CHARNIA

Newsletter of the Leicester Literary and Philosophical Society

Section C: Geology

Winter 1993

Micritic Milldale Limestones Massive Mud Mounds and Mineralisation in Millstone Grit.

Mike Goodwin

Eleven OUGS Members and three dogs assembled on a slightly damp Sunday morning, at the Waterhouses Picnic Area car park, a brisk crossing of the busy A523, Ashbourne to Leek road, led us to the entrance of Brown Edge Quarry Geological Nature Reserve, managed by the Staffordshire Wildlife Trust and the North Staffordshire Group of the Geologists' Association, the reserve is open at all times to visitors and is enhanced by a number of display boards describing the geological features of the site.

This Lower Carboniferous sequence was originally formed as horizontal layers of sediment in the Widermerpool Gulf, when Britain was near the equator, 350Ma ago, subsequently tilted and uplifted above sea-level, about 290Ma ago, during the Variscan Orogeny, at the end of the Carboniferous Period. Erosion took place during the semi-arid Permian and Triassic Periods, when red beds were laid down, solutions from these beds percolated down, causing haematite staining of the limestone.

The older, fine-grained, Milldale Limestones dip to the South-West underneath the younger Hopedale Limestones, (8 metres thick) which outcrop at the North-West end of the quarry.

Closer investigation of the Milldale Limestones revealed Crinoid stems, trace fossils and the occasional colonial coral, the Milldale Limestones were probably deposited in still waters with occasional periods of current activity.

The Hopedale Limestones showed graded-bedding with the grain size decreasing upwards, probably turbidite deposits, caused by the flow of sediment laden currents down submarine slopes, under the influence of gravity, the largest particles being deposited first.

At the Eastern end of the quarry, two masses of unbedded limestone were visible on the quarry face, these contain no signs of reef-building organisms and may be described as carbonate mud mounds, small versions of the Dovedale Reef Knolls which we would soon be studying at the next location. At this part of the quarry the view to the south yielded a clear exposure of Triassic sandstone overlaying the limestones in the quarry face of the cement works at Cauldon Lowe.

The short drive to Dovedale was enlivened as we passed runners in the Ashbourne Half-Marathon and Fun Run, as they struggled up the steep uphill stretch between Dovedale and Ilam, the facial expressions of the runners were hardly suggestive a 'fun' run. As we got out of the cars the sun came from behind a cloud and the rest of the day remained dry.

As our small, intrepid group braved the vast hoards of daytrippers, we were told that although the mode of origin of the Dovedale Reef Knolls is still debated they consist of massive poorly-bedded mudstone cores, with thinly-bedded coarser flanks, Thorpe Cloud being a typical example. It is thought that bacteria and algae played a major role in their development, together with hyrdrothermal and volcanic activity providing nutrients for enhanced bacterial growth, the early Carboniferous mud mounds resulting from the progressive closure of the Rheic Ocean, which culminated in the Variscan Orogeny. The walk along Dovedale showed that the mud mounds are fairly resistant to erosion, near vertical cliffs and pinnacles have formed, weathering sometimes giving the appearance of peeling.

As we continued to walk along the dale we passed caves and pinnacles, some impressively named, the Twelve Apostles and the Tissington Spires, some with attendant climbers, inspiring jokes about bright red mineralisation between climbers, although there was a tendency to string this joke along a little. We were besieged by a party of junior opinion pollsters complete with clip-boards, who turned out to be a school party on a GCSE project. At the furthest point of our walk we investigated a small cave from which water flowed into the River Dove, the cave was very small and the limestone very dense so why did this much water issue from the cave? The answer was found by looking up, two fault lines were visible near the rear of the cave. We retraced our steps, back to the car park, this time crossing the river at the well worn stepping stones, noting the crinoid stems on the stones as we stepped across.

After an alfresco lunch at the car park, we drove to our third location, the Derby Hills Quarry. The quarry faces exposed the sandstones and conglomerates of the Sherwood Sandstone Group from the early Triassic period and these rest unconformably on Lower Carboniferous limestone. It is believed that the missing coal measures and millstone grit were eroded in semi-arid Permian desert conditions. As we studied the quarry faces we could find evidence of high velocity discharge, the gravel beds, and evidence of low velocity discharge, layers of fine sand and silt. Layers of flat lying pebbles are evidence of gravel bars, the cross-bedded pebbles having slipped down from the bars.

The Sherwood Sandstone Group is widespread in the Midlands, it is composed from the erosion debris of the former Variscan Mountain chain from the South. These materials were transported by a huge braided river, with alternating periods of high and low velocity discharge, the material is believed to have come from as far away as Cornwall, the English Channel and Brittany.

We drove a few miles to the fourth and final location of the day, at Alport Heights, an aptly named spot, we spotted landmarks up to 30 miles away to the south and west, just below this point was the site of a small, long disused millstone grit quarry. An unusual feature was a column of millstone grit standing in isolation at the front of the quarry, various explanations were suggested for its existence, none sufficiently convincing to be acceptable to the group. This Mid-Carboniferous fluvial deposition is believed to be the delta-front of a river originating from the north. Evidence of cross-bedding could be found in many of the blocks, several of the blocks had quite extensive sheets of mineralisation exposed on one of their faces, several suggestions, from our group were made regarding this mineral, until we eventually found that it was barites.

Our thanks must go to Brenda Humphreys and Muriel Wright for a very varied selection of depositions in four locations so close together and for such an informative and entertaining day.

Mike Goodwin graduated with honours from the Open University, specialising in Computing and Electronics but took geology as an interest. His degree was awarded in 1991, and confessed to me on this trip that he now had more spare time, hence was persuaded (?) to write this report.

Quarry Quagmires

Roger Baker

A post-exam celebration it had said, but the weather was anything but celebratory, having engaged in an orgy of serious dampness for the preceding three weeks. Anyhow, off I set at 7.15 for a quick sprint up the M20/M25/M11/A604/A1 to arrive in Ketton village (SK9884051 - about 55km south of the grid reference quoted!), in good time for the 10 o'clock start. Some 14 similarly sodden souls assembled in the squally showers awaiting our guide for the day, Alan Dawn.

The area around Ketton is part of the major Jurassic oolitic outcrop that stretches from Dorset to the Humber by way of the Cotswolds, Northamptonshire and the Lincoln Edge. It was laid down some 170 million years ago when Britain was at a latitude of about 30° N with a climate somewhat similar to that enjoyed today in the Bahamas or Mississippi Delta. The actual environment of deposition varied significantly during that period, but for the most part Ketton lay in a broad area of shallows stretching SW-NE separating the Pennine High from a low-lying E Anglian platform. At Ketton Quarry itself 3 major sequences are exposed, each worked as a separate bench at the quarry face, especially for the benefit of OUGS students.

As soon as everyone had assembled, signed in and paid their respects to the gold pan (=dustbin lid, or Sandy's Royal Ascot hat circa 1985?) we headed up the hill to the quarry entrance where Alan let us all in . . . . First mistake of the day - I had brought walking boots naively expecting that Middle Jurassic limestone would be intrinsically dry underfoot, whereas the quarry revealed a vast expanse of oolitic mud! "Oh well, just have to choose my path carefully" - I usually do spend most of the time looking at the ground anyway. As if that wasn't bad enough, I made my second mistake of the day - whilst contemplating the liquid landscape I did not step back quickly enough when John asked for volunteers - and I found myself nominated scribe. Feeble protestations about a lack of writing implements were countered by the loan of a pencil guaranteed to write in the wettest of conditions, and the only advice given was that the account should contain at least one pentasyllabic work (will that do John?).

Ketton quarry is worked to supply the adjacent cement works with its raw materials, limestone, clay and gypsum, and there appears to be very little removal of overburden or waste material. The face itself is some 1½ miles in length, being the largest in the East Midlands and rivalling that of Tunstead in Derbyshire (of late-lamented S238 Summer School fame). The lowest exposures at the quarry floor are of Inferior Oolite/Lincolnshire Limestone/Lower Bajocian (why, oh why do there have to be so many names for the same thing?). The sequence is some 15m thick, being of poor quality stone at the base, but the upper beds comprise a creamy oolitic limestone, many blocks of which exhibit a vividly contrasting "Blue Heart" of pyritized oolite. These upper levels yield blocks of considerable size, a number of which were set out on the quarry floor awaiting the attention of the local stone masons. At the top of the sequence is a band of low-grade ironstone, full of wood remains and clasts of clay. The depositional interpretation (a double pentasyllabid!) is of a high energy marine barrier transgressing a protected lagoonal environment, followed by a period when the area was again close to land.

We then walked up to the next bench, which is set on an erosion surface, and represents a gap of some 5 million years. Talking of gaps, there are many solution cracks in evidence, some of which could be traced for a hundred yards or more across the bench floor, wide enough to swallow a lorry wheel - or unwary geologist! The face here exposed the Rutland Formation of Upper Estuarine Clays, above a distinctive Ironstone band - the Stamford Member (not sure if he had paid his dues) - which represents the infilling of a freshwater lake. The estuarine series itself consists of a number of cycles of shelly beds fining up to silts capped by rootbeds, which in turn are truncated by fresh shelly sequences. This has been interpreted by a large deltaic margin subject to tectonic subsidence and hence periodic marine transgressions. Here we could see clearly a distinct normal fault in the quarry wall with a downthrow to the face in this locality was very unstable, and the need for hard hats obvious as we witnessed parts of the face slumping not twenty yards away from us.

The third and highest level in the quarry is exposed in more ways than one, and there was a general donning of an extra layer of windproof clothing. Here we examined the highly fossiliferous Blisworth Limestone, which is only a metre or so thick in this quarry, and represents a return to a higher energy, but more stable marine environment. Of particular interest however was that the quarry workings have recently uncovered the overlying Blisworth Clays, with clear bands of gypsum in "cone-in-cone" formations. To complete the story, the whole sequence is topped with a very impressive boulder clay of relatively recent date.

By now the need for sustenance was compelling, so we made our way back to the cars and down the hill, pausing only to make a brief inspection of the yard of Ketton Stone Masons. Here we could see amongst other stone, examples of the Ketton Freestone in various states of dressing, for use in the restoration of many local buildings, as well as a number of Cambridge Colleges. Ketton village just happened to furnish an appropriate hostelry (what incredibly clever planning!), and in the "post-exam celebration" rapidly began to take on the form of a wake (in memoriam Summer '92?). However we eventually stirred our stumps and a funereal cortege of 11 cars headed southwards from the village - under the distant scrutiny of the local constabulary.

The target for the afternoon's examination was Crossleys Quarry off the A447 at (TF032005), some 3 miles SE of Ketton. If the terrain in the morning was typified by mud, the afternoon was to be decidedly aquatic, as the floor of the quarry in places was several feet below water level. Alan assured us that it had been bone dry in the summer! The quarry itself is not regularly worked, but appears to be a recession store of mountains of graded limestone.

What was clear however was that although the Jurassic oolite may be continuous and extensive on the SW-NE axis from Dorset to Humberside, its character and thickness varies significantly in a distance of only 3 miles at right angles to this line. Yes, there were the massive oolitic limestones with blue-heart, the sandy clays with rootbeds, and the limestones with nerinid gastropods, but the whole was compressed into a face only 6m high compared with 5 times that thickness at Ketton. There were also a number of decalcification (six syllables, John!) and weathering features not seen at Ketton. In particular we could see one bed 30-40cm thick consisting of convex-up calcareous bands interspersed with sand, looking for all the world like stromatolites, but without structural detail. The upper and lover bounds of the bed were planed quite flat and cut through the structures; and they provoked considerable discussion as to their origin. At the highest level in this quarry was about a metre of hard brown thinly bedded ringing limestone, known as the Wittering Pendle, much favoured by builders because of its waterproof properties.

Finally, we came to the doggers. No, they are not Australian Dingo hunters, nor the Dutch fishing boats that used to trawl Dogger Bank in the North Sea. They appeared in the scree at the foot of the quarry face as large, sandy, calcareous, spherical nodules - another weathering phenomenon? This prompts another question - when does a sandy limestone become a calcareous sandstone?

By now the muddy accretions on our boots were making us all leaden footed, and the gathering dusk forced a general retreat to the cars. Many thanks as ever to Alan Dawn for leading us, to Carol Warcup for making the arrangements, and to John for, well, being there.

Diary 1993-94

Leicester Literary and Philosophical Society,
Section C, Geology

Meetings

Wednesday 10th February
Reading the Hard Rocks of Leicestershire Dr Mike le Bas, University of Leicester.

Wednesday 24th February
Members Evening Short talks and slides

Monday 1st March (8.00pm)
Parent Body Joint Meeting. **Commercial Exploitation of our Fossil Reserves** Stan Wood.

Saturday 6th March
Mineralogy of Leicestershire Saturday School at Vaughan College. Dr Robert King and others.

Wednesday 10th March
An Amateur Geologist on the Loose Mr Alan Dawn of Stamford and Peterborough Museum

Wednesday 24th March
AGM and Chairman's Address: Colin Green of Severn Trent

Other Society's events
Stamford Geological Society. Meet in the Science Laboratories, Stamford School.
Phone Alan Dawn, (0780) 64714

Thursday February 11th.
Colin Bagshaw on the **development of theories about the emplacement of hydrothermal minerals**.

Thursday March 11th.
AGM and Dr Tony Waltham of Nottingham Polytechnic "**A walk through Nepal**"

Open University Geological Society
East Midlands Branch Open University Geological Society field trips attract a non-voluntary contribution of 50p. plus an extra 50p for non-members to cover insurance. except where stated

Saturday 20th February
Branch Dinner, Donnington Manor Hotel, Castle Donnington. 7.30 for 8. Cost £10.75 including service and VAT. Phone Sheri with your booking and choice of meal, please, by Saturday 13th February. Drinks not included.
Contact Sheri Thackeray 0332 290649

Sunday 14th March
Urban Geology in Nottingham. A look at the building stones, cliffs and caves of Nottingham. It is possible that we shall be visiting the Trip to Jerusalem somewhere around lunchtime. 10.00 am.
Contact John Colby 0455 290271

Sunday 4th April
Basic Mapping. The Charnwood Anticline. Targeted towards S236 students, but with plenty of interest for everyone. We'll be following the western limb of the Charnwood anticline, from Bradgate through Markfield and Warren Hills to Blackbrook Reservoir, and seeing just what can be distinguished from field measurements. You will need a clipboard, pencil, compass-clinometer, hand lens. Led by John Colby. Map: Pathfinder 1:25000 Loughborough (South) SK41/51. Meet Hunts Hill Car Park, Bradgate Park. SK523117 10.00am prompt.
Contact John Colby 0455 290271

Ardnamurchan 93

with Dr Simon Day.
Monday - Saturday 12th - 17th April.

The trip is entitled **"Tertiary igneous intrusions and their contact metamorphic aureoles; structure of the Tertiary volcanoes"**. Simon Day is an igneous petrologist and structural geologist. His PhD thesis was on Hypersthene Gabbro, Ardnamurchan (Imperial College/Durham 1985-89), and has been staff demonstrator in igneous and metamorphic petrology at the University of Liverpool 1989-92. When I was asking about leaders for this trip last summer, Professor Geoff Brown named Simon immediately as the best person.

We are staying at the Sonachan Hotel, Kilchoan, Ardnamurchan (NM453664). Optional stopover in Glasgow on Sunday 11th (Easter Sunday) at extra cost. Full field notes will be provided. Please be warned that this is the usual type of Scottish countryside, with rough ground and walking up to 300m altitude. As roads in the area are scarce, to say the least, most of the trip will be on foot. Good boots, warm clothes and waterproofs are essential. Cost £180.00, Deposit £20.00 required. Phone now for details - we're very nearly full.
Contact Sandy Colby 0455 290271

Sunday April 25th
Basic Geology, Middleton Top and Bonsal. Targeted towards S102 and S236 students, but with plenty of interest for everyone. The morning is led by John Colby when we'll be looking at the surface structures of Middleton Moor, dip and scarp slopes, fossils, bedding, dip and strike, a quarry or two and corals, not forgetting the chert. In the afternoon Peter Greaves will illustrate lavas and their interrelationship with the country rock, minerals and much more. If you bring your dogs, remember that it'll be lambing time. Meet Middleton Top Car Park, Wirksworth, Derbyshire, 10.00 am, SK275552
Contact John Colby 0455 290271

Sunday 16th May
Scunthorpe, the ironstone and the fossils. A collector's paradise.
Contact John Colby 0455 290271

Sunday 20th June
The PreCambrian-Cambrian boundary, Judkins, Boons and Woodlands Quarries, Nuneaton. See where the first shelly fauna in Britain is situated. Meet SP352926, 10.00am
Contact John Colby 0455 290271

Friday - Sunday 2nd - 4th July.

Symposium-93

The Evolving Lithosphere.

University of St Andrews, Scotland. £90.00. There are ten lectures ranged around the title subject, and include new and unpublished research. A field trip programme is also included.
Contact John Colby 0455 290271

Sunday 11th July
Family Field Day - a geological Car Tour, led by Glynis Sanderson.
Contact Glynis Sanderson (0332) 663214

Sunday 19th September
Revision Trip to Millers Dale and the Buxton Quarries.
Contact John Colby 0455 290271

Sunday 31st October
Post Exam Celebration. Venue and times to be arranged.
Contact John Colby 0455 290271

Tuesday 9th November **Branch AGM.** Regional Office, The Octagon, Derby Road, Nottingham
Contact John Colby 0455 290271

Saturday 27th November **National AGM.** The Open University Campus, Milton Keynes
Contact John Colby 0455 290271

Friday-Sunday 3rd-5th December

Snowflake 93

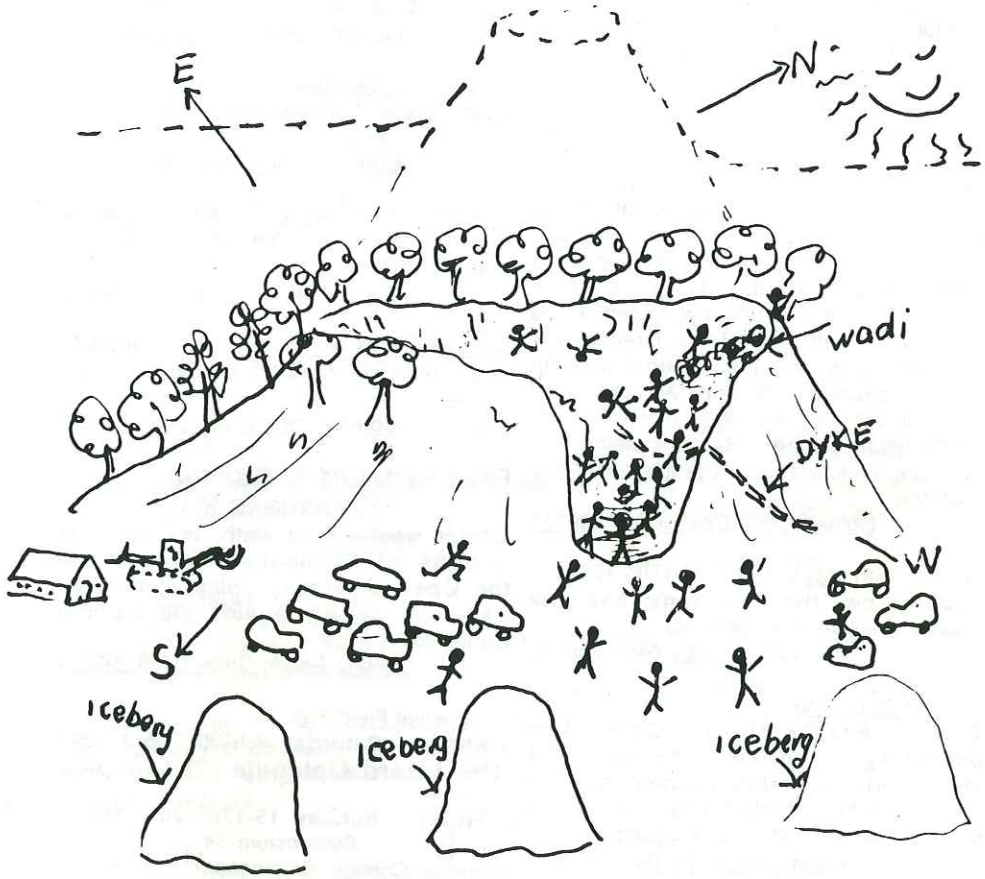
Winter weekend to Bath, led by Clive Roberts of Cheltenham College and the Open University. Staying in or near Bath and looking around the western Cotswolds
Contact Sandy Colby 0455 290271

Residential Field Trip
Monday - Saturday 4th-9th April 1994
The Lizard Ophiolite (?) Complex

Friday - Sunday 15-17th July 1994
Symposium 94
Newman College, Birmingham.

# of Icebergs and Volcanoes

Helma Tasker



From the Beacon, and facing due west, one can look into a large brown crater surrounded by a high rim covered with trees a few miles away. I have never noticed this quarry from any other place nor have I met a roadstone lorry on my frequent walks or rides in this area, but this is the Mountsorrel quarry which has been operational for quite a long time. On Sunday 5th April a group from Leicester Lit & Phil and several other Societies met there with Dr Mike le Bas for a very instructive day.

To start with a comparison was drawn with the recent events at Mount Pinatubo, data of which are now being published. This volcano, which was nearing the end of its evolutionary life from basic to acidic had not erupted for 600 years and probably contained a congealing crystalline 'mush', "firm enough to stand on" said Mike. Into this from underneath was injected an amount of basaltic magma at a much higher temperature of over 1000°C (?) which is thought to have been the trigger for the massive eruption. Hot basalt melt acquired a chilled margin while re-heating and melting crystals at the contact with the existing dacitic magma, some incomplete mixing happened.

This intrusion of basaltic melt first caused some minor eruptions of steam, ash lava tephra and pyroclastic flow. As pressure lessened in the magma chamber both basaltic and dacitic magmas de-gassed thus vastly increasing in volume and causing the paroxysmal and explosive eruption.

At Mountsorrel we were standing in the magma chamber. The original volcano cone had towered several miles above us. To the west a wall 100ft or so high and mostly smooth appeared to be one side of a vertical fissure and coated with a green granular deposit, possible a chromite mineralisation. Around us in the blocks of granodiorite (the plutonic equivalent of dacite) we could see patches with a much finer crystallisation though otherwise of the same lovely red colour and without any sign of a chilled margin between. These were interpreted as having been partially melted by the greater heat of basaltic intrusions, and then cooled more quickly before any segregation of the constituent minerals could take place. The other adjacent matter still had its crystals intact.

I found a large block with a large and prominent epidote, and suggested that John take it home, but he gallantly excavated it for me: Precious acquisition No. 1

A basaltic dyke was noticed cutting NW across the road and up the vertical wall, and we wondered if this was part of a similar feature at a quarry further in that direction.

Part of that same wall was a rubbly and that turned out to be a wadi . . . After the emptying of the magma chamber (of several km^3 of magma) the roof of this had collapsed forming a caldera. Millions of years later a desert formed of the weathering products of the volcanic remains; a large pebble of igneous rock was formed into a dreikanter by the prevailing winds, was eventually washed into the wadi, and still more

millions of years later it became precious acquisition No. 2. We also examined consolidated sedimentary matter showing repeated layers of graded particles of quartz and red feldspar showing lack of chemical weathering, and which way up it had been deposited.

After lunch Graham too us to Kinchley Quarry on Severn-Trent land. This is a small quarry used long ago for local building, now an SSSI and no hammering! In the 1920s Dr E. E. Lowe in his thesis described the rocks here as a melange, any more scientific description would have been very controversial. But it fits the 'trigger' suggestion; the rock is mostly of basaltic appearance and has clearly visible patches of pink fine-grained rock. The dark grey rock shows a clear and definite chilled margin at its contacts with the pink.

Mount Pinatubo is now thought to be the biggest eruption this century throwing 3 MEGATONNES of ash sulphur dioxide and other hot gasses high up into the stratosphere. The plume has circled the equator and is now spreading all over, the acidic dust will pervade our atmosphere for years, masking the expected El Niño event, looming ice age, global warming, crazing aircraft windows, necessitating satellites with vision to be recalibrated . . . .

Dacite volcanoes are prone to end this way - El Chichon in Mexico in 1982, Mount Pinatubo in 1991, did Mount Sorrel do it long ago? Which will be next - Mount Fuji Japan?

Oh yes, the Icebergs . . . That is the local name for the large white bollards that stop the lorries from using the old entrance . . .

Read all this in more detail in:

Lowe, E. E. **Transactions of the Leicester Literary and Philosophical Society, no 551 1926.** (In Leicester Reference Library)

le Bas, M. J. **Caledonian Igneous Rocks, publication of the Yorkshire Geological Society 1972.** (In Derby Reference Library or in the Brotherton Library, University of Leeds)

Pallister, J. S. et al. **A basalt trigger for the 1991 eruptions of Pinatubo volcano?** Nature, 2 April 1992 (In Leicester Reference Library)

Booth, William. **Articles in the Washington Post reprinted in EPISODES, vol. 14, no 4, December 1991.** Articles are **"Pinatubo volcanic dust . . ."** and **"Pinatubo exerts global influence . . . "** (In Leicester University Library, Magazine Section.

Since this trip last year, Dr Mike le Bas has lectured to the section on "The Hard Rocks of Leicestershire", and used examples from both Bardon, which was visited in 1991, and Mountsorrel.

Helma Tasker is reading geology with the Open University and travels far and wide on international field trips.

Professor Ian Gass

Ian Gass, founding father of the Open University Earth Sciences department died in October. His contribution to earth science in general and the OU in particular will take a long time to be equalled. He was first head of department, and held a personal chair at the O.U.. His personal research led him, among other places, to Oman and Cyprus, where he identified the ophiolite complexes and succeeded in interpreting many aspects of plate tectonics. He retired in 1991 from full time involvement with the OU, and characteristically refused a gift at that time, instead requesting that a foundation be established to enable student to pursue research when other sources of funding were unavailable.

Dr Richard Thorpe

The meeting of the Geological Society of London's Volcanology group this year was dedicated to the memory of Dr Richard Thorpe, who died leading a field trip to Lundy on August 22nd 1991, was held on 22nd-23rd January. Entitled "From Source to Surface: Modern Perspectives of Magmatic Processes", featured thirty one speakers and twenty nine poster contributions. Over a hundred and fifty people attended, including a sizable contingent of OUGS members. It was pleasing to see the way that people of differing disciplines came together for a conference which had for mere undergraduates many things which went straight over the top of the head. It was also comforting to be told that a senior member of OU staff felt likewise! Having said that I would gladly go to next year's session which concerns granites.

Understanding The Earth (£19.95)

The seminal work for many years in Earth Sciences was "Understanding the Earth", produced by Ian Gass and colleagues. The work has reached a second version, edited by Geoff Brown, Chris Hawkesworth and Chris Wilson, all of the Earth Sciences department. It is set to become a standard text, and for those who have had limited contact with geology but wish more,, invaluable. With contributions of twenty nine authors in twenty five chapters divided into eight sections, each with its own introduction, it uses the very successful format familiar from OU texts. Coverage is from the composition of the solar system, through magmatic processes, plate tectonics, the structure of the lithosphere, sedimentary processes, stratigraphy, palaeontology, palaeoclimatology and volcanic hazards. It is accompanied by a full glossary, almost a mini geological dictionary. Well worth raiding the housekeeping for the cash to buy it. Some people have reported some difficulty in obtaining a copy, but we got ours from Leicester University Bookshop (phone 0533-524456)

Caves

The East Midlands Geological Society have published an abstract from The Mercian Geologist "Sandstone Caves of Nottingham", by Tony Waltham, of the Department of Civil Engineering of Nottingham Polytechnic. This detailed work surveys the caves carved into the rock below Nottingham, the history, the engineering problems they cause to modern builders, and the uses to which they have been and are put including half a dozen pubs beer cellars. At £3.00 very good value. Contact Mrs. S. Miles, Beech Cottage, Cropwell Butler, Nottinghamshire.

Maps

The Map Shop in Leicester are marketing a White Peak map which is laminated. In fact they have all the Outdoor Leisure series laminated, and they all cost double the price of the non-laminated version. Lamination means that they're enclosed in plastic, waterproof, and stay in one piece longer than normal maps. They also have a lamination service for other types of map. The Map Shop, 15 Malcolm Arcade, Leicester, LE1 5FT, (0533) 628077.

Holmes

A new and updated edition of Holmes Principles of Physical Geology has been produced. It costs, from memory, £24.95.

John Colby

Professor Geoff Brown

FGS, DSc, PhD, BSc, MIMM

There can be few people reading this newsletter who have not heard the devastating news of the death of Geoff Brown at the 4,300m Galeras Volcano in Columbia on 14th January. He was there for a United Nations sponsored conference at the town of Pasto, 7km from the volcano. The volcano has seen renewed activity since August 1991, and a party of vulcanologists from the conference were taking measurements from the crater when a sudden eruption occurred, and killed a number of scientists of repute of different nationalities, including Geoff.

This is what Geoff Brown wrote about himself in the summer for the introduction for a lecture he gave to the Lit and Phil in December last, typically sitting on the stairs outside the bar at Lenton Hall, Nottingham University. This is what was read out as the introduction at that meeting.

> "Graduating from Manchester University, Geoff Brown went on to complete his PhD in experimental petrology of granites (1970). He worked on granite geochemistry, mineralisation and geothermal systems and was a lecturer at Liverpool University for seven years in Geophysics. He then joined the Open University preparing and presenting undergraduate courses. During the last 10 years his research has focussed on volcano geophysics and has been head of department since 1983."

The U.K.'s leading vulcanologist, Geoff's work has helped save the lives of people who live near volcanoes by being able to predict eruptions so that they could move away in time. It must take a special kind of dedication to undertake this sort of work, in full knowledge of the dangers.

Those who came into contact with Geoff as students will always remember his encyclopaedic knowledge of his subject, his willingness to listen, sometimes to the most odd theories and patiently and quietly bring his own argument to bear. His students must have tried his patience on more than one occasion, but he did not let it show. The sense of loss which Geoff's death has brought about defies description. It must be magnified many times for his close colleagues. To have known a man of such intellect is privilege indeed, one which is granted to few people.

But especially we must extend our heartfelt sympathies to Dr Evelyn Brown and their daughters. Theirs is the loss that no-one can share.

John Colby

DEG