites are composed of kamacite and a polished and etched surface reveals a series of parallel bands called Neumann lines; it is possible that these indicate that the parent meteorite suffered some mechanical deformation in a low-space temperature environment. The ataxides are much richer in nickel than the other two and show no Widmanstatten structure or Neumann lines. Lead is present in some irons, a useful dating tool and one used by Clair Patterson to determine the age of the Universe and Solar System.

Between the irons and the stones are the stony-irons, containing both metallic and silicate material. Different grouping is based on the silicate component, as the FE:Ni part seems similar in all groups. The Pallasite Group is the largest, with about 40 samples, the Mesosiderites have some 30 samples and the smallest group Lodranites have two.

Although most of the finds are irons, most of the meteorites that actually reach Earth are stones; the difficulty is finding them - they look very much like ordinary stones, especially when they have weathered and lost the *fusion crust* that they may have gained during their passage through the atmosphere.

The stones can be divided onto two classes - the CHONDRITES and the ACHONDRITES. Chondrites are so-called because they contain CHONDRULES - globules of silicate material only a few millimetres in size. Chondrites can be further sub-divided into ordinary chondrites and CARBONACEOUS chondrites. Ordinary chondrites are the more common and can contain 5 - 15% iron-nickel metal, which clearly distinguishes them from terrestrial rocks. Carbonaceous chondrites contain organic compounds, which may include amino acids. All the carbons are classed as primitive, but some are more primitive than others i.e. nearer the composition of the Solar Nebula. C1s are the least altered, C2 next and C3 the most altered.

The Allende Meteorite is a C3. It contains two classes of inclusions, Calcium Aluminium-rich Inclusions (CAIs) and chondrules. CAIs have the mineralogy you would expect to find in a normal condensation sequence, i.e. corundum, perovskite and spinel. Some elements in the CAIs have unusual proportions of isotopes, which cannot be explained by radioactive decay, or any other process known to occur in the Solar System. It is now thought that they had their origins in a different environment, probably pre-solar and possibly the original supernova; it also contains microscopic diamonds.

The plot of Allende composition was compared to that of the Sun and found to be remarkably similar. Radiometric dating of this meteorite gives an age of some 4.5 billion years. Reflectance spectrography has shown that the only similar solid body in the Solar System is the Martian satellite Phobos.

The achondrites - without chondrules - are thought to be stony meteorites that have been heated to their melting-points and formed by crystallisation of their magmas on their parent bodies. Under this heading come some of the most rare types of meteorites, the SHERGOTTITES, the NAHKLITES and the CHASSIGNITES (SNICK). There are only about a dozen of them and they are very much younger than any others, about 1.3 billion years as compared with about 4.5 billion for the rest. The most favoured place of origin for the SNICK meteorites is the planet Mars; a theory supported by analysis of gas found in one of the larger shergottites. Studies of EUCRITES suggest that the asteroid Vesta is their place of origin. It is hard to imagine how much information can be contained in a small piece of material, and the conclusions to which that information can lead.

Thank you very much for having me; the highlight of the evening was the wonderful collection of meteorites brought by Alan Cutler. I never thought that I would see, let alone hold, a piece of Canon Diablo. Thank you Alan, the green has almost faded but the memory hasn't!

Barbara Russell

Lecture : The Geology of the Isle of Man Dr Roger Dackombe, 25th October 1999.

Dr Roger Dackombe, Senior Lecturer in Environmental Science at Wolverhampton University and Geological Consultant to the Manx Government, gave a most informative talk to the Society which was well illustrated with maps, sections, diagrams and slides. His theme was the Quaternary of the Isle of Man and the Northern Irish Sea Basin. It was evident from the content of his talk and his style of presentation that this is a topic about which Dr. Dackombe is not only extremely knowledgeable, but it is also a subject in which he is passionately interested.

The Isle of Man is situated centrally in the Northern Irish Sea Basin, about 5 km south of the Iapetus suture. The island is a Palaeozoic inlier, with Devonian rocks to the west, Carboniferous rocks to the south and Permo/Triassic in the north. Much of the bedrock of the island is overlaid with the clays, sands and gravels of the Quaternary period. Notable features of this period are the fine examples of drumlins near the airport and spectacular sections of moraine in the Bride Hills.

The island was covered by ice during the last period of glaciation and Bolton's map of the ice for this time shows an ice dome centred over the Southern Uplands of Scotland some 1700 metres in height, with a ridge protruding out over the island towards Anglesey. The contours of this ice map show a steep slope of ice dipping south, which when melting, created a fast flowing ice stream draining the West coast of Scotland.

The geology of the Quaternary in the Isle of Man would seem to be somewhat enigmatic, for although the island has been covered with ice, the evidence to support glaciation is by no means as clear as one would suppose.

Dr Dackombe explored the two avenues of thinking about the comparatively recent geology of the island, each supported by its own body of evidence. The terrestrial viewpoint suggests that the island was indeed covered by an immensely thick layer of ice; the evidence for this being rocks which show worn and striated surfaces in some parts of the island. An example of the crushing force of the ice was shown in one of the slides where a boulder, embedded in the clay, had collided with a granite intrusion that had shattered under the force of the collision. The structure of the Bride Hills would also seem to support this line of thinking, being a fine example of a readvance moraine thought to have resulted from deposits made by the ice as it rapidly retreated from a steadily advancing sea.

The marine viewpoint suggests that the Quaternary deposits were laid down under marine conditions; that soft sediments containing examples of the flora and fauna of the period typical of a marine setting, built up beneath the melting and retreating ice and the advancing sea.

Alternatively, the island, astride an ice flow in the Irish Basin, could have stood proud of the ice. This might account for the comparative scarcity of evidence to support glacial activity. The severely distorted Manx slates found in the uplands show no evidence of having been smoothed by a covering of ice; their shattered effect could well be attributed to extreme weather conditions, such as frost, endured by exposed rock.

Sands show considerable complex patterns of bedding and layering in which comparatively few small, well-rounded erratics are to be found. This suggests deposition by water rather than by ice. The Irish Sea till is unlike most boulder clays as no major erratics are embedded within it. Occasionally, sizeable boulders are found, some with their upper surfaces smoothly worn and containing striations characteristic of glaciation. Generally, the till contains the remains of shells and smaller erratics, which could be the deposits of floating ice, suggesting marine conditions rather than glaciation.

In the uplands, the valleys although appearing to be of the classically glaciated U-shape, are on closer inspection found to be asymmetrical. The major terraces being on one side of the valley only, with sand and gravel drifting down to form fan deposits of drift material, suggesting that they owe their origin to solifluxion rather than to glaciation.

The Bride Hills present some spectacular exposures. Composed of Irish Sea till and sand with pockets of gravel near the surface, there is evidence of tectonic disturbance in the near vertical faulting. These thrust faults are thought to be the result of earthquake settlement. Interestingly, these high angle thrust planes are at the wrong angle to support the idea of glaciation if the ice was pushing from the north. The bedrock of the structure under the beach, however, suggests folding and is probably related to ice advancing from the north.

Dr Dackombe concluded his talk by conceding that although the island was well mapped geologically, there was just insufficient evidence to support either the terrestrial or marine formation during the Quaternary period of the island's history; he did however admit to being a supporter of the terrestrial theory.

Mike Carter

NEWS IN BRIEF

1. Welcome to new members
   Neil Cooper of Stirchley
   Paul Sewell of West Hagley

2. The OU Multimedia Geology course has been nominated for the EuroPrix awards and is among the final five in the 'Knowledge and Discovery' category. Winners will be announced on November 21st after this newsletter has gone to press. The course, relaunched this year, makes extensive use of CD Roms, using virtual reality to enable students to visualise rocks, minerals and fossils in three dimensions. Students can also use the technology to take 'virtual field trips'.

3. Notification of the Lapworth lectures arrived too late for inclusion of all but the December lecture. On Tuesday 14th December Prof. Marge Wilson (University of Leeds) will talk on 'Large igneous provinces - feeling the pulse of the earth'. Talks commence at 4.00 pm. in the Large Hills Lecture Theatre (Room 212) School of Earth Sciences, University of Birmingham.

4. Member Joy Duckworth has sent me a number of Geology Society programmes which she has collected from Ontario, Canada and New Zealand. Their field trips make enviable reading! Good to know we are not alone in our interests. I believe that news of our activities is disseminated by Joy to groups overseas..

5. Geologist Association Field Trips 2000

   The complete list is too detailed to print in full but contact Dr Lynn Allen, 32 Elmcroft Court, Burnet Close, Hemel Hempstead, Herts, HP3 9ES TEl. 01442 267525
   Here is a sample:-

   June 16 -18th Geology of the Sheffield area
   August 4th - 6th The Alston block Granite
   18 - 20th August A weekend with the Shropshire Geological Society
   September 22nd - 24th Ammonites in Dorset and Somerset

   Longer Excursions abroad in 2000:-

   May 22nd - 5th June Cappadocia, Turkey: Dr Jill Eyers
   Mid June N. W. USA the 'Bretz' megafloods: Prof. Peter Worseley
   June /September Uranium! Canada and N. USA: Prof Geoff Parslow

6. University of Nottingham School of Continuing Education Field Trips

   19th - 25th May 2000 Geology of the Isle of Skye. Residential: Ian Sutton
   23rd - 25th June 2000 Geology around Abergavenny. Residential: Judith Rigby and Albert Horton
   22 -24 September Geology of South Devon. Residential: Ian Sutton
   Phone 0115 951 6526 for details

7. Amir Kanwar says he is in the process of organising a new website for us. It will be on **http://www.bcgs.org.uk.** I'm not sure how quickly the new site will be operational but the Society is most grateful to Amir for his interest, help and enthusiasm.

8. This is the first Newsletter in which I have had an active involvement since the onset of an illness in January. Bob and I would like to take this opportunity to offer our sincere thanks to everyone for their kind thoughts and support which has been, and continues to be, a very important aid to my recovery. I am pleased to inform you that my recovery is almost complete and I look forward to continuing to serve the Society in the coming year.

   Sue Fairclough

9. Alf Cole, a committeee member who has contributed much to BCGS, not least in introducing so many new people to Society activities, has had a heart attack but his wife reports that he is doing well. We send him our very best wishes for a full recovery.

10. **Thank you to all who have sent in questions and contributions for the Brains Trust. We still need many more so please don't forget to send in YOUR contributions.**

ANNUAL GENERAL MEETING 2000

Notice is hereby given of the twenty fifth annual General Meeting of
THE BLACK COUNTRY GEOLOGICAL SOCIETY
at 7.45 pm on Monday 28th February 2000 in the Ward Arms Hotel, Dudley

AGENDA

1. Apologies for absence
2. Minutes of AGM held on 8th March 1999
3. Statement of accounts and Treasurer's report
4. Chairman's annual report
5 Election of officers and committee
    a) Chairman
    b) Vice-chaiman
    c) Treasurer
    d) Secretary
    e) Meetings Secretary
    f) Field meetings Secretary
    g) Three committee members
    h) Auditor

Current committee members

Chairman: Alan Cutler
Vice Chairman: Graham Worton
Treasurer ----------
Secretary----------
Meetings: Gordon Hensman
Field Meetings: Catherine Eales
Members: Sue Fairclough Peter Smith Alf Cole
Auditor: Martin Normanton

All posts are honorary and available for re-election. Nominations may be sent to the Secretary or declared at the AGM.

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MONDAY 31st JANUARY 2000 "Brains Trust"

My question(s) for the Brains Trust is (are) as follows-

I am willing to bring a specimen (rock, mineral or fossil) to be identified / discussed.

I am willing to bring no more than 4 slides of geological interest to discuss at the meeting.

I have a further item which may be of interest.

Name
Address

Tel.

SUBSCRIPTIONS 2000

YOUR NEXT SUBSCRIPTION IS DUE ON 1ST JANUARY 2000

Subscription rates for the year are:
Individual £10 Family £14 Full time student £3 Group/Company £28

Subscriptions may be paid at the January meeting or by post to the Acting Treasurer, Mrs Sue Fairclough, 7 Pool Street, Woodsetton, Dudley DY1 3SN

Please enclose the slip below

NAME _____

ADDRESS _____

_____

TEL. _____

Enclosed £ for (type of membership) Date

Cheques payable, please, to the Black Country Geological Society.