



The Black Country Geological Society

Editorial:

People who belong to geological societies are often asked what they actually do. In this newsletter we have two accounts which should help to answer such questions.

On the last field trip, to Hook Norton, Hilary Giltrap found fossil bone which has caused considerable interest beyond our society as well as great excitement within it. The bone went first to Leicester Museum, where parts were fitted together, and the preliminary identification is of a Stegasaur dorsal vertebra. The parts will be matched with specimens from other national museums, and there may be another field survey. The site is one of Special Scientific Interest, but it was about to be de-classified. The find may therefore change the classification.

The increasing links between engineering and geology are well brought out in Douglas Warren's interesting feature on the Channel Tunnel. He attended a joint engineering, geological and geotechnical meeting in London about the tunnel. Geological knowledge will help to reduce the costs and also to save lives, and this is particularly important in the construction industries, because they have a higher rate of deaths and injuries per man hours than do the coal mines.

Forthcoming Meetings:

Monday: 8th June - Field trip to Wrens Nest. Leader Paul Shilston.

Monday: 22nd June - Field trip to Wordsley area. Leader Alan Cutler.

Monday: 6th July. Talk by Dr. D. Gobbett - "Palaeoecology of the Dudley Limestone."

Indoor meetings are held at the Saracen's Head, Stone Street, Dudley: 7.30 p.m. for 8 p.m. start.

Those who would like lifts for field meetings, please contact John Easter - (0384) 274916.

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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 insurance to the level which you feel appropriate. Schools and other bodies arrange their own insurance as a matter of course.

Programme 1987:

Monday 8th June: Field trip to Wrens Nest. Leader Paul Shilston. Meet in car park of King Arthur pub at 7 p.m. Junction of Priory Road and Birmingham New Road.

Monday 22nd June: Field trip to Wordsley area. Leader Alan Cutler. To see the geology and natural history of the area. Meet 7 p.m. at White Swan pub, Brierly Hill Rd., Wordsley, opposite Swan Lane.

Monday 6th July: "Palaeoecology of the Dudley Limestone", talk by Dr. Derek Gobbett. This is particularly about Silurian reefs, and he will use material from Birmingham University.

Monday 14th September. "Accretionary processes in the Formation of the Barbados Reef". Talk by Professor Westbrook of Birmingham University. This will include sedimentary processes near deep ocean trenches.

Sunday 11th October: "New Sites in the Malvern Hills". Leader Dr. D. Bullard. Joint field trip with Shropshire Geological Society.

Monday 16th November: "Geology and Philately". Talk by Dr. R. Bradshaw of Bristol University.

Monday 7th December: "Greenland Geology - Roots of an Old Volcano". Talk by Dr. Andrew Chambers of Birmingham University.

"Green Rock in the Black Country"
Talk by Colin Knipe 9th Feb., 1987:

Many of us know Colin as the senior partner of Johnson, Poole and Bloomer. Not all of us knew that some years ago he took a very active part in the formation of the Institution of Geologists and was later their chairman.

Igneous intrusions were called green rock by miners - hence the title. The green olivine dolerite weathers to a rusty brown. We were

given a resume of the intrusive columnar jointed dolerite of the Rowley Hills and elsewhere in the Black Country and Colin's own conclusions that there were fairly continuous sheets of dolerite underground. Radio-isotope datings indicated Carboniferous and Lower Permian periods.

In the Rowley Hills area the dolerite merged with the coal seams. Old newspaper cuttings and sections showed where coal had been rendered useless. Thus the dolerite was highly mobile when liquid. It had opened out the strata like fingers inserted in the pages of a book. Powke Hill has a dimple or blister of dolerite, and Colin thinks that there were other similar blisters in the Black Country. The dolerite seems to have worked from south to north. In Wednesfield it was from 30 to 50 metres thick. The talk was followed by many questions, and Colin answered them all easily and to our enjoyment.

Douglas Warren:

Field Meeting to Hook Norton:
Leader Brian Boneham. 12th April, 1987:

This field meeting visited an area south and west of Banbury, to see exposures of the Lias and Gault of the Jurassic. The BCGS has not had a Jurassic field meeting for several years, so we were looking forward to this one.

The first site was Alkerton Quarry (386428) in the Middle Lias. The quarry is being actively worked for iron ore, and good exposures of the Marlstone Rock were seen. The ore contains some 6% iron in the form of chamosite, and as it also includes limestone, it is particularly suitable for steelmaking. At this time there was a shallow marine environment, and several horizons in the quarry produced oysters, ammonites (Pleuroceras), as well as death assemblages of brachiopods.

The second site, Horley Nature Reserve (415432) was in the same horizon of Marlstone Rock, but some 20 feet higher in the sequence. These had

also been ironstone quarries but are now derelict. The environment was also mostly shallow marine, with lagoons and pools, but at the railway cutting the strata were more 'blocky' and less sandy due to deposition in deeper water. At the next quarry we were higher up the Jurassic sequence, in the Bathonian of the Great Oolite Series. One of the horizons yielded oyster remains and Hilary found the bone mentioned in the editorial. The final site in Hook Norton railway cutting (359322) showed Upper Lias Clay with limestones above. Fragmented fossils were found in the limestones, but also of interest was the landslip which had blocked, and finally closed, the railway. The clay, with limestones above, was dipping to the west, across the line of the railway. This caused the unstable east bank to the cutting, and there had been several serious landslips before the line was finally abandoned. During the whole of the day we had glorious sunshine, and this completed a very interesting day in a new area.

The Channel Tunnel:

An engineering, geological and technical overview. 10th Feb., 1987:

This was the title of a joint meeting of the Engineering Group of the Geological Society with the British Geotechnical Society and the British Tunneling Society. There was a good mix of geologists and civil engineers present, and 40 people were unable to gain access to the lecture room at Burlington House! There were six speakers.

1. Introduction - Organisation of Eurotunnel and Transmanche-link.

C. J. Kirkland, Technical Director Eurotunnel, Chairman British Tunneling Society, Vice-President International Tunneling Association. This will be the longest sea crossing in the world. There will be three tunnels, one each way for trains, with cross over tunnels. Between these tunnels will be a pilot

tunnel linked at 370 metre intervals with the train tunnels. The pilot tunnel will contain many of the services. The trains will carry coaches, cars, heavy goods vehicles and vans.

The financial and civil engineering administrative framework was described. The total cost of the scheme including rolling stock, as at January 1986 was estimated at £4,780 million with a seven year contract and a start by the U.K. late this year. The French have started work on a new shaft. About 200 people were doing design work. 7,000 soundings have been made, 3,000 samples have been taken, and 52 documents already exist on the geological considerations alone. The succession is:-

Upper and Middle Chalk,	
White and Grey Chalk) Lower
Chalk Marl) Chalk
Gault Clay	

2. Technical Aspects of the History of The Tunnel. G. West, Transport and Road Research Laboratory.

An illustrated description was given of tunnels prepared by:-

Albert Mathieu 1802.

Thome de Gounard 1867.

In 1882 the Brunton and Beaumont English Tunnelling machine was built. In 1881 a scheme on a route similar to that of the present proposed, was started. A total of 2 $\frac{3}{4}$ miles of tunnel were driven from France and England. By then it was realised that in abrasion between metal and rock, the metal comes off worse. This abrasion can be minimised by using a rolling cutter, and thus by pressure you burst the rock open. It was also accepted that the tunnelling machine must be as stiff as possible to avoid the loss of energy by elastic compression. This machine proceeded at 4 feet per hour. A practical difficulty in those days was the provision of power, and the opening of the Faulkes electric railway in Brighton during 1883 gave an impetance to tunnelling machine development.

The Whitaker Tunnelling machine originated in World War One. It was designed to tunnel under enemy lines and blow them up from below. It was

powered by a 120 h.p. electric motor, and proceeded at 9 feet per hour. An improved model was produced in 1922.

In 1975 at the Shakespeare Cliffs a 17.8 feet diameter Priestley Tunnelling machine started work with picks and discs. A Robin Tunnelling machine on the French side was not used.

The TRRL have done tests of picks and discs. The progress made was slightly less with discs. (Optimum machine design could vary with the strata involved). Sir Alan Muir Wood, the special guest invited to participate, pointed out that it was the late H.J.B. Harding, a former president of the 'Civils' who was the real sponsor of the tunnel. He worked hard at the project between 1958 and 1964 and it was in 1964 that there was a conflict between private and government finance. He also pointed out that cooling by compressed air was of great use in tunnelling work.

3. The Geology of the Route.
Professor M. B. Hart, Head of Department of Geological Sciences, Plymouth Polytechnic.

The Gault Clay was overconsolidated. The Lower Chalk has a very complicated lithology. Below the surface it can be cut with a knife, but if it dries out it can be very hard.

From 1964-5 a micropalaeontological investigation was undertaken to obtain knowledge of the Lower Chalk. 125 million foraminifera 0.1 to 0.5mm. across were picked up by sable brush and stuck on slides! 600 different species were found. The biostratigraphy of the Lower Chalk was determined using the foraminifera evidence. The middle Chalk was nodular and very hard. 120 boreholes were driven at 1.25km intervals. 26,000 samples were looked at and the rate and flow of currents at the time of deposition were determined.

A whole series of major unconformities were found, and the line of the tunnel was moved to avoid areas of unconformity as far as possible

Sir Alan Muir pointed out that in the 1958-59 period no money was available for sampling. Geophysics however provided some useful information.

(The second half will be in the next issue).

Douglas Warren:

Medway Gem and Mineral Fair - 20th June at Hempstead Valley Shopping Centre (Savacentre) M2 Motorway, Junction 4. 10a.m. - 6 p.m. Admission 40 pence. Information R. W. Thomas, telephone Medway 31052. Field trips to three sites on 21st June:-

1. Warden Point Sheppey - Eocene, London Clay - shark, fruit, molluscs.
2. Copt Point, Folkstone, Gault Clay - ammonites, belemnites, crabs, molluscs.
3. Abbot's Cliff, Folkstone - Upper Cretaceous Chalk - ammonites, bivalves, brachiopods.

The fair itself sounds very interesting and well organised, and includes displays by 25 dealers. Ample parking.

University of Sheffield, Division of Continuing Education, 85 Wilkinson St., Sheffield S10 2GD.

5th-7th June: Mineralisation of South Pennine Orefield - Derbyshire.

3rd-5th July: Mineralisation of North Pennine Orefield.

11th-13th Sept: Geology around Appleby.

North Staffs Group of Geologists' Association. Sec., A. Fleming, 1 Teanhurst Close, Stoke-on-Trent, ST10 4LN. Tel. 722443.

1. 19th July. Tideswell. Field trip to Lower Carboniferous, and demonstration of field-work techniques.
 2. 27th Sept. Field trip to Tissington, Lead by Dr. N. Aitkenhead of British Geological Survey, about the new Ashbourne map 124.
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28th International Geological
Congress: Washington DC, USA -
9th-19th July.

A fascinating and detailed programme has been received, covering many pages and every possible topic, (for viewing please ask Paul Shilston) and there are field trips in Alaska and the Rockies and Cascade mountains as far south as California and to the Mid-West, and Appalachians. Anyone organising a field trip to the field trips will be expected to write it up for the rest of us!!

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From the Papers:

Science report

Mapping the molten centre of the Earth

By Keith Hindley

Seismologists have uncovered evidence of structural detail in the previously poorly defined region of the Earth's metallic core. It has come from studying the way in which the velocity of shock waves from major earthquakes changes as the vibrations echo through the globe.

Computer analysis of 20 years of seismic records by two separate groups has produced images of slices through the Earth showing far more detail than anyone has seen before. They are similar to the CAT-scan tomography slices taken routinely to show the internal detail of a patient's body for medical diagnosis.

Dr Kenneth C. Creager and Professor Thomas H. Jordan, of the Massachusetts Institute of Technology, believe they have found regions of different composition and temperature close to the boundary between the outer molten core and the overlying rocky mantle. They call the structures "continents" since they appear to float on the metallic sea of the molten core in just the way that the surface continents float on the molten mantle.

These formations must be far less rigid than continental plates such as Africa or Asia but their size and shape appears to be controlled by the flow of materials at the core-mantle boundary. There is no obvious relationship between the two forms of continent but the two could be linked by heat flow from deep within the earth.

Dr Andrea Morelli and Dr Adam M. Dziewonski, of Harvard University, have reached similar conclusions, but they argue that their results are best represented by anomalies inside the metallic core itself. They think the structures may be circulating currents set up within the liquid core as it cools and adds to a growing solid below.

These preliminary results were announced recently at a meeting of the American Geophysical Union but they provide a first tantalising glimpse of a region which powers much of the world's geological processes.

Currents in the liquid core generate the Earth's magnetic field and provide heat for the mantle.



THURSDAY OCTOBER 9 1986

Fossils make a comeback — 400m years on

FOSSILS dating back 400 million years have been donated to Dudley Museum.

Now the borough's newly-appointed Keeper of Geology, Mr Colin Reid, has put out an appeal for other old collections of fossils that may be hidden away in garages and attics.

The appeal follows the arrival of a fossil and mineral collection, bestowed to Dudley by Mrs Joyce Wedge of Southampton.

She bought the collection at an antique sale in 1979. Museum staff describe it as "the most historically important collection to enter the

borough's collection since the early part of the century".

Included in the collection are a number of 400-million-year-old fossils from Wren's Nest, Dudley, including the Calymene trilobite, the famous Dudley Bug, plus a sea lily, which was exhibited at an important meeting of the British Association.

Mr Reid said: "Mrs Wedge decided to give the collection to the museum as she felt that it was where it really belonged.

He said improvements had been carried out within the museum over the past four years by assistants employed through the Manpower Services Commission scheme.

These had resulted in the restoration of the museum's world famous fossil collection and installation of proper storage facilities, ensuring a good home for Mrs Wedge's collection.

Now the new geology curator is appealing for people to search through sheds, attics and garages to see if they can unearth any old collections of fossils that they may have stored away.

"People have been collecting beautiful fossils at Wren's Nest and Castle Hill for hundreds of years, particularly during the period when the old limestone quarries were in operation," he said.

"I'm sure there must be families in the vicinity who still have boxes of specimens collected by relatives or ancestors which are still lying in old cupboards or dusty attics."

Mr Reid said that while the museum could not guarantee all material would be of high enough quality to be retained and displayed by the museum there were bound to be some fossils of great interest or, like Mrs Wedge's collection, of considerable historic importance.

Part of the collection will be displayed at an open day of rocks and fossils planned for the summer.



Calling for more collections ... Colin Reid with the Dudley Bug