



NEWSLETTER NO. 105 JUNE 1994

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 to use it when you feel it is necessary or when a site owner makes it a condition of entry.

FUTURE PROGRAMME

Lecture meetings are held in the Banquet Room (Dudley Suite) at the Ward Arms Hotel, Birmingham Road, Dudley. Phone: (0384) 458070. 7.30 p.m. for 8 o'clock start.

SUNDAY 12TH JUNE. Field meeting to the Forest of Dean. Leader: Roger Vaughan (Bristol City Museum).

Meet 11.00 a.m. at the entrance to Edgehills Sand Quarry (grid ref. 659169). This is on the A4136 road, about one mile south of Mitcheldean, at the top of Plump Hill opposite the entrance to the Wilderness Field Centre.

The Forest of Dean is an outstanding geological area with Devonian and Carboniferous strata and Roger Vaughan has planned an itinerary visiting a number of quarries showing good exposures of them.

ROGER VAUGHAN is a geological conservator with Bristol City Museum. He mapped the Wigpool syncline as part of a student project in 1984 and has taken many parties to the area. A few years ago he lectured to the Society on the excavation of the dinosaur found in Snowhill Quarry in Gloucestershire.

HARD HATS ARE REQUIRED FOR THIS FIELD MEETING - members must provide their own.

MONDAY 20TH JUNE. Lecture: "Australian Journey" by Paul Shilston.

PAUL SHILSTON writes: "This talk is based on a recent six week visit to Australia and will describe some of the geological highlights we saw. There is a wealth of geological interest in Australia and this talk will only give a few snapshot views.

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Ayers Rock definitely is a ROCK and therefore involves geology, but the talk will also include gold mining in Ballarat, volcanic features at the Glasshouse Mountains near Brisbane and the Atherton Tableland near Cairns, the Great Barrier Reef, the Arnhem Land escarpment and features of the Red Centre including the Olga Mountains, Kings Canyon and of course Ayers Rock."

SUNDAY 3RD JULY. Field Meeting to Derbyshire with a lead-mining theme. Leader: Lynn Willies (Peak District Mining Museum). (Joint meeting with Manchester Geological Association and with North Staffs Group of the Geologists Association).

Meet 10.30 a.m. at Magpie Mine, Sheldon near Bakewell (grid Ref: 173682). FOR THE LOCATION OF MAGPIE MINE - SEE THE MAP WITH THIS NEWSLETTER. The morning will be at Magpie Mine, an old lead mine where there are substantial surface remains. These include the engine, winding and boiler houses and other buildings which have been preserved as a historical monument of the lead mining industry. The mine was worked for at least 170 years (finally closing in 1959) and Lynn Willies will describe the site and its history, probably including a visit to Magpie Sough (the mine drainage outlet).

The afternoon will start at 2.00 p.m. at the Peak District Mining Museum in Matlock Bath (grid ref: 294581) where Lynn Willies will give a guided tour of the Museum displays on the history and development of mining in the area, including typical minerals. This will be followed by a visit to the nearby Temple Fluorspar Mine which is owned by the Peak District Mining Historical Society and has a section open to visiting parties.

There is a charge of around £2 per person for entrance to the Museum and Temple Mine but a drink of Matlock spring water can be obtained free!

LYNN WILLIES is heavily involved with the Mining Museum and with the Peak District Mining Historical Society. He has a great knowledge of Derbyshire lead mining and played a major part in the preservation of the Magpie Mine surface works.

HARD HATS ARE REQUIRED FOR THIS FIELD MEETING - members must provide their own.

FRIDAY 22ND - SUNDAY 24TH JULY. Weekend field meeting to the Chester area. Leaders Dr. Jerry Davies (BGS), Dr. David Thompson (Keele University) and Dr. David Wilson (BGS). SEE SEPARATE NOTICE IN THIS NEWSLETTER.

5TH - 9TH SEPTEMBER. BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE. 1994 ANNUAL CONFERENCE - LOUGHBOROUGH.

SATURDAY/SUNDAY 24/25TH SEPTEMBER 1994. 10 a.m. - 5 p.m. each day. DUDLEY ROCK & FOSSIL FAIR - Town Hall & Museum, Dudley.

SUNDAY 2ND OCTOBER. Field meeting to the Bridgnorth area. Leader: Dr. David Thompson (Keele University).

MONDAY 24TH OCTOBER. Lecture: The Geology of the Isle of Man. By Dr. Trevor Ford (Leicester University).

MONDAY 14TH NOVEMBER. Lecture: "Geology - without a rock hammer?" By Kathie Bowden (National Remote Sensing Centre, Farnborough).

MONDAY 28TH NOVEMBER. Lecture: Pleistocene geology of the loess plateau of China. By Dr. David Keen (Coventry University).

MONDAY 16TH JANUARY 1995. Lecture: Tales of teeth and tails - the origin of fish". By Dr. Paul Smith (Birmingham University).

FEBRUARY (date to be advised) 'AGM followed by a talk "Geology of Iceland" by Alf Cole (Society Member).

EDITORIAL

Since in recent editions of 'Geology Today' the Society has frequently had honourable mention, I shall reciprocate by commenting on how much of interest I found in a recent issue. It contained a splendid article on the costs and arguments for and against drilling different types of deep holes in the continents and the prospects for reaching the 'Moho'. Another article detailed the use of industrial minerals in our daily life, from 'kitty-litter' (the article was American!) to golf clubs and television sets. I learnt elsewhere how British attempts to run down the coal industry are in sharp contrast to the increasing use of coal in the USA and the Pacific Rim. My fears about the safety of dumping intermediate nuclear waste were heightened by an article quoted from the 'Observer'. Also there was a song, written in French in 1913, "La Chanson Du Moine Thrust" but it didn't translate well! A book on Geology by Richard Fortey, Chief Palaeontologist at the Natural History Museum "The Hidden Landscape" has won a prize from the Royal Society of Nature Conservation and sounds a tempting read - and all this richness can be obtained at a discount, by members of our Society.

REPORTS

Groundwater Supplies in the Severn Trent Catchment, Monday 18th April.

Mr. R.I. Rodgers (ground water planner for Severn Trent Water) explained that Severn Trent get most of their groundwater from Triassic Sandstones, a little from the Carboniferous Limestone and some from Permo-Carboniferous Sandstones.

Severn Trent has 210 groundwater sources from which it obtains water from 384 boreholes, 28 springs (notably on the Cotswold Edge) 2 adits and 1 river infiltration gallery.

The Triassic Sandstone is estimated as having a renewable resource of 1804 mega litres per day for which Severn Trent holds a licence for 1420 mega litres. The water board is unable to extract to the limit of its licence due to environmental constraints enforced by the National Rivers Authority i.e. the need to protect baseflow, groundwater levels, wetland habitats and S.S.S.I.s.

The early pumping stations were built close to the areas of demand. Big wells were built and large steam driven engines were enclosed in massive buildings.

A later stage tapped sources further from towns. Wells placed near rivers tended to cause the rivers to dry up.

Later still many boreholes were sunk to cover the whole of a rock's outcrop and, as pumping exceeded rates of recharge, adjacent confined i.e. concealed, areas of source rock would sometimes dry up. Strategic aquifers are over licensed and often over abstracted.

Mr. Rodgers concentrated his talk on the Nottingham area. Problems facing the water board are: high and rising nitrate levels, over licensing, over abstraction and meeting the growth in demand. The nitrate problem is 'solved' by blending water from high and low nitrate sources, e.g. nitrogen rich water from Nottingham is blended with low nitrate water from the River Derwent. Growth in demand will be met by extending treatment of surface water. In the future Severn Trent may have to move to nitrate treatment but this is expensive and awaiting improved technology. At present Severn Trent are increasing abstraction from the Triassic Sandstone where it lies beneath the Mercian mudstone and are thus obtaining less contaminated water.

In nitrate sensitive areas farmers may be compensated for changing their farming practices to reduce nitrate levels.

Questions revealed that confined water may be 10,000 years old, though that abstracted from outcrops may be very recent. Water may take 10-15 years to reach the water table.

Ground water is cheap. Surface water is twice as expensive as it requires more treatment.

Nottinghamshire coal mining causes problems. Subsidence can cause boreholes to collapse. Water from coal mines tends to be high in sulphates but provides baseflow and can be used to dilute sewage. Closure of mines will lead to a rise in water table and water will flow southwards and not to the west where it is needed. Recharging the Triassic sandstone is difficult as it has limited permeability owing to lack of fissures.

Mr. Rodgers assured us that Quality Standards are rising, especially with regard to nitrates, pesticides and organic contaminants.

K.M. ASHCROFT

Visit to Salt Union Ltd., Winsford Salt Works, Winsford, Cheshire.
Wednesday 27th April 1994

Arriving early to allow for picnic time proved to be a bonus on this mid-week expedition. We parked by the side of the river Weaver and enjoyed three quarters of an hour of Springtime. Construction work reduced the width of the river for crossing purposes. The blocks comprised sandstone and limestone and in the latter was the best array of coral fossils I have ever seen. Though somewhat removed from their place of deposition, they were nonetheless fascinating. The sun brought out the vibrant gold of the dandelions and the spring greenery. With the river sparkling and rolling gently by, a better scene could not have been set up as a stark contrast to our impending underground journey.

In the reception area we met Surveyor David Egerton who was to be our leader. We donned dust coats, hard hats and safety goggles and collected lamps. A large map showed the huge area already mined. We were to visit just 8 miles of the hundred miles of tunnels.

The mine has been in existence since 1844 and a further 25 years mining rights have been acquired from the local council (mineral rights were secured many years ago). The company is very aware of public thinking and everyone living above areas mined/to be mined are kept fully informed of what is going on underneath them.

The original shafts sunk in 1844 were filled in and sealed in 1975 and the three existing shafts were sunk in 1940, 1964 and 1973. The earliest shaft is 3m in diameter, 145m deep and is used today as a man-riding and service shaft. The second is 4.9m diameter, 183m deep and is used as a ventilation shaft and for lowering heavy machinery and vehicles into the mine. The third is 4.9m in diameter, 144m deep and contains fully automatic skip winding equipment for hoisting the mine's production to the surface. Everything is assembled underground and no machinery is ever taken back out again. All remains as silent testimony to the many years of mining activity underneath Winsford. As the mining progresses chambers are enlarged for storage and maintenance and the belt conveyors and equipment are constantly moved towards new faces.

The rock salt is 93-95% pure and 95% is crushed and used on our roads. One million tons is produced annually. With the rapid development of motor transport and the road system in the 1950's and the need to keep road traffic moving in winter, mining operations developed in scale and sophistication, especially from 1960 onwards.

ICI rock salt products are also used as a fluxing agent in non-ferrous metals refining, in some animal food compounds and as a fertiliser for sugar beet and mangolds! but the biggest demand is for ground material for clearing roads of ice and snow. It is specially screened for mechanical spreading and consists of a balanced range of fine and coarse particles to give both rapid action and a prolonged effect on snow covered and icy roads. Even in the open without cover, the salt can be stored for very long periods without setting because it is specially treated.

First improvements in the mine for the workers came in 1928 when electric lighting and modified mechanised coal mining equipment were installed. Until then the usual primitive mining conditions prevailed. Black powder and picks and shovels were used to win the salt and tallow candles provided lighting. Today the mine has modern productive equipment comparable with any in the world.

The rock salt is extracted from working faces about 20m wide and 7.5m high to form a series of rooms/caverns by leaving behind about 35% of the total area in the form of giant square pillars to support the roof.

The rock face is undercut at floor level and overcut at roof level to a depth of 4.5m using universal rock cutting machines mounted in the latter case on a massive mobile gantry. The face is then drilled to a standard 2 x 255 pattern using an electro-hydraulic rotary drill. These drill holes are charged with explosives and short delay detonators by two men working from a special mobile platform vehicle and the face is blasted to bring down about 1,500 tonnes of well fragmented rock. This operation takes place three times a day. There is a total workforce of 70, with 54 men working underground.

The blasted out rock is picked up by load-haul-dump vehicles equipped with 11m³ capacity buckets which carry it a short distance to a mobile feeder breaker which crushes the biggest rocks down to size suitable for transport on a belt conveyor. It continues its journey by belt conveyor to the shaft measuring pockets where it is weighed prior to

being fed into 9 tonne capacity skips which shoot to the surface in two lifts.

Our visit began with a 500ft descent in the 1940 shaft after which we clambered into an open backed vehicle to bounce off on the start of our 8 mile journey. I for one was affected very early on by the diesel fumes and coupled with the motion of the vehicle I thought there was a strong possibility of some sea sickness. I mentioned to one of the party that it must be like this "on safari" but she assured me that experience is far worse.

The shiny, glassy "roads" are made of saltcrete and they rise and dip following the lower cutting surface of the extracted beds. They are well sign posted for those in the know but to us it was a complete maze. Our leader turned off the security of our little vehicle's lights for a few seconds and bumping along in total darkness led to a certain degree of disorientation. Pinpricks of light in the distance became mini-havens as we headed towards them. The orange-lit galleries for storage/working were art in action underground.

We made various stops to look at the cutting patterns of the machinery and the machines and vehicles themselves in action. The whines and screams and relentless movements of the drills, dumpers and crushers made it seem like a mechanical Jurassic Park. A large block of the rock salt had been left in one gallery. We put our lamps on to it and a stunning lighting effect was produced and indeed there was a lamp made of rock salt in the reception area. The degree of colour grades from colourless to brown and the transparency from transparent to opaque.

All doors are automatic and coupled with the element of surprise appearing out of the darkness our trip became somewhat reminiscent of a childhood ride on a ghost train.

Towards the end of the trip we saw the huge CAT in the inspection pit, engine removed for servicing. This vehicle sports a 28 tonne bucket with 9ft diameter tyres which cost £15,000 each. Then we watched huge chunks of rock being dumped by the load-haul-dump vehicles into the maw of what seemed to be a surprisingly small mobile feeder breaker but it certainly did the job. We could taste salt quite strongly most of the time we were down the mine and even in the reception area. We were taken to one face (in use but not working) and let loose to bring away as many samples as we cared to carry from this hidden Aladdin's cave - and we did! Plenty of time was allowed for taking photographs and there was much scope for beauty as well as for interest.

Not knowing anything at all about the mining of rock salt, I queried the difference between the deposits in this mine and the ones where the salt is extracted as brine and there is none. Water is pumped down and brine is pumped out but a finer processing is carried out and the end product finishes up on our tables. Down Winsford "What you see is what you get".

A lot of space is created as the workings move forward and the possibility of use was questioned. To date only small areas are used by companies like British Aerospace for testing new equipment. Above ground, of course, interference is received from radio waves. As well as C.F. Europe testing computers, ICI have a huge compound for storing documents in the mine.

Although it had been a seemingly long and quite intensive visit due no doubt to the amount of travel, the many stops and the feeling of total isolation brought on by the intensity and stillness of the darkness

surrounding our little havens of light, we were reluctant to leave. It had been fun as well as being very informative and the ascending lift resounded with much chatter and laughter.

Salt Union arrange 2-3 visits each week not only for customers but societies such as ours and colleges etc. They make no charge but they do ask for donations for the charities which they support and everyone was very happy to comply with the request.

We finished the afternoon off by returning to the banks of the Weaver and I suggested to my husband that he write a piece of music inspired by the visit. (As a non-geologist he had been quite enthralled). "Winsford Salt Works" doesn't have quite the same ring as "Fingal's Cave" but there was as much beauty and atmosphere in this mine as any composer could wish for.

HILARY GILTRAP

NEWS IN BRIEF

1. Welcome to new members

Dave Every - Redditch
Ron Whitfield - Kidderminster

2. Wales has less than 10% of the mineral species known to science. However, if you need to identify Welsh minerals, help is at hand. 'A Mineralogy of Wales' is written by Richard Bevins, Head of the Mineralogy/Petrology Section of the National Museum of Wales. It contains descriptions of all 340 mineral species identified in Wales together with records of their distribution and modes of occurrence. Lavishly illustrated, it is available, price £25 plus £2-50 postage, from the Bookshop, National Museum of Wales, Cathays Park, Cardiff CF1 3NP.

The Forest of Mercia is being planned as a Community Forest and will consist of a mosaic of woods, farms, native areas and parkland. The area designated covers 92 square miles and extends from the western margin of Sutton Park to the eastern edge of Penkridge. Much of the area has less than 3% of woodland at present.

The Society has been providing information to the Office Manager of the forest on sites of Geological interest within the forest area. Graham Worton will liaise on behalf of the Society (what should we do without him?) and information is being sent from data bases held at Stoke and Dudley Museums.

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