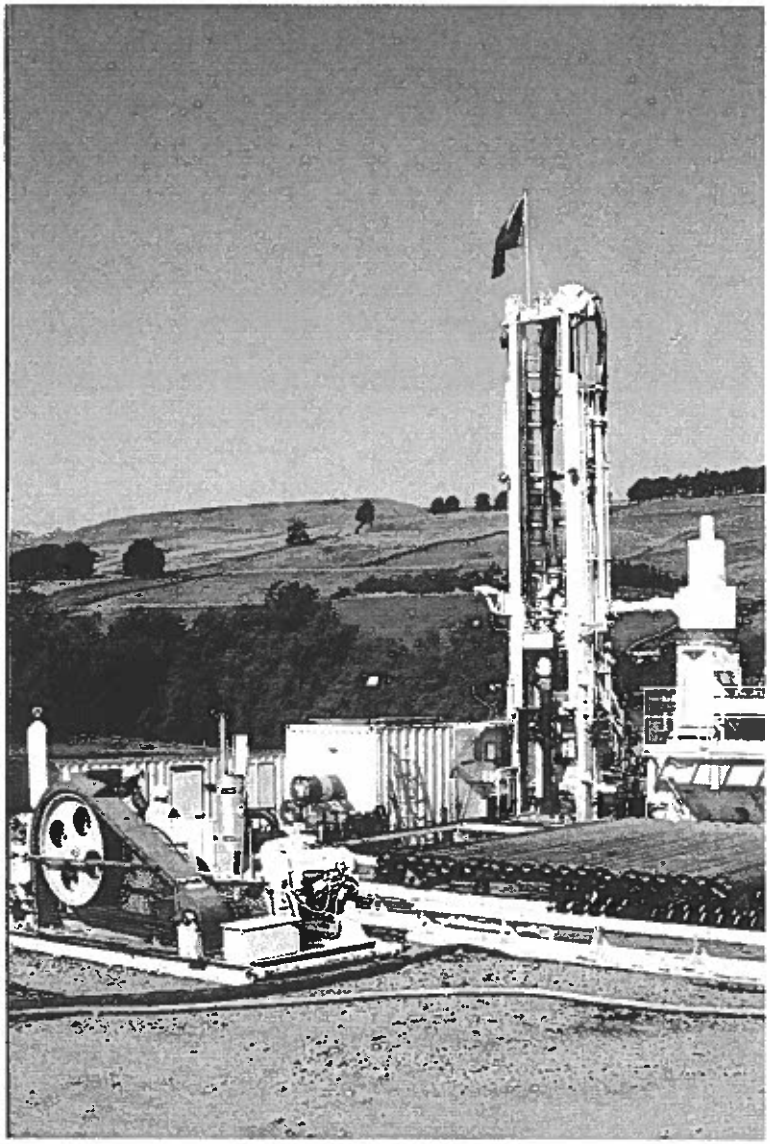
THE · FRIENDS · OF
KILLHOPE
Charity No 517647

Newsletter No 63 **January 2005**

Eastgate Borehole - Positive Findings

North eastern members will know that the exploratory drilling for "hot rocks" at Eastgate in Weardale was completed recently. Professor Paul Younger who delivered our lecture on his work there while drilling was still ongoing tells me that they reached a depth of 995 metres and the temperature of the water there was 46.2 degrees centigrade. It is estimated that 60 cubic metres per hour would be available.

There are signs of mineralization down to 800 metres with the best lying just above the whin sill which is in the same position as found in the Rookhope borehole. The latest boring will allow interesting comparisons with that earlier work. The Slitt Vein was hit in preliminary borings made at angles of 45 to 60 degrees but only quartz, fluorspar and very little galena were present. No old workings were penetrated so as Professor Younger remarked it shows that the Old Man knew what he was doing!



The drilling rig at Eastgate

Photo: Professor Paul Younger

Ultimately the cuttings from the boring will be divided between the British Geological Survey and the Friends of Killhope to hold for posterity. Bearing in mind the catastrophic vandalising of the Rookhope drilling, the Eastgate borehole is now securely sealed and on the advice of Killhope management, buried beneath a very substantial pile of muck! Thus the project has established the existence of 'hot rocks' (and indeed water) at the Eastgate site but the exploitation of this resource now seems to be in the hands of the politicians. So as they used to say, watch this space.

My thanks to Professor Younger for this very latest information and for the offer of a fuller report to Friends in due course.

NB Professor Younger will deliver a lecture "Drilling for geothermal energy at Eastgate" at 7.30 om on 1st June in the Dales Centre, Stanhope as part of the 2005 Geology Festival. See Forthcoming Events for further details.

An Apology

In the last newsletter the caption to the photograph on the front page should have read Councillor Dennis Morgan. My apologies to all concerned for any inconvenience caused.

A Message from your Membership Secretary

Thanks to the members who have paid for 2005, especially those who have corrected their standing orders.

This newsletter will be the last sent to anyone who did not pay their 2004 subscription or rejoin for 2005. There is still time to correct this. If you have not received your 2005 membership card it could be because you have not paid the correct subscription for your category.

The donations given by some members to assist in postage etc is greatly appreciated. Thank you.

Next Deadline

Material for the next newsletter should be in the hands of the Editor by **1st April 2005** please. Hard copy to the Editor and on disc, if possible, or by e-mail to dickgra@aol.com.

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North Pennine Silver - Myth Or Reality?

Brian Young

It is well known that the lead ores of the Northern Pennines contain traces of silver and that over centuries of working, its extraction was a widespread, and locally lucrative, part of the smelting process. Through such figures as Thomas Pattinson, the Northern Pennine smelting industry on occasions led the world in de-silvering technology.

Within the last decade or so a number of reviews of medieval British metal mining have been published which suggest that the Northern Pennine mines were consistently producing several tonnes of silver per year during the 12th century (Blanchard 1992, 1996). It has been claimed that silver production from the Northern Pennines during the years 1136 – 1138 was ten times more than had been produced in Europe in the previous 750 years. The remarkable claim has been made that in 1165 the Durham mines alone produced 18 tonnes of the metal. A grand total of about 350 tonnes of silver is claimed for the Northern Pennines for the period 1125 to 1215. Rather surprisingly the author of these accounts offers no supporting evidence for any of the levels of output claimed and has not attempted to examine these figures in the light of the very substantial volume of reliable records of known silver values across the area, accumulated over its long history of mining and exploration.

In one of his last pieces of research in the Northern Pennines, the late Sir Kingsley Dunham and others undertook an investigation to explore the apparent conflict between these unsubstantiated historical claims and the hard analytical data. The results were published late in 2001 as one of the Sir Kingsley's last research papers (Dunham et al, 2001). As one of the collaborators in this work, I have prepared the following short summary based on the comments and suggestions made in this paper and ideas which have developed from the investigation.

We should begin by looking very briefly at the occurrence of silver within the Northern Pennines.

In common with many of the world's lead ores, the galena of the Northern Pennines contains silver. Between 1729 and 1870, silver recovery during smelting by the London Lead and WB companies yielded a recorded output of 5,450,000 oz (about 170 tonnes) of silver from 1,542,184 tonnes of lead concentrates, suggesting an average silver content of around 100 ppm (parts per million). A wealth of contemporary assay values suggests that the normal silver content of Northern Pennine galena ranges from 111 to 251 ppm, though exceptional values of over 2000 ppm are recorded from a very few localities. It is likely that across much of the orefield silver occurs in solid solution within galena (Dunham, 1990). The only reliable record of discrete silver minerals in the orefield is that of the comparatively widespread occurrence, reported by Ixer *et al* (1996), of argentopentlandite ($Ag(Fe,Ni)_8S_8$) in microscopic amounts in a few veins in the central part of the orefield. Silver-bearing tetrahedrite has been described by Vaughan and Ixer (1980) as microscopic inclusions in galena from Teesdale. Ixer and Stanley's (1987) description of a rich assemblage of silver minerals from Tynebottom Mine, Garrigill may be discounted as it was based on specimens from the A W G Kingsbury Collection now in the Natural History Museum, South Kensington. It has recently been shown that many of Kingsbury's records were fraudulent and it now seems certain that these specimens did not originate in the Northern Pennines, an error quite unknown to Ixer and Stanley at the time of their research.

Dunham (1990) has suggested a total historical output of lead concentrates from the orefield in excess of four million tonnes. Assuming that all of this was de-silvered and that the recovery was of the order of 100 ppm, as appears to have been the case throughout much of the life of the WB and London Lead companies, the total silver production would be about 370 tonnes. Even

if a silver content as high as 1000 ppm, as suggested without any supporting evidence by Blanchard (1996), had been consistently available in the 12th century, his claimed output of 350 tonnes of silver would have required the mining and processing of about 460 000 tonnes of galena at this high grade. It seems extremely doubtful whether the mining and smelting technology of the time was capable of sustaining these levels of output, or indeed whether the contemporary economy could use such large quantities of lead.

Despite the several shortcomings in the historical accounts of medieval silver production, there is some evidence to support high silver outputs for a few decades in medieval times. To yield anything remotely approaching the claimed levels of medieval silver production would clearly require the mining of lead ores with silver values consistently far above those smelted within the last two to three centuries.

Silver enrichment of deposits similar to those of the Northern Pennines, resulting from transport of silver within groundwaters, is known from lead-zinc deposits in places such as central Ireland. As part of this investigation we collected and analysed a suite of samples of highly oxidised galena and cerussite from across the orefield. All but one showed silver values well below the average for the orefield. It is possible that these oxidised samples could provide evidence of leaching of silver within the orefield. If such leaching has indeed taken place, it is possible that silver may have been re-deposited to form enriched ores. Of the samples we collected and analysed, only the example from Dry Pry Mine, near Wolsingham exhibited a significant silver content, though even this was well short of what would be required to sustain the levels of silver output claimed in the historical accounts. Although enriched silver ores may be anticipated in the geological setting of the Northern Pennines, neither this investigation nor a review of existing geological, mineralogical or chemical data give any direct evidence for it. It is, however, worth considering that the few occurrences of galena with unusually high silver contents, eg those at Cadger Well in Teesdale, and Chesters near Garrigill (Dunham, 1990) could represent remnants of such enriched ores, though the evidence to support such an assertion is admittedly very weak.

To enhance the silver content of the Northern Pennine deposits to the levels needed to sustain the claimed medieval silver output would almost certainly require the formation of discrete silver minerals, though these might be present as microscopic inclusions or as inconspicuous and easily overlooked supergene species. In this context it is worth recalling that in the Lake District, where galena commonly exhibits silver contents several times higher than in the Northern Pennines, a few occurrences of native silver, a surprisingly inconspicuous and easily overlooked mineral, have come to light only within the past few years. In this examination, polished specimens of all the samples collected were carefully examined for discrete silver minerals. None was found. It is nevertheless possible that careful searching may eventually reveal occurrences of supergene silver in the Northern Pennines similar to those of the Lake District.

If the area was indeed a source of high silver production from such rich ores it is surprising that close scrutiny of the area's deposits over centuries of working and exploration by companies who in their day lay at the forefront of exploration and assaying technology have failed to reveal even traces of these ores. It is also noteworthy that modern geochemical surveys, which have been conducted across the area, have detected no remnants of such mineralisation. The results of this recent investigation into the geological and mineralogical basis for claimed high silver outputs are thus inconclusive.

A final, though completely non geologically-based thought may be worthy of consideration, at least in part. What could be a better method of 'laundering' and legitimising stolen objects than to melt them down and turn them into ingots in a remote smelt mill? Surely a possible additional hypothesis, though as difficult to prove as the so far elusive silver-rich minerals.

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Obituary

Connie Ayre, Nee Atherton

It is with great sadness that we have to report the death of Connie Ayre on 6th January 2005, after spending two months in hospital, aged 91 years.

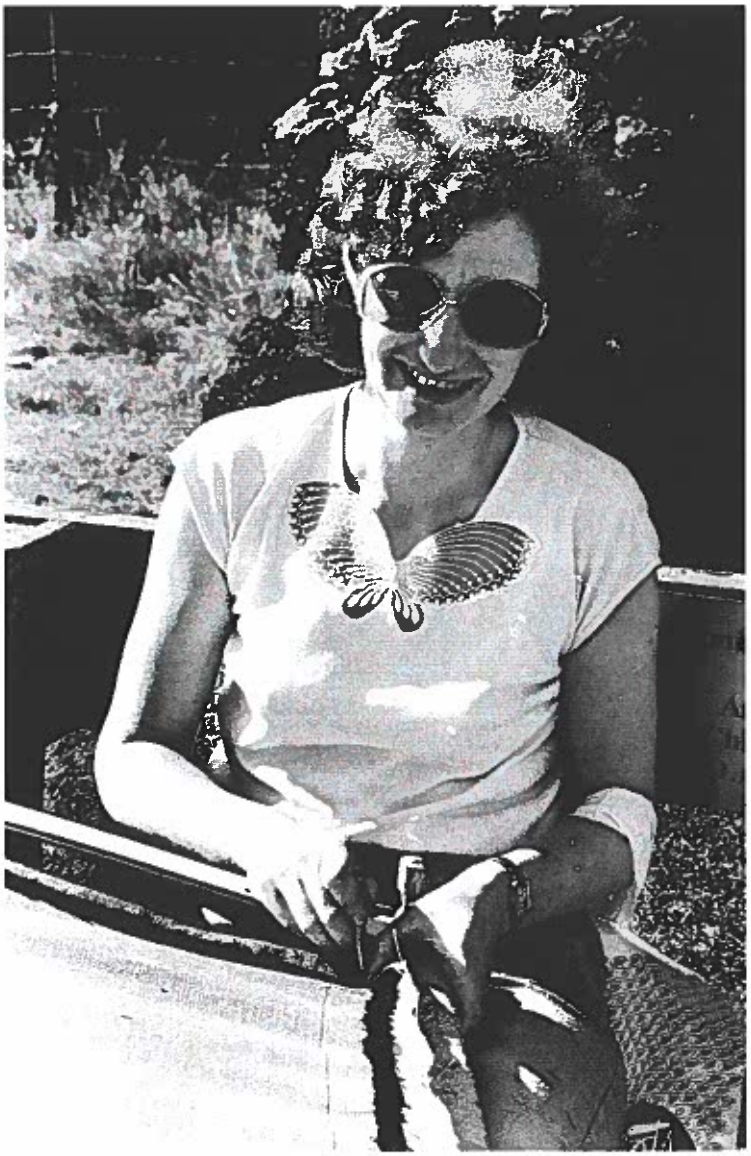
As you will have read in the last Newsletter (No 62) she came into the lives of the Friends of Killhope in the later years of her long life, but left an indelible mark on us. She lit up our lives with her ready smile, her fascinating reminiscences and her keen interest in everything that we showed her at Killhope. Our only consolation is that she was so obviously delighted that her Dissertation would be lodged in our archives for others to enjoy and hopefully gain much useful information from it.

Shelagh Bridges

Computer Processing

Sketches, maps, and other graphics are usually computer-processed to ensure that an author's work is shown to the best advantage when printed.

An Early Notice of a Fringe Event



Kathy Grylls at the top of the mine shop steps at Killhope, September 1985. She is doing a spot of mat-making while waiting for customers to pay for admission to the mine shop which she thinks was less than £1. There was no charge to go on the site. Sartorial note: Kathy was wearing fashionable fustian trousers and clogs (female)

Photo Harry Parker/Kathy Grylls

All good celebrations have a fringe and Killhope's 21st Birthday Party will be no exception. On Saturday 21st and Sunday 22nd May there will be a 'fringe exhibition' in the Hut in the top car park. In essence, it will be a nostalgic trip back through time with a twist!

To view the exhibition (which may not be manned), please ask for the key to the hut from the Information Assistants in the shop.

Hope you enjoy the whole weekend.

Kathy Grylls (Killhope, March 1985 - ???).

See Forthcoming Events for further details.

David Scott continues below his fascinating and valuable recollections of his time in the north Pennines over 50 years ago. Sadly this sort of material seems not to find its way into any text books which makes it so important that we are able to record this recent history for posterity. I am extremely grateful to David and other contributors who have shared their experiences with us and I think members will agree that it is one of our most important functions to collect and publish these unique accounts. *Editor*

Stotsfieldburn Mine - 1949

David Scott

Despite giving every appearance of the typical, quiet, Pennine village, Rookhope was a hive of activity, something it hadn't been for many years but apart from the refurbishing of the long inactive Boltsburn mill all the activity was underground. Stotsfieldburn mine, a half mile down the road was working around the clock three shifts a day. A new underground shaft 2,900 ft in-bye on the adit level was being fitted out and considerable waste-rock development was being carried out to accommodate the shaft hoist and the several openings and widened drifts for what would be the main shaft station. All of this besides the routine business of mining fluorspar, developing new reserves and seeing the spar trammed to surface where it would be transferred to lorries and hauled to Sedling for treatment. The mine was a busy spot with many of the work crew coming from East Allendale, upper Weardale as well of course from Rookhope itself.

Two and a half miles higher up the valley Wolfcleugh mine was being reopened and near the head of the Wear, Coptcleugh adit by Sedling Burn was being cleaned out and all of this in 1949, several years before Weardale's fluorspar boom arrived.

Cut-and-Fill mining - C&F for short - was the mining method at Stotsfieldburn. It was frequently used elsewhere in the North Pennines, on occasion even at Settlingstones when the vein was not wholly enclosed within the whin sill and the wall rocks were not able to support themselves. It was a slow, expensive method of mining but it was safe.

Working drawings showing how the method was carried from one level to the next would give the impression of a controlled, efficient system almost clinical in the manner in which a horizontal slice of ore would be mined out then replaced by waste rock with the cycle repeated over and over until the ore was completely mined out to the level above. But the reality was far different. Apart from the use of pneumatic drills and high explosives the work was entirely manual. It would be more accurate to say, 'almost entirely', as the first steps towards mechanization at Stots were taken in 1949. Allowing for that exception, the extravagant use of labour would not have been out of place anywhere else in the UK, in fact, by far the greater part of the nation's annual 190 million tonnes of deep-mined coal was lifted from the coal face on the end of a shovel, this dismaying practice a carryover from an earlier era when an abundant reserve of low-wage manpower was available and on call. But wages were rising and times were about to change.

The most striking example of such manual work was a C&F stope ready for filling with waste rock, or 'backfilled' in other words. It was an imposing sight, especially for the three or four man crew whose job it was to see it filled flat and level to within 3-3½ ft of the back (read roof) with nothing more than hand shovels and a wheelbarrow. The cavernous opening would be 90-100 ft long, the length of the stope, 12-15 ft wide, sometimes more, depending on the width of the fluorspar vein and, 9-10 ft high. Waste rock was dumped into the stope from the level above, spread manually and at the same time, two, sometimes three mill holes would be built up with timber cribbing to keep pace with the rising backfill. These openings were about 30 ins square and served as near-vertical openings and transferred the spar that would be mined later to the 27 fathom level below. When backfilling was practically finished, it was levelled off and a skin-tight floor of 2 ins plank laid on top as the final touch. This last was a 'bunning', the local name

for any temporary wood flooring laid down to ease shovelling and when that was done the mining crew comprising an experienced miner and his helper took over and the breaking of spar began.

After two or three shifts drilling and blasting, the full vein width was exposed fresh and clean, and, close up, at arm's length, the spar's varied colours became distinguishable, amethyst, colourless, sometimes white and frequently a translucent, pale green, not the grass-green often seen in the specimens exhibited by mineral dealers on the Internet but of a tint tending towards bluish-green, "South Seas" green in fact. Sadly, as soon as the spar lost its moisture it reverted to the uninteresting, chalky, greyish rock that formed the surface stockpile just beyond the adit portal.

Clumps of brilliant galena not much larger than fist size would be sparsely distributed near the south wall of the vein, the foot wall, but it was rarely seen elsewhere in the main mass of the vein. The old timers would have described the vein as, '... spar brangled with ore ...' but the galena would rarely amount to more than 1.5% of the ore mined. Had this narrow zone been "slit" the ore grade would have increased to 6-7% because of the much narrower width mined, just wide enough to work in, and it would have paid its way though only just.

Fairly often there would be lenses of rock enclosed within the spar, more particularly near the walls and of these a mining student and myself were to learn a great deal more. The rock itself was limestone, the Great Limestone and while this is normally a lightish-grey rock with a dull, matte like appearance this rock was black with a perceptible sheen created by an exceedingly fine-grained admixture of silica. It was silicified limestone, a rock akin to jasper and it formed a zone several feet wide separating the fluorspar vein from the unaltered limestone beyond.

Our learning of the nature of this rock followed prolonged petitioning by the aforementioned student who was carrying out his obligatory vacation work and myself and eventually we were given the job of drilling and blasting a short, narrow drift leading from the 15 fathom level to breakthrough into a rise from the stope below. Ten days work was involved for the two of us though I have to say an experienced miner could have finished the job in half the time with far less grief. Except for the last few feet, the drift was wholly within silicified limestone laced with veinlets of quartz and ankerite and there's no question Jim Brown, the shift foreman and a Rookhope man, let his generally equable disposition take a sour turn when he offered us this particular drift in which to try our skills for if there had been anything harder to drill it would have been cast iron, to say nothing of the frustration dealing with steel bits that dulled within minutes and needed to be replaced continuously. Even today it is an experience well remembered.

Dunham (1948) quotes one of Beaumont's agents reporting Coptcleugh vein as, '... hard to drive ...'. We knew now exactly what that meant and at that time in 1870 the miners had nothing more than hand-steel and gunpowder to do their work. Theirs was a working world we can scarcely visualize today.

It deserves recording that it would have been extremely unlikely any other manager in the region would have given two rank amateurs the opportunity of trying their hands at drilling and blasting, it is a job that requires skill and experience but Wardrop was like that. I learned later he had said, to the effect, "... all right, give them a chance, let them find out what this business is about ...".

As mentioned, Stots was beginning to mechanize, a compressed air driven bucket-loader arrived at the mine, February 1949 and was put to work on the adit level where unusually large tonnages of waste were being broken in the process of carving out facilities for the new shaft. At first no one quite knew how to handle the machine in a manner that was much of an improvement over hand mucking, then, a week or two later, a jovial Glaswegian, Jimmy Glass came on the scene and everything changed. He had previously worked for a contractor, he knew the machine and

that was obvious the day he arrived, he could never be supplied with enough empty tubs to keep him going.

In that connection and for those who may not know www.ukminingventures.com, the site is well worth a visit. Besides the many scenes of Weardale, moorland and village, and all well presented, the same model bucket-loader is shown in the series of photos entitled, 'Tour of Rogerley Mine', (page 1 to be precise). The machine is an Eimco 12B. It is still widely used today and in the 80 years since it first came into use in the USA it has literally moved mountains. At first sight the machine is simplicity itself, there are only two controls, two joysticks, but it takes instantaneous reflexes, 100% focussed attention and more than a measure of knack to make it function the way the designers intended.

Beside the bucket loader, William Wardrop, WLCo's General Manager since 1940, also introduced the first scraper underground but the success of the bucket loader wasn't repeated - that would come later but its first trial was a failure. The scraper, or slusher as it is often called is no more than a heavy-duty hoe drawn to-and-fro by a wire rope but after two weeks of experimentation by three separate individuals, myself included, the machine was considered more trouble than it was worth, we didn't know the tricks, and it was packed off to the mill to work as a lowly winch. It was a missed opportunity.

Three months after starting work at Stots the mine was visited by the Mines Inspector and it came to light I was under-age for night shift work, 18 years was the statutory minimum, so, when the turn came for the Weardale crew to go on graveyard shift, 10.00 pm - 6.00 am, I reported to the Rookhope office.

Some months previously Wardrop had hired a recent, mining school graduate as Assistant Manager to help oversee re-establishment of the mill. There was much detail work to be done, it occupied a great deal of time and whenever I was on hand I helped in marking-up steel, taking measurements, etc etc. In addition, there were several visits to Coptcleugh, surveying, where the excruciatingly slow work of cleaning the adit and installing fresh support had been completed and rock work was underway. Development work was also going ahead in Burtree Pasture Water Level, 100 ft below.

Incidentally, and a tid-bit for current Rookhope residents, the above-mentioned Assistant Manager, a Cornishman and newly married, was given the large, stand-alone house on the far side of Rookhope Burn. Presumably it had been built for a previous manager and was then vacant. He said it was the draughtiest house he had ever lived in.

The re-furbished mill was to be a conventional jig and table plant producing metallurgical spar and a one-ton per hour flotation circuit for acid spar. But the latter didn't come about in 1949, it was cancelled and it wouldn't be until 1955 (Almond) that it was finally installed. (For a full account of developments at the several mills in the region refer to J K Almond's recent *'Dressing North Pennine fluorite ores for the Market,' in, 'Fluorspar in the North Pennines'. Publisher: Friends of Killhope, 2003.* Dr Almond's coverage is comprehensive).

Cause of the postponement was the finding by the company's metallurgical consultants that the mill pulp would need to be heated in order to produce the high purity required of acid-grade spar. However WLCo's resources were heavily committed at the time, two mine openings, a new shaft at Stots in addition to the mill itself and there is no doubt the unexpected expense of a steam plant couldn't be borne. The flotation circuit was shelved.

In hindsight, the decision was probably a blessing disguise though the company's directors may scarcely have thought so when they first heard about it - the company would be losing the opportunity of entering the premium priced acid grade market - but it would have been a line of thought quite out of touch with reality as events elsewhere were soon to prove. Almond recounts the slow, frustrating and costly process that was needed to transform a flotation system

developed in the laboratory into a commercially viable process. WLCo avoided that expense and when the time came to install its own plant many of the more serious difficulties had been overcome and of these the development of a flotation reagent that dispensed with the need for heating the fluorspar pulp was undoubtedly the most important.

In early October 1949 I left Stots to take up similar underground work in Cornwall. Two or three weeks earlier Coptcleugh vein had been cut for the first time since the 1870s but on Stots 27 fathom level, the lowest at the time, the Red vein had started to weaken. It was not much more than seven feet wide and the greater part of that was a grey, mealy looking fluorspar. The prospects didn't look good and in fact that section of impoverished vein later proved to be the beginning of the end of the fluorspar ore shoot that had been worked since the mid-1940s.

However, contrary to every expectation, a visit to the mine three years later in January 1953, showed a thriving operation. What had happened since late 1949 was the pinching out of the Red vein on the 27 fathom level as intimated, then, as if to compensate, a branch of the vein and a strong branch, was found by diamond drilling and this was being actively mined. The shaft too had been deepened from the 27 to the 34 fathom level finding workable fluorspar between the two levels and there were thoughts of trying the vein at greater depths. In that regard and referring to Dunham (1990) an incline was in fact taken later to what would be the 50 fathom level and, quote, '... a wide body of mineral was found ...' but the spar was of too low quality to be mined other than on a trial basis, (the question is - would the spar have been payable if the flotation plant had been ready?).

There were other changes too, work at Wolfcleugh and Coptcleugh had been terminated, the mill at Sedling was due to close shortly and the work schedule at Stots had been cut from three to two shifts per day with a subsequent reduction in the work force. Harry Green had succeeded William Wardrop as General Manager, Wardrop retiring to Edinburgh and the Cornish Assistant Manager who I had worked with from time to time had left the company and taken a term contract in Tanganyika.

All-in-all, three years had seen the mine and its organization practically reinvented but despite the obvious liveliness of Stots at the time, all was not well, Harry Green estimated that unless new reserves were found the mine would be exhausted in three to four years, that is 1956/57. In fact, his estimate couldn't have been closer. Referring again to Dunham (1990) the eastern section of the mine was worked out and abandoned in 1957. But Stots had another surprise in store, the western part of the mine previously developed for lead during the years 1863-84 was redeveloped for fluorspar and the mine continued for another nine years. It wasn't until 1966 that the end finally came and by then a new mine at Redburn had been discovered.

Including the salvage, catch-as-catch-can operation from 1929 to 1940, Stotsfieldburn mine didn't have an especially long life, that is, from 1929 to 1966. From 1940 onwards it was systematically developed under Wardrop's management but even so there were two bleak periods, the mid-1940s and 1957 when the mine's future seemed to be in the balance yet on both occasions there was a reprieve and the mine recovered with gusto. One cannot but wonder what might have happened if Redburn hadn't been discovered when it was, its spar replacing that which would otherwise have come from Stots. It is certain that additional probing would have been carried out at Stots, it would have been a matter of urgency and history might have repeated itself once more with another reprieve coming to the rescue just in time. But, we will never know.

Killhope's Squirrels

Ian Forbes

Did you know that grey squirrels outnumber reds in Britain by sixty-six to one? Or that there are estimated to be only about 30,000 red squirrels left in England? Even if you don't have a head for statistics, you must know that red squirrels are under threat and have disappeared from large areas of the UK. You maybe also know that the colony in the Killhope woods is the last purely red squirrel colony in County Durham. In short, Killhope's squirrels are important. They are also undeniably cute and a great visitor attraction.

And now the Friends of Killhope, working in partnership with BTCV, are implementing a project to help a wider range of visitors see the squirrels and learn more about them. We were delighted to have been awarded nearly £10,000 from the "Peoples Places" scheme to carry out a project in the museum's woods.

The money has allowed us to install a brand new and purpose built fully-accessible squirrel hide which is suitable for wheelchair users and which is to be found just below the reservoirs on the woodland trail. The hide was put up (inevitably in appalling weather) by a hard-working group of BTCV volunteers on a working holiday, with help from Friend of Killhope Phil Curtis.

Phil, myself and others are now working on a series of interpretation panels for the hides and the woodland walks which will tell visitors more about squirrels, their way of life and the threats they face as well as what we can do to help them. This part of the work is being supported by the North Pennines AONB Partnership and the Countryside Agency as well as BTCV and Peoples Places, with help from "Red Alert".

I hope many of you will take a stroll round the Killhope woods in the summer, spend some time in the new hide, and learn a bit more about our wonderful red squirrels.

Frosterley Marble

Bryan Chambers

In a recent newsletter I stated that the only pieces of 'marble' in Frosterley which had been put to some use were a butcher's chopping block (now at Beamish) and a font in the church which had been 'rescued' from Lincolnshire. There is a block in its raw state in the car park and in July 2004 a sculpture cut from a piece quarried recently at Broadwood has been installed on Frosterley station platform.

Judith Bainbridge who has researched the history of the village and has been responsible for the excellent annual Village Hall exhibitions for many years now informs me there was yet another piece of marble in the east end Methodist (Wesleyan) chapel which was located at the west end of the green. This example was the backing for a memorial stone and Judith describes it as 'huge'. When the chapel closed it was stored at the Bridge End Methodist chapel in the village. Soon after the marble font was installed in the church the memorial was taken of the slab and the marble was given to the Catholic church in Wolsingham. Here it was cut and made into a very attractive tabernacle.

Many thanks to Judith for this extra information.

In some of our earliest newsletter there was speculation about the 'Killhope engine' which was a steam engine used for pumping and located I think near the bottom of Hazely Hush. No one seemed to know what happened to the engine for certain but when I asked the late Bill Proud about it he did have some thoughts on the subject. One of Bill's first jobs as a youth was to tend the water courses from Killhope down to Sedling and he worked many years in the industry at Blackdene.

I recently came across the brief notes I made at the time of the interview and these are reproduced below in the hope that in the almost twenty years since then some more information may have come to light. If so we would of course like to know. Ed.

The Fate of the Killhope Engine

Interview with Mr W Proud 27th April 1986

Mr Proud believes the engine (and pumps) were moved by Weardale Lead Co to the Lodge Field Shaft near Ireshopeburn (east of Blackdene) where the company were driving (NE) along the Lodge vein to cross the Slit Vein. An independent surveyor named Dawson had been hired and he hoped to find viable reserves of fluorspar (? anchorite) but the yields were not good (? separation problems). The General Strike of 1926 and the resultant coal shortage caused work activities to cease and the workings became flooded never to be reopened.

The engine was eventually moved the short distance to the company workshops at Ireshopeburn where it powered a saw bench - probably to the end of its days.

As reported in the last newsletter the reinstated Jacob Walton Memorial was unveiled in Alston last July 6th. The people standing around the memorial are descendants of Mr Walton and our chairman Dick Graham was there representing the Friends.

The Lead Works - Part 2

(continued from Newsletter No 61)

Dick Graham

Castings

Lead with its melting point of 327°C is easy to melt and its ability to form a stable tenacious oxide on the surface of the molten metal, which protects it from further contamination, allows clean castings to be produced. A wide range of materials, including wood, can be used as moulds and fine details can be reproduced in lead castings.

Lead beads, dated 6,500BC, have been found in the region now known as Turkey and castings representing their gods have been found in Egyptian tombs. Cast lead urns and statues were often used in the landscaped gardens of the eighteenth century. Lead has been used for many years for water pipes, rainwater gutters and headers on downcomers.

Cast lead was also used to fix iron bars into stonework, caulk boilers and to fill the joints between pieces of cast iron. One hundred and twenty tons of lead, mainly in cast form, was used in the recent restoration of the Albert Memorial. As lead has a high density many lead castings were made hollow and iron bars were often placed in the mould cavity to add strength to the finished casting.

The figure below shows one of a pair of lead castings of Greek Sphinx which stood outside the offices of Calder Lead at Elswick. These castings have an interesting history as they are rumoured to come from the entrance to the London home of the Dukes of Northumberland. For many years they stood outside the Lambeth Lead works in London, but were moved to Elswick when the Lambeth works closed in the 1950's. They are going on long term loan to Alnwick Castle to feature in the water garden now the Elswick site is closed.

Bryan Chambers in the September, 2003, newsletter drew our attention to the figures of the shepherd and shepherdess which decorate the public house in Beamish village and are rumoured to have come from Beamish Hall.

Lead Shot

The Greeks used cast lead shot, produced using stone moulds, for their catapults. As gunpowder and guns were developed there was a need for smaller diameter shot and this was produced by pouring molten lead through a perforated plate into water. The resulting shot was pear shaped and it was tumbled with sand in a rotating drum to make it rounder. In 1782 William Watts, a Bristol plumber took out a patent for a new method of producing shot using a tower. The basis of Watts' patent is that when falling in air, surface tension causes molten lead to minimise its surface area and form a sphere. If it is poured through a perforated plate it will form spheres of the same diameter as the holes in the plate and if the tower is high enough it will solidify whilst falling and the resulting shot can be collected in a water tank. This shot is uniform and has a smoother surface than the shot produced by the earlier methods of manufacture.

Watts developed his method by experimenting, dropping molten lead from the top of the tower of St Mary's church in Redcliffe, Bristol, assisted by his wife. In 1785 he leased a large old house on Redcliffe Hill and converted it for lead shot production. The house had an existing well in the cellar which he deepened, he constructed a small tower on the roof and cut holes in the intervening floors to give a total drop of 90 feet. Whilst it did not endear itself to the neighbours the shot tower remained in production until 1968 when it was demolished for a road widening scheme.

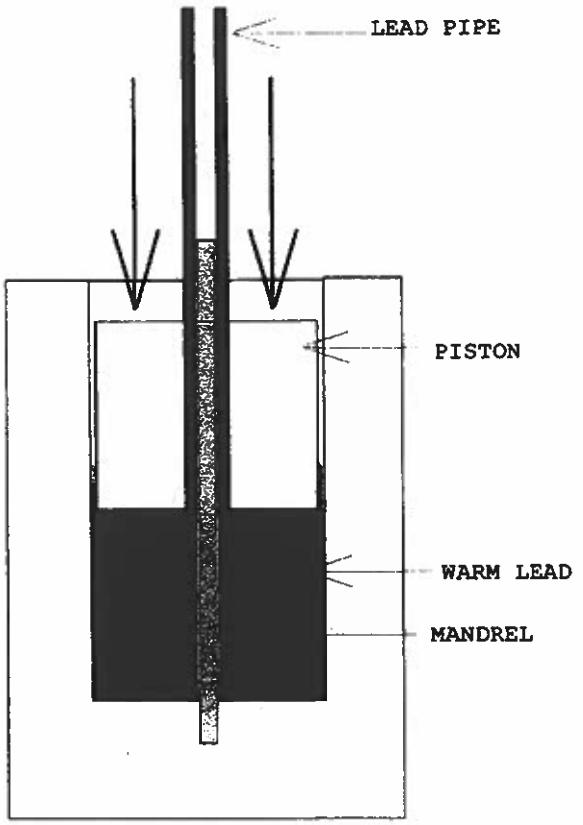
The shot tower at Elswick was built in 1796/7 and was 174 feet high with a 150 foot drop which allowed larger diameter shot to be produced than in Watts' tower. Shot production ceased at Elswick in 1951 and despite the building being listed in 1954 it was not maintained and was demolished in 1969.

The end of an era. Calder's Elswick site cleared, January 2005

Photo Dick Graham

It is not necessary to build a tower to produce shot if there is a deep vertical hole in the ground available and in 1801 Locke, Blackett and Co were using an old coal mine ventilation shaft at Wylam Colliery to produce shot. After two tons were dropped a man was lowered in a kibble to recover the shot and send it up to the surface. This seemingly inefficient process lasted over a hundred years to the early 1900's. A similar arrangement near Alston is remembered by Lead Shot House which stands on the site of a lead shot shaft.

Whilst the majority of lead shot was used in ammunition it was also a convenient form for handling and is often used when lead alloys are manufactured or lead additions are made to copper and copper-based alloys to improve their machinability.



Extrusions

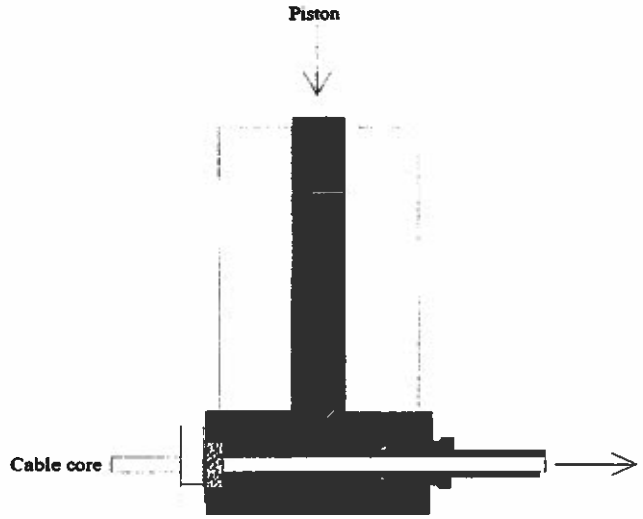
In 1790 James Wilkinson patented a method of producing lead pipe by drawing it through dies.

The technique involved starting with a short piece of cast, thick walled pipe, placing an iron bar in the bore and drawing it through a series of dies to reduce its diameter and increase its length. In 1797 Joseph Bramah conceived the idea of producing pipe by pushing warm lead through an annular orifice but it was not until 1820 that a Shrewsbury plumber, Thomas Burr, developed a practical machine.

The lead is cast in a metal cylinder with a mandrel in the centre and allowed to solidify. A piston with a hole in the centre is forced into the cylinder and the lead is extruded under the force of the piston. The outside diameter of the extruded lead pipe is determined by the diameter of the hole in the piston and its bore by the diameter of the mandrel.

Gas lighting was introduced in England at the beginning of the 19th century and by 1834 there were six hundred miles of gas mains in London alone. Many hundreds of miles of lead pipe took gas to the fishtail burners. (The gas mantle, invented in America, was not introduced to England until the 1880's to combat the growing threat from electric lighting) During the 19th century water supply systems were developed and, whilst the mains were usually cast iron, lead pipes were used to connect the end user to the main.

I visited Elswick Lead Works in the 1950's and recall seeing the manufacture of 'S' bends for kitchen sink waste traps. An extrusion press with a double cylinder arrangement was used, the feed rate could be varied on each side causing one side of the pipe to extrude faster than the other forming a bend. The operator sat on an old canvas chair with a lever in each hand which he manipulated to form the 'S' bend and when it was complete he cut it off with a hacksaw.

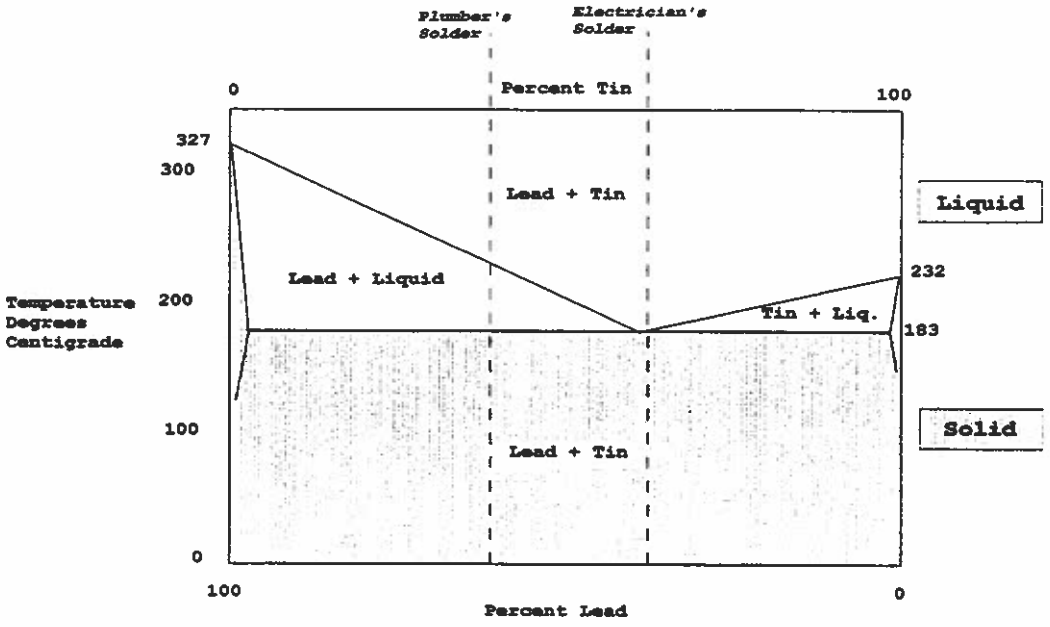


A variation of pipe extrusion is the lead sheathing of electric cables where the cable is fed through in place of the mandrel. Modern systems use the Archimedes' screw principle to exert the pressure instead of a piston, molten lead can be fed in continuously and this allows long lengths of cable to be sheathed without a break. Lead is still used for sheathing undersea cables.

Alloys of Lead

The most important alloys of lead are those produced by combination with tin (chemical symbol Sn) and antimony (chemical symbol Sb). Up to the year 1700, after sheet, pipe and shot, the most important demand for lead was probably in the manufacture of pewter. Pewter was used for most household utensils and was essential for the trade in the numerous ale houses. The composition of pewter varies considerably, the Romans used 50% lead and 50% tin but in later times pewter was almost pure tin with a small amount of residual lead present. The higher the lead content the higher the risk of lead poisoning and 20% lead was considered the safe limit. The use of pewter began to decline with the introduction of tea drinking in the middle of the 18th century and the introduction of porcelain.

Lead-tin alloys have been used for joining metals for many centuries and are known as solder. The higher the tin content the stronger the solder but the composition with 38% lead gives the lowest melting point. Plumbers solder is about 60% lead and as seen in the diagram

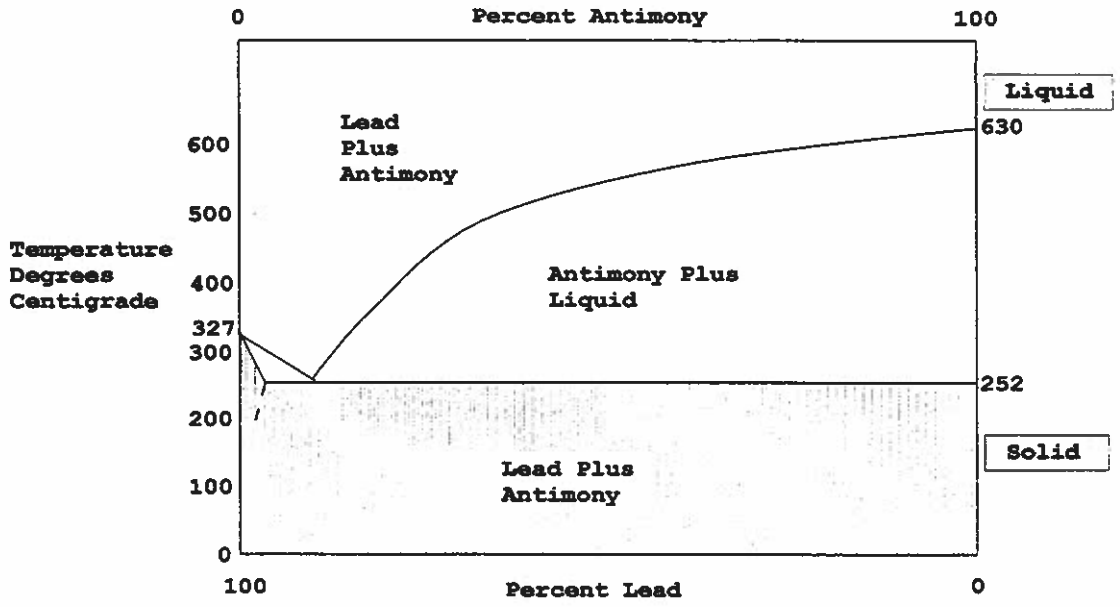


Simplified Lead-Tin equilibrium diagram which shows the behaviour of the alloy with changes in composition and temperature.

this gives a solidification range of about 50°C. This solidification range coupled with the melting point of about 225°C was important when joining lead pipes as the solder could be heated and deposited around the joint without melting the lead and the joint could be wiped as it cooled and became solid. The joining of lead pipes by wiping (shaping and smoothing) whilst the solder was in the mushy stage was a very skilled business. Electrical joints in copper are made with a solder of about 40% lead which has a small range of solidification at around 185°C, the low temperature helps to avoid damage to adjacent insulation.

Lead with about 10-15% tin is used to coat steel sheets for a corrosion resistant product used for roofing, petrol tanks and for packaging. Lead with about 1% tin and 1.5/1.75% silver is used for solders for use at higher temperatures. The alloy known as 'Wood's Metal' after its inventor melts at 71°C , well below the boiling point of water, its composition is 25% lead, 50% bismuth and 12.5% cadmium. Solders containing lead are going to be banned from most products by the year 2008.

Antimony is often associated with galena and is reduced with lead in the smelting process and has a significant effect on the mechanical properties of lead. It is added to lead to improve its strength and hardness and lead with 1-6% antimony is known as hard lead and it has a brighter appearance than pure lead. Lead antimony alloys loose their strength rapidly with elevated temperatures and their use is limited to 125°C. Unlike most metals antimony expands when changing from the liquid to the solid state. Antimony's 4% expansion is used to counteract the contraction of lead in print metals (25% antimony, 7% tin, 68% lead) were used in the printing industry. This alloy did not contract when it solidified and was therefore ideal for reproducing the fine features of print characters.



Simplified Lead-Antimony equilibrium diagram which shows the behaviour of the alloy with changes in composition and temperature.

Where a shaft turns in a journal it is good engineering practice to use a bearing metal to protect the shaft. Bearings need to be softer than the shaft material, resistant to wear and be good at maintaining a film of lubricant between the bearing and the shaft. Lead meets these requirements but it is prone to creep and distort over time. The addition of antimony improves the strength and to ensure that the particles of antimony are evenly distributed tin and copper are added. When the bearing is cast, interlocking needle like crystals of copper-tin compound ($CuSn_5$) solidify first and prevent the cubic shaped antimony crystals which solidify next from floating to the surface. These bearing metals are often referred to as "Babbit Metals" after the American who developed them. Steam engines and the big end bearings in cars were usually an alloy of 40% lead, 13% antimony, 45% tin and 1.5% copper. Modern car engines are more heavily stressed than the older models and aluminium or copper bearings with a flash coating of indium are used now. (To be continued ...)

Some years ago the newsletter contained a brief reference to river pollution resulting from mining activity in the 19th century, so it is especially pleasing to print Roger Morris' much fuller coverage of the subject in the article which follows. The problem remains, wherever mining takes place, and readers will recall the recent incident at Frazers in the Rookhope Valley even after mining had ceased.

Visit to the Lead Mines of Weardale and Teesdale by Her Majesty's Inspectors of Fisheries 1867

Roger Morris

The Nineteenth century was a time of apparent indifference to the pollution of rivers and waterways. But reports included in the Durham Advertiser of 1867, by the Wear Fishery Association tell of recommendations for remedial actions. In the absence of punitive legislation, there were at least Brownie points to be collected for the cleaning up of the mine waste. For the owners of the lead mines, beside the clear financial gain from the last ounce of lead from the ore, there was credit also to be won on the environmental front.

Only one month after the inspection WB Beaumont Esq MP became a subscriber to the Wear Fishery Association. A case of the poacher, if not turned gamekeeper-at least looking after his own interests within the same circle of anglers and land owners. The newspaper coverage begins with the announcement.

At the Annual meeting of the Wear Fishery Association at Bishop Auckland on 29th March it was resolved "That the Inspectors of Fisheries should be invited to visit the lead mines in Weardale, to ascertain their condition, and to suggest the best method of improving the water issuing from them". (It was also suggested the lead mines of Teesdale should be included in the programme and the inspection was organised over the 19 and 20th July, over three months after the announcement).

Along with the inspectors Buckland and Walpole, a large party of proprietors and others interested in the purification and the preservation of the fish met the inspectors for dinner at Mr Henderson's. The following day a larger party that would have been even bigger but for the inclemency of the weather proceeded by a special train to Stanhope. They left the train at Frosterley, where carriages and ponies were in readiness and proceeded to Bollihope.

At Cornish Hush the great mine of the London Lead Mining Company, they were met by Mr Bainbridge. Here they found a great deal had already been done in the shape of forming of a series of subsiding ponds, and beds partly at the suggestion of the late Mr Ffennel, inspector of fisheries. All that is needed is to develop these further to remove the evil complained of.

Breakfast was taken at Stanhope before making their way up the Wear to Burtree Pasture, near Cow's Hill. A large mine belonging to Mr Beaumont, where Mr Sopwith explained to them all particulars respecting the working of the mines. This mine was not in full work as most of the men were engaged in the hay harvest. But the inspectors saw enough to convince them that an immense quantity of hush and refuse must come down the river from the mine. The party then made their way to Stanhope, and examined a place (the name of which was forgotten) where mineral waste is brought a considerable distance by railway before being tipped in the river. This struck the whole party as being a most wanton and mischievous nuisance; the whole bed of the river for miles around, is now covered with large, sharp, angular stones.

Surely, land is not so valuable in this cold, wild barren district but that a small portion could be spared on which to cast the debris of mines rather than do an irreparable injury to the spawning beds of the river. The hush we admit is a difficult matter to deal with; but for this nuisance there is no shadow of excuse.

On the arrival of the party at Stanhope between 40–50 dined at the Phoenix Hotel. Mr Henderson, London Lead Company, and Mr Sopwith, on behalf of Mr Beaumont, expressed themselves as willing to do anything practicable, consistent with the working of the mines on which the subsistence of the population in that part of the country entirely depends.

On Saturday the party visited the lead mines in Teesdale. The first point visited was Wiregill, the rich lead mines in which discharge their "hush" into a brook that meets the Tees a little below Middleton. The mine is leased by the London Lead Company whose manager, Mr RW Bainbridge, had made arrangements to accompany the inspectors and party over the principal mines of the company in Teesdale. The party having been joined by Mr William Lee, overman of the underground department of the Wiregill mine. Mr Jacob Redshaw, washing agent in the underground department, proceeded to inspect the crushing mill, and afterwards the machinery operations of "plunging", "hodging" and washing.

An adjournment was then made to the "settling pits", which extract the lead from the water after it has done its work in the above ground operations of the mine. At this mine, which is one of the richest in the possession of the company, there are three sets of settling pits, through which the water or "hush" passes in succession, and as proof that they do their work efficiently. Mr Bainbridge informed the inspector that from experiments made it was found that the "hush" in the first series of pits possessed 5% lead, in the second only 2% and in the last this was reduced to a quarter percent. After selecting samples of the water and sediment, the inspectors took refreshments in one of the mine buildings, after which the inspection was brought to a close.

This was followed by a visit to the Coldberry mines. These derive their water supply from reservoirs formed near the top of the fell. The operations are carried on both by hand labour and machinery, at several parts of the hill, the water descending from the reservoirs visiting the various places where the "plunging", "hodging" and washing processes were being performed. Before passing through various sets of "settling" pits, until it was finally discharged into an immense reservoir close to the burn in which the "hush" is turned as stated by means of a dam, after being allowed ample time to settle. The proportion of lead found in this tank was a quarter percent as at Wiregill. At both places the inspectors recommended the erection of another series of "settling pits" to further purify the "hush" before it was finally discharged into the neighbouring burns.

The party afterwards ascended to the mouth of the mine inspecting the various modes of separating the mineral on their route. Near the entrance is the crushing machine through which the blocks of ore are passed before the washing operation is gone through. The process is performed by a machine, which was first invented in America for the purpose of crushing stones for road making and is known as Blake's machine. A similar apparatus is in operation at the Wiregill mines. The work above ground at both of these places is done by lads, who with the miners reside at Middleton, and have consequently, in some instances four or five miles to walk over mountain roads to their work.

Another inspection group visited the Newbiggin mine the property of Messrs Wilson and Crawhall. The work is performed by hand labour, and is not so extensive as the operations at Coldberry. The ore is obtained from the lode by means of a burn which descending as it does from a higher altitude, is dammed up until sufficient weight of water is obtained. It is then turned loose down the sides of the hill, where it lays bare the earth beneath the surface. The separating process is performed by "cradling", after leaving which the "hush" is transferred into a series of settling pits, from which it passes to the Tees at the foot of the fall near the village of Newbiggin. At this point, Mr Dodds handed round a letter that he had received from the secretary of the Severn Board of Conservators. These contained plans showing the superior mode of filtering by means of catch pits provided with gravel and charcoal. Mr

Buckland asked whether the system of forcing upwards" the hush" when separating the lead by means of a force pump, might not be adopted with advantage.

Pikelaw mine also known in the neighbourhood as Collinson's Hush, from its owner, is situated in a ravine formed by washing near the top of Pikelaw. This was the last place to be visited. The work is done by hand labour, and consists of laying the vein bare by flushing with water, and then gathering the ore by hand picking and afterwards submitting it to the process of washing as in other places. The "hush"after it has left the settling pits, runs down the side of the fell to the Tees. No particular recommendations were made at these mines other than the exercise of the utmost care in providing settling pits and keeping them in a thoroughly efficient state."

Dinner taken at the High Force Hotel concluded the visits. Afterwards there were speeches despite differences of interest, there was a sense of goodwill. Mention was made of the fact that 100,000 people obtained their drinking water directly from the Tees. The problem of pollution was evidently of wider concern than of the fishing interests alone. A spokesman for the Duke of Cleveland in fawning tones echoed Sopwith's comments of not wanting to incur increased production costs.

"Whilst the Duke was desirous of assisting the Tees Fishery Board in their endeavours, His Grace could not forget that an important industry had its seat upon the upper waters of the river. He trusted that the Board would exercise the utmost consideration with respect to those long established and valuable works". In short, His Grace seems to have been reluctant to pay for improvements in water purity.

Severe though pollution was, it was the dams and weirs without fish passes that prevented the run of salmon and sea trout upstream. The dam at Lumley Locks was removed on the Wear in 1854 and a dozen years later it was reported. "Last season and this, more fish of the salmon kind have been seen in this river than was ever known – that is for the last fifty or sixty years".

Despite the upbeat tones to the inspection of the lead mining districts. The Fishery Commissioner's report ends tellingly. "The river Wear is dreadfully polluted by "hush" from the lead mines, black–water from coal washing, bad water pumped from coal pits, ashes from the collieries, iron works, and cinder ovens, waste ley, etc, from paper mills, refuse from gas works and chemical works, by sewerage and by every abomination that a thickly polluted district can get rid of by putting into the river".

From a Christmas Cracker

An archaeologist is someone whose career is in ruins. (Oh dear!)

A few of our members will have heard this many times so apologies to them.

The Killhope Grand Mineralogical Exhibition 2004 And Beyond – Some Thoughts

Brian Young

Killhope can, if it wishes, claim two 'grand' mineralogical exhibitions. One is the two day event which has for the past 12 years been such a feature of the FOK programme. The other is, of course, the superb Kingsley Dunham permanent display of minerals, housed in the Museum and now joined by the National Spar Box Collection. The success of these permanent displays has resulted in the need to transfer the former event down the dale to Ireshopeburn Institute in 2003 and again in 2004.

The 2004 ' Grand Mineralogical Exhibition', the 12th such event held by FOK, was again staged at Ireshopeburn. Although featuring rather fewer exhibits than last year, the show featured a spectacular display of some of the finest examples of Northern Pennine minerals held in private collections. As with previous years, it was good to see the return to the show bench of several familiar specimens, together with a fair selection of 'new comers'. Not only does this add interest for regular visitors to the show, but amply demonstrates that there is a richness of high quality Northern Pennine specimens being enjoyed and well cared for by several collectors. In common with other years, 2004 saw the appearance of a number of specimens collected since the previous show, clearly demonstrating that high quality, and scientifically important, specimens are still being uncovered.

Recent years have seen the introduction of a class in which exhibitors are invited to display a selection of specimens accompanied by a brief explanation or interpretation of their importance or significance. Especially noteworthy in this class this year was an extensive suite of specimens collected from Rampgill Mine. Prominent amongst these were many extremely fine specimens which comprised epimorphs (or casts), mostly composed of quartz, after a pre-existing cubic mineral, almost certainly fluorite. Many of these specimens revealed rather complex relationships of the constituent minerals. The exhibitor, Ralph Sutcliffe, is to be congratulated not only for attempting to describe and explain these relationships, but also for recognising their potential to add significantly to understanding the formation and geological evolution of the deposit from which they were collected, and for his inviting of expert geological assistance with further studies.I believe this raises an important point which, as judge, I have touched upon before. I hope I will be allowed here to do so again.

Whereas most, if not all, of the minerals which appear on the show bench are objects of great beauty, their importance goes far beyond aesthetic considerations. Many, perhaps most, have the potential to tell us much that is new on the formation of the deposits of which they formed part. Some specimens which have appeared at the show over the years have done just that. Many, including this year's selection of epimorphs from Rampgill Mine, have the potential to add greatly to our understanding. Collecting beautiful or interesting minerals has always been a traditional part of mining. These specimens are the raw materials for ideas and hypotheses on the nature and formation of the deposits. Enabling specimens like those we see at the Killhope show to tell their stories follows in this tradition. When working mines constantly revealed new material, collecting saved many a fine specimen from otherwise inevitable destruction during processing. With the demise of mining, mineral specimens have become part of a rapidly diminishing, and in some instances unique, resource. Surely it follows that collecting of these scarce pieces should carry an obligation to derive as much information from them as possible. Not only does this underline the need for careful curation, including labelling, but also places on the collector a responsibility to facilitate the fullest possible understanding of the collected material, both in its own right as a mineral specimen, but also in its widest geological context. Sadly, I am bound to say that

some very important opportunities to derive such vital clues from minerals exhibited in recent Killhope shows have so far been missed. Let us hope that these specimens can be properly investigated soon.

The award of European Geopark status to the North Pennines AONB in 2003, the first such designation in Great Britain, gives tremendous opportunities and incentives to celebrate and exploit in the best possible way, the area's enormous geological interest. Last year saw the first North Pennine Geology Festival, which proved to be a huge success with over 800 participants in the two week programme. A similar two week programme is planned for 21st May –4th June 2005. This year, the Friends of Killhope have decided again to participate fully in the 2005 Geology Festival. Instead of a competitive mineral show in September, this year the Friends of Killhope will host a two day exhibition, to include non-competitive mineral and other geologically based displays and demonstrations. Following in the finest tradition of the original mineral shows, this will be held at St John's Chapel Town Hall on Saturday 21st – Sunday 22nd May 2005. The organisers hope that previous competitors will join in by exhibiting at this exciting new event.

Over the 12 years of the Grand Mineralogical Exhibition it has been a great privilege and pleasure for me to act as judge. Every year has thrown up something new and, on occasions, a few challenges. The 2004 exhibition was, like its predecessors a considerable success, but the time is right to move on. The plans for 2005 should not be seen as the end of the Killhope show, but its obvious evolution into an exciting and rather different event, which because of its more spacious venue can include a greater variety of topics in addition to minerals, and thus can enjoy wider appeal. With the enthusiasm and support which distinguished the Grand Mineralogical Exhibitions, the new event will follow in the best traditions of the mining heritage from which it is derived and can surely look forward to contributing much to the North Pennines European Geopark of which it forms part.

Friends To Enter The Cinema Business

Dick Graham

As part of the AONB Geopark festival we are arranging to show a film "A Century In Stone" which tells of the discovery of ironstone near Eston in Cleveland and a hundred years of ironstone mining. It covers the growth of Middlesbrough, at the expense of Witton Park, mining techniques, the working conditions of miners and their social life. Using re-enactment, virtual reality, rare archive film footage and interviews with the last of the Eston miners, the film provides an insight to a forgotten industry.

Whilst ironstone mining is not lead mining there must be many features in common, indeed the decline in lead mining in the second half of the 19th century coincided with the rapid expansion of the Eston mines and no doubt many miners moved from Weardale to Cleveland. The film, which covers social conditions as well as working conditions, demonstrates how well off we are now compared with the recent past and how hard the miners and their wives worked.

When the film was shown at a multi-screen cinema in Middlesbrough it attracted an audience of over3500 in two weeks, outperforming the Hollywood productions showing at the same time. We have arranged to show the film, which lasts for two hours, at St John's Chapel Town Hall on Tuesday 24th May at 7-30pm(doors open at 7-00pm). To cover the cost of hiring the film, the projector and the hall we are making a charge of £3, a small price for a good evening's entertainment, so please make the effort to come and see it.

Europamines (1)

Ian Forbes

Europamines

Back in nineteen-ninety something a group of mine historians and archaeologists from across Europe visited Killhope as part of a tour of European mining heritage. They were impressed by the authenticity evident in the reconstruction taking place at Killhope and by the detailed research and care which lay behind our work. Subsequently Killhope was invited to join "Minet", a European network of mine heritage sites, and I gave a talk on our approach to conservation and interpretation at an international conference in Nenagh in Ireland.

Minet rather fizzled out, not because the name apparently means something rude in several European languages, but because the European project funding came to an end.

However several leading players in Minet were reluctant to see the idea die, and now a descendant of Minet – Europamines – has been formed to carry forward the work begun in the 1990's. Europamines, like Minet, will be a network of European mine heritage sites which will demonstrate and share best practice in research, conservation, interpretation and education. The mission of Europamines is:

To advocate the positive advantages to communities and nations accruing from the identification, conservation and interpretation of mining landscapes, including their historical, sociological, cultural, technical, environmental and economic dimensions.

Europamines members are all committed to the highest standards in all aspects of mining heritage, to the dissemination of best practice and to partnership working. Members will work towards the recognition of the Europamines logo as a quality label, and Europamines sites will be exemplars of all that's best in European mining heritage.

The network will share experience, knowledge and expertise in a range of activities. These activities will include inter-regional projects, promotions, publications, research, conservation, education and training initiatives, policy advocacy and experience exchange.

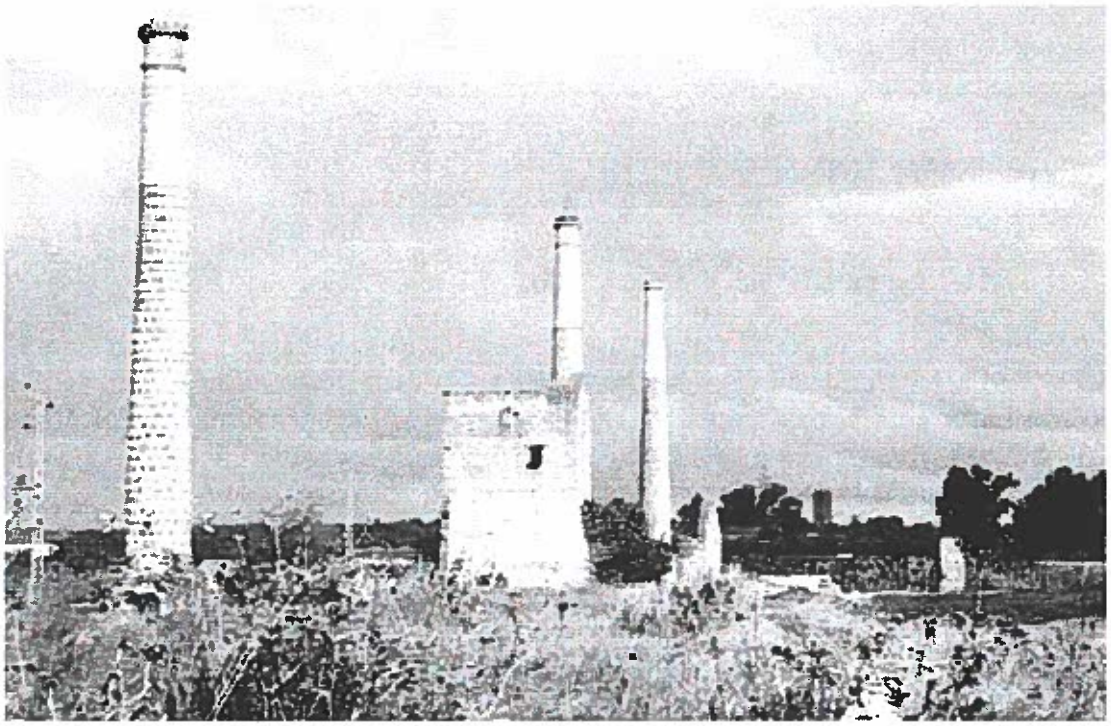
The initial founding group of Europamines consists of six co-organisers in five countries. These co-organisers are the Geological Society of Ireland; the Mining Heritage Trust of Ireland; Colectivo Proyecto Arrayanes in Andalusia in Spain; Camara Municipal do Fundao in Portugal; Comunita Montana Valli Chisone e Germanasca Scopriminiera in northern Italy – and Killhope. There are also four further partners in the project – Zloty Stok Mine and Museum in Poland; Ville de L'Argentière-la-Bessée in the French Alps; Cornwall County Council and the World Heritage site at Der Rammelsberg in Germany.

You will see the "Europamines" logo on the new Killhope leaflet, and we are looking forward to playing a big part in helping the network grow, develop and become sustainable. It's great to be in at the beginning of this new Europe-wide initiative, and wonderful to see Killhope now playing a part on the European stage.

Europamines (2)

Ian Forbes

During the Nenagh conference I met a group of enthusiastic and committed people from Spain who were trying to save their remarkable lead mining heritage – a heritage that was rapidly being destroyed by widespread olive grove planting. These were some of the founders of the Colectivo Proyecto Arrayanes in Andalusia and recently I had the chance to meet up with them again on their home ground. They are based in Linares in northern Andalusia, and it was here that the first Europamines meeting was held in December.



La Tortilla mine just outside the city of Linares in Spain. This was Thomas Sopwith's most productive Spanish mine. You can see his steam pumping engine houses strung along the line of the vein. The intention is to create a museum on this site, using one of the engine house complexes as an interpretation centre.

Photo: Ian Forbes

It was heartening to see how much they had achieved in the intervening years, and how they all shared a vision of what they still wanted to do. As a voluntary group they are very impressive. The Colectivo is very focussed on raising the awareness locally of the importance of the region's mining heritage, and of exploiting the tourism potential of the mining remains and mining stories.

The Linares area has an immense mining heritage, spanning the millennia from the Bronze Age to the early 1990's. The range and variety of what still survives is phenomenal, and it was a privilege to have been shown a small part of it. I was particularly pleased to see the region because of the very strong historical link with our patch here in the North Pennines.

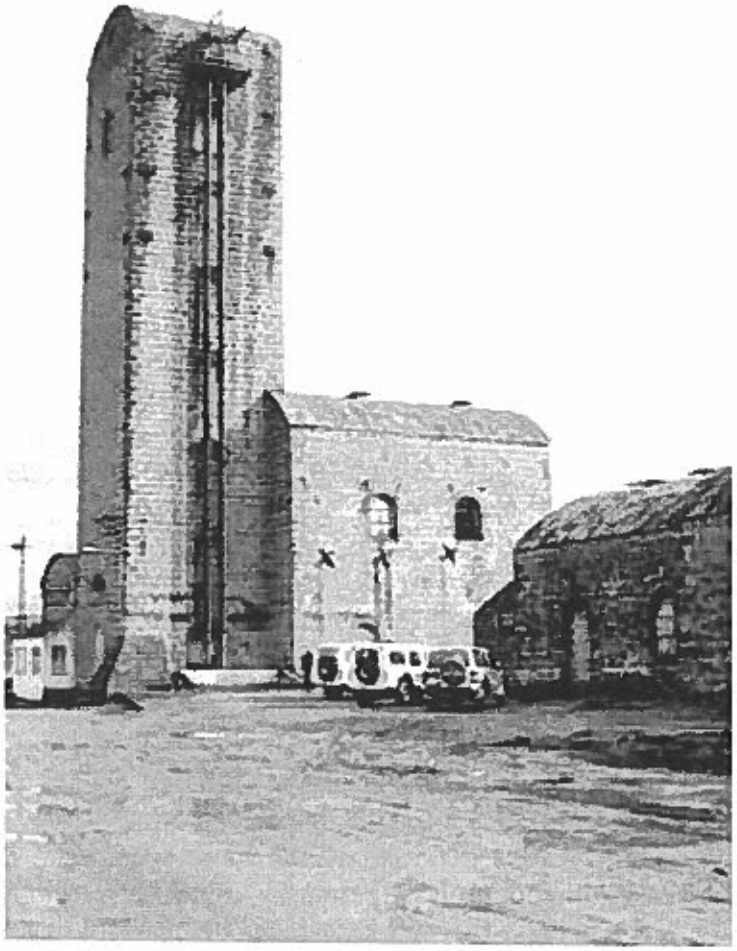
The story is this. Back in the 1860's Thomas Sopwith persuaded his employer, Wentworth Blackett Beaumont (owner of the WB Lead mines) to send his son, also called Thomas, on a grand tour of European mining ventures. The idea was for young Tom to pick up on the best practice in European mining for the benefit of the business back home. Perhaps also Beaumont and Sopwith were looking for investment opportunities abroad.

Whatever lay behind the trip (which was financed by WB Lead) Thomas Sopwith Junior eventually wound up at Linares. He saw a real opportunity to set up a new mining business here, and did so, with the support of both his father and the Beaumont family. Sopwith's "Spanish Lead Company" was established in 1864, and refloated in 1880 as "T Sopwith and Company".

To cut a long story short Sopwith's Spanish business prospered and grew to become a massive and profitable concern, involved in not just lead mining but in smelting and processing lead products. Sopwith's played an important role in the late 19th century Spanish mining boom. This flowering of the Spanish lead industry was enormously significant. Between 1870 and 1880 production of lead ore from the Linares region rose to around 400,000 tons per year, with more than 9,000 people employed in the industry.

It was of course this boom that helped destroy the British – including the North Pennine – lead mining industry.

It was thus both poignant and thrilling to visit Sopwith's mines and smelters where the power and size of his once-mighty enterprise is apparent in the scale of the remains.



La Tortilla smelter near Linares. Sopwith's company not only smelted lead at a vast smelting complex, but made lead products here as well. This well-preserved building is the shot tower. Sopwith's building style in Spain is characterised by the universal use of corrugated sheet as a roofing material. Lead was smelted on this site until 1967.

Photo Ian Forbes

Linares does indeed have a truly remarkable mining heritage. We can only hope that much of it can be secured for future generations to enjoy.

Book Reviews

Secret Worlds: Spar Boxes of the North Pennines by Ian Forbes. Killhope, the North of England Lead Mining Museum. 2004. 88pp. ISBN 0-902178-21-0. Price £4.50

The Northern Pennine Orefield of the Alston Block can justly claim worldwide celebrity in many fields of earth science. As one of Britain's longest worked orefields, it has played a fundamental role in developing concepts in mineralising processes, has yielded some of the world's finest examples of several minerals, including four species first discovered here, and has been an innovative centre for mining and smelting technology. In 2003 it became Great Britain's first European Geopark.

One of a number of much less well-known, and almost unique, aspects of this area is the subject of this fascinating book. Spar boxes, which hardly need any introduction to most Friends of Killhope, are the product of an unusual folk craft developed by North Pennine miners during the latter years of the 19th century. It seems to have been a craft confined to the North Pennines, west Cumbria and the Isle of Man. As many lead miners were avid collectors of "bonny bits", the making of spar boxes, cabinets lined with crystals of minerals collected from the mines, provided a focus for their collecting. Whereas many were no doubt created purely for decoration, a strongly competitive tradition developed with spar boxes figuring prominently in local shows, including the 'Grand Mineral and Geological Exhibition' held in St John's Chapel Town Hall on Christmas Eve 1887, and which provided much of the inspiration for the Killhope 'Grand Mineralogical Exhibitions'. Although once comparatively common features in many a Weardale cottage, spar boxes have in recent years suffered the fate of becoming 'collectable', and have been eagerly snapped up by dealers, leaving few in their native territory. Fortunately, Killhope Lead Mining Museum holds a magnificent collection of these boxes which is now on permanent display.

Ian Forbes' book offers a superb compilation of background information on this unusual craft and provides a wonderful companion to the Killhope exhibition. The book explores the sources of specimens and the practices of the collectors, before going on to examine the development of spar box making as a local craft. Fascinating details of the most significant shows, and profiles of some of the most prominent 19th century spar box makers. are followed by a section on modern spar box makers who are keeping the tradition alive. The author's enthusiasm for, and knowledge of, his subject are plain throughout the text. Colour photographs of spar boxes from the Killhope collection, together with other illustrations including documents and personalities, abound. Numerous extracts from letters and other documents, enliven the text. However, in this the author has not been best served by the book's designer. These extracts, and the blurb on the rear cover, are reproduced in such a pale grey type-face that reading them can be frustrating. Having said that, the book is highly recommended to anyone with an interest in any aspect of the Northern Pennines.

Brian Young

Geodiversity Audit Action Plan (GAP) for the North Pennine AONB/European Geopark 2004-09 - North Pennines AONB Partnership/British Geological Survey. 131 A4 pages.

This high quality document is at the same time an easy read text book and a glossy tourist guide. As its name suggests it is a comprehensive inventory of sites selected for their 'typicalness and geological merits' - many of them illustrated by excellent colour photographs. Naturally there is a substantial section devoted to the geology of the area which is clearly explained with maps and diagrams and again many fine coloured photographs.

The third section, Exploring and Celebrating our Geological Heritage lists certain key sites and features considered for interpretation and it is pleasing to see included some of one's favourite spots which up to now seemed to be left to God and good neighbours. The plan sets out what should be done at each site, who should do it and in what time scale. Current condition of features is given and priority for conservation, interpretation and access indicated. This section also includes a useful list of abbreviations used in the plan. Did you know for example, that RIGS stands for Regionally Important Geological and Geomorphological Site Groups? Finally just in case you're wondering Geodiversity is defined as, 'the link between people, landscape and their culture'. To be more serious however this is a most impressive scheme which deserves the best support and cooperation of all concerned including of course the Friends of Killhope.

The plan is free at the discretion of the North Pennines AONB at Stanhope, but it is also available on the 'web' (www.northpennines.org.uk) and we have a copy in the archive.

Bryan Chambers

Readers Letters

Lindisfarne Gospels

I hope you have all had a wonderful Christmas and a great start to 2005. Killhope is very pleased to announce, that during the month of August we will be getting the Lindisfarne Gospel facsimile.

It will arrive on Monday 8th August and go on show to the public the following day till 11th September. We must admit this is a facsimile but for those of you that have seen it before will know it is an excellent copy. The British Library is keen that visitors should be allowed to 'turn the pages' and see close up the wonderful details inside. The Gospels will be kept in the exhibition space upstairs so when not under supervision it will be monitored by CCTV, but we would be grateful for anyone who would like to volunteer to supervise the public assess to the gospels.

Your time is limited, but we would be eternally grateful for the odd afternoon between the 9th August to 11th September. This is a wonderful opportunity for you to get close up to this treasure. We will of course offer you lunch and refreshments. If you can offer any time, would you please ring Helen, our new Administration officer (our new Annie). Any other questions just call and either I or Helen will be pleased to help.

Tina Raynor, Commercial Services Officer, Killhope

Why are we doing another ironsmelt at Killhope?

Because we're masochists. No, not really, the point is to find out whether the Cumbrian haematite will smelt in our furnace *if* we mix it with some slag from the previous haematite smelting attempt. To remind readers, the purer Cumbrian ore failed, and the less pure Weardale ore succeeded, in producing a bloom in our medieval-style furnace in June 2004 (see Newsletter No 62).

The theory is that the less pure Weardale ore worked because the slag which formed round the particles of Weardale ore prevented its reacting with the furnace lining, giving time for the reduction reaction to take place, whereas much of the purer Cumbrian ore reacted with the furnace lining and flowed away as slag. Mixing slag with the Cumbrian ore should prevent this happening, or so the Master Smelters say.

Place your bets now! Or, better still, come and help with the bellowing on Saturday 28th May. Go on, it's the day after my birthday, and positively the Last Medieval Ironsmelt (or so they say...).

Ros Nichol

Smelting Cumberland Ores - An Answer?

I see there is a request for suggestions why the Cumberland iron ores gave precious little of a bloom and the Weardale limonites produced a three pound projectile. The previous year the bellows broke, the furnace cracked and despite heroic efforts nothing materialized. And no bloom this year from Cumberland haematite either but the Weardale ores could scarcely wait to reduce to iron. Well, the reason seems pretty obvious to me. The spirits of the Weardale iron miners generations past were aghast at their descendants trying to smelt an iron ore from foreign parts. They just wouldn't allow it. But when home ores from Weardale were tried that was a different story, the spirits gave every encouragement and the ore sweated out its iron like treacle. QED.

David Scott

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Friends of Killhope Grand Mineralogical Exhibition

Fact: some of the world's finest specimens of fluorite have come from the North Pennines, and particularly from Weardale.

Fact: in the late nineteenth century a series of mineral exhibitions in St Johns Chapel celebrated the economic potential and beauty of Weardale's minerals.

Fact: through most of the twentieth century the public had only very limited opportunities in Weardale or elsewhere in the North Pennines to see the very best minerals the area has to offer.

It therefore seemed utterly appropriate for the Friends of Killhope to revive the tradition of mineral shows, a decision we made over a decade ago.

Since then the first weekend in September has been fixed in the calendar as the Killhope mineral weekend, and competitors and spectators have come to the dale from all over the country to display, to compare, and to enthuse about minerals. We have had some wonderful shows and seen some superb minerals of outstanding quality. We have enjoyed the meeting of old friends every year and have been privileged to host some great conversations and reminiscences. The mineral show has been hard work, but immensely rewarding for all concerned.

But now, in the last few years, things have changed. The Friends of Killhope ensured that Killhope now has its own permanent mineral display. The exhibition room at Killhope has shrunk because of this and the spar box display, and is no longer big enough to host the September mineral show. Moving the show from Killhope to Ireshopeburn Institute has only been a partial success, and the event has felt isolated from Killhope. Last year the North Pennines Area of Outstanding Natural Beauty and Geopark launched a geology festival fortnight at the end of May and beginning of June. This was well received and will become an annual event.

For all these reasons we feel it is time to move on and change the format and date of the Friends mineral weekend.

The September mineral shows have been wonderful events and I feel proud to have been associated with them. However we need to retain the spirit and enthusiasm for the subject which the shows demonstrated and reinvigorate the idea in another format and venue.

Thus this year the friends of Killhope mineral weekend will be on 21st and 22nd May, and will be the opening event of the North Pennines geology festival. It will return to the nineteenth century venue of St John's Chapel Town Hall, but will be a series of displays rather than a competition. We are hoping to borrow some of the Rookhope borehole core (including the Weardale granite) from Durham University, the British Geological Survey will mount a display, there will be children's workshops and a public talk as well as - of course - displays of North Pennine minerals.

Do come along and support the "new look" mineral weekend. Combine it with a visit to Killhope's 21st birthday bash and make a memorable weekend!

I cannot say goodbye to the September shows without recording our enormous gratitude to those who put so much into making the event work so successfully. Thank you, all of you.

Ian Forbes

Killhope staffing

Annie Macdonald, Killhope's admin officer, retired at the end of last season. Annie had been the hub of the Killhope office – the steady calm unflappable presence at the centre of everything going on at the museum. Any of you who came into contact with Annie will have experienced her calm efficiency and her unfailing courtesy and helpfulness. Killhope owes a great deal to Annie, and we all wish her and Laurie the very best in retirement. They deserve it.

Killhope's new admin officer is Helen Marritt from Cowshill. I'm delighted that she has settled in extremely well and has very quickly become a valued member of the Killhope team.

Killhope continues to be very fortunate in its staff, with everyone completely committed to making a visit to the museum the best possible experience. We have recruited a number of new information assistants to the team for 2005. They are Hilary Andrews, Caren Henderson, Pru Kitching, Thomas Robinson, Sarah Shaw and Emily Wallace. We welcome them to the team.

The very positive relationship between staff and friends is one of the real strengths of Killhope, so please make yourself known to new staff when you visit.

Ian Forbes

Killhope's twenty-first birthday - come and celebrate with us!

I find it hard to believe, but Killhope museum comes of age in May. We've travelled a long way in those twenty-one years and we intend to celebrate the journey in style on the 20th and 21st of May. We will have a public celebration on Saturday 21st, but on Friday 20th we intend to host an "invitation only" event at Killhope. We would like as many people as possible who have been involved in Killhope over the years to come to the museum on Friday 20th May, to meet up with old friends and acquaintances and to celebrate what we've all achieved over the years. Do come along – it will be great to see a large number of Friends there – after all Friends of Killhope have made a massive contribution to the work of the museum. If you'd like a ticket, give Helen at Killhope a ring on 01388 537505.

Please note that in the last newsletter we indicated that Killhope would be in Victorian dress on 21st May. This will not now be the case – but if anyone does want to dress up in traditional style and come to Killhope on that day to add a bit of atmosphere to the site, you'd be very welcome to do so.

Ian Forbes

Forthcoming Events 2005

Friends of Killhope Events 2005

21st May to 6th June	North Pennines Geology Festival (see below for details)
28th May	Iron smelting in the wood at Killhope (medieval style) 10.30 am all day
18th June	Annual General Meeting - 11 am at Killhope
19th June	Annual Quoits Championship

Killhope's Events Programme 2005

Temporary Exhibition - Lindisfarne Gospels

9th August – 11th September

Normal Admission Prices Apply

March	Killhope opening Daily 19th March – 31st October 2005 10.30 – 5.00	
19th/20th Science	Weekend Einstein's Birthday Bash – Free Workshop	
25th – 28th	Hop into Easter Easter Egg Trails – Quiz trails – Creative workshops	11.00-4.30 £1.50
May		
1st /2nd	Clarty Clay Play Days Come and join in the Fun Fun FUN	11.00-4.30 £1.50
15th	National Mills Day Come and join the Bishop Auckland Radio club contact the world	
21st	Big Birthday Bash - Killhope comes of Age Killhope is 21 – from picnic area to Britain's Most Family Friendly Museum	
21st/22nd	FOK Rocks and Minerals (Town Hall – St. John's Chapel)	
29th/30th	Pond Ecology Workshop What is living in Killhope reservoirs Parental Supervision essential	11-1 & 2-4 £2 per child
21st May–5th June	**North Pennines Geology Festival**	
June		
4th	Kids Spar Box Workshop. We supply the materials – you supply the imagination	11-4.30 £5
19th	Quoits Comp – Friendly competition played on grass – come along and have a go	2.00
July		
10th	Kids Water Power FREE Workshop – How does it work – which wheel is the best – make your very own water power wheel.	11.00-4.30
31st	Let's Go Fly a Kite – Make your own kite to fly up in the windy North Pennine Hills – we supply all the materials – you supply the imagination	11.00-4.00 £2.00
August		
7th	Bird of Prey Information Day - Come and meet Gandalf the owl and his friends	12.30-4.30 Free
13th & 14th	Hidden Treasures - A rare chance to see Killhope's Hidden Treasures	10.30-4.30 Free
21st	Bugs Alive – Creepy crawlies, slithery snakes - you can even hold some! if you dare	12.30-4.30 Free
28th/29th	Woodland Sculpture Workshop – Come and be creative with the sweeping from the forest floor	10.30-4.30 £1.50
August 9th – 11th September	**Lindisfarne Gospels**	
October		
2nd	Deadly or Delicious Fungus foray and BBQ. An expert will be on hand to help Adults £2.00 Children Free – Bring your own accompaniments to the feast	
21st/30th	Hallowe'en Craft Workshops - create creepy crawlies – lanterns etc	12.00-4.30 Daily £1.50
29th/30th	Scary Woodland Walk Come and listen to the scary stories - FREE	
December		
3rd/4th	Santa Down the Mine – **BOOKINGS ONLY**	
10th/11th	Santa Down the Mine – **BOOKINGS ONLY** **No age restrictions - 9.30am-4.00pm**	

Killhope and Friends of Killhope Events for Geology Festival

21st/22nd May	Friends of Killhope geology weekend in St Johns's Chapel Town Hall. Sat 12 noon - 5 pm, Sun 10.30am - 4 pm. Free entry. Includes displays of local minerals and an exhibition on the Rookhope borehole and Weardale granite. In conjunction with BGS and Killhope Lead Mining Museum. On both days there will be children's workshops run by the Friends of Killhope at a cost of 50p per child to cover materials.
22nd May	St John's Chapel Barrington Hall - 2.00 pm. Brian Young will give an illustrated talk on "The Making of the North Pennines". Free admission. Organised by Friends of Killhope and BGS.
24th May	St Johns Chapel Town Hall - 7.30 pm film "A Century in Stone" - the story of the Cleveland Ironstone industry. £3 per head, no advance booking required. A Friends of Killhope event.
25th May	"The Pikelaw Mines of Upper Teesdale" guided walk led by Brian Young and Ian Forbes to look at the geology and mining remains of part of the Teesdale mining field. Meet at 1.30 pm at the layby in Westgate in Weardale (A689). Pre-booking essential - telephone 01388 528801. Come prepared for moorland walking with stout walking boots and weatherproof clothes.
28th May	"Scordale" guided walk by Brian Young and Ian Forbes to look at the geology and mining remains on the Army ranges in an area not usually accessible to the public. Meet at the beginning of the Scordale track at the north end of Hilton village (GR NY736208) at 10.30 am for an all day excursion. Pre-booking essential - telephone 01388 528802. Come prepared for moorland walking with stout walking boots, weatherproof clothing and a packed lunch.
28th May	At Killhope "Medieval Iron Smelting" experimental iron smelting by the Friends of Killhope. From 10.30 am, all day. Normal Killhope admission charges apply
1st June	"Prospecting for geothermal energy at Eastgate", Dales Centre, Stanhope at 7.30pm. An illustrated lecture on the recent drilling programme at Eastgate by Prof. Paul Younger (Newcastle University) A Friends of Killhope talk.
4th June.	Killhope lead mining museum. Children's workshops making spar boxes. Organised by Killhope. From 11am. £5 per head plus Killhope admission.
21st May-5th June	Exhibition of North Pennine minerals and the national spar box collection at Killhope. Killhope admission prices apply.

Weardale Field Study Society - Programme 2005

All meetings held in Durham Dales Centre, Stanhope at 7 pm.

1st March (AGM)	Dr Robert Young	'As me and me marras were gannin' te work ...' Traditional song and Industrial Archaeology in the North East of England
5th April	Mr Dave Barrett	'RSPB / Birds'
3rd May	Mr Paul Allison	On the subject of 'Low Harperley'
7th June	Outing 7.00 pm	Visit to Low Harperley
6th September	Mr Ian Bloomfield	'Renewable energy in Weardale'
4th October	Mr David Heatherington	'Early Methodists in the North Pennines'
1st November	Dr Tom Gledhill	'Stanhope Park Archaeological Survey Stage 2'
6th December	Mr John Banks and the Stanhope Photographic Society	'Interactive evening – Weardale in pictures'

Friends of Ninebanks Youth Hostel

YHA Ninebanks is running another geology weekend with BGS on 21st and 22nd of May as part of the Geofestival (details from the hostel). They are also running a number of conservation holidays in partnership with BTCV on a variety of projects including taster weekends for families and individuals throughout the year (again details from the hostel). The Friends will also be running a series of events - details in the next newsletter.

Details from:
Pauline Elliott, YHA Ninebanks, Orchard House, Mohope, Ninebanks, Hexham, Northumberland, NE47 8DQ
Tel: 01434 345288; Fax 01434345414; email ninebanks@yha.org.uk; Web site http://www.yha.ninebanks.co.uk

Keswick Mining Museum - Open Day Sunday 6th March 2005

Otley House, Otley Road, Keswick

We are pleased to announce that our annual open day will be on the 6th March 2005. The event is free and all your members are welcome.

In mining circles, the museum Open Day has become well known as a high point of the year, a day when mine explorers, ex-miners and quarrymen, mineral collectors and general enthusiasts come on site to one of the finest mining museums in the country. Hopefully the Cumbria Mines Ore Rescue team and Ambulance will be on site again as they were last year.

The day will commence with a guided walk to STONEYCROFT MINE starting at 10.30 am from Stoneycroft near Barrow Mountain and return by 12.30 am to the Museum for official opening. Then the launch of Ian Tyler's latest book "Goldscope and the Mines of Newlands Valley" will take place. The book will have dozens of original photographs of the mines, maps, plans and drawings.

At about 1.00 pm a light buffet, soup, roll, quiche, salad, cake, tea, coffee etc will be served. From then on there will be the rest of the afternoon to mingle, talk and meet fellow enthusiasts.

Hopefully our new venue in Keswick will inspire you to come and see our new home.

We look forward to seeing you. Ian and Jean Tyler

Some of the inmates at the Friends' Christmas social. Let's hope they're feeling better by now.
Photo Dick Graham