



The Northern Mine Research Society

Issue
3

Newsletter - May 2003

Society Meetings -2003

Provisional Field Meet Programme (Dates & details to be confirmed)

June 7th-8th NAMHO Conference. Aberystwyth see inside for details

June 22nd Swaledale, Swinnergill level

Meet leader Richard Platt Tel 01204 362892

Meet at Keld village, NGR SD896011, at 10.30

July 5th Gillheads/Appletreewick

Meet leader Martin Roe Tel: 01274 814749 roe_martin@hotmail.com

Meet NGR SE063620 Appletreewick at 10.30. Surface and easy underground

For further details contact Martin.

July 20th Whitaside, Summerlodge and Moulds, Swaledale

Meet Leader Richard Platt Tel 01204 362892

Underground . Meet at 10.30am Askrigg to Grinton Road. NGR SD982964

August 17th Grassington Moor

Meet leader Sallie Bassham Tel 01524 241851

Surface walk. Meet at 11 am Yarnbury NGR SE015659

August Swaledale/ Arkengarthdale (Richard Platt)

September Faggegill (possibly joint meet with EMRG)

October 11th NAMHO Seminar see inside for details

Underground Archaeology of Mining, Grassington

October 26th and 27th Hude Valley, Teesdale

Meet leader Tony Fretwell Tel 01388 605965

Meet at 10.30 (both days) Middleton in Teesdale NGR NY947255

October Goldscope/Newlands Valley Lake District (I Tyler)

SOCIETY TREASURER WANTED

Barry Suddell agreed to be re elected as Society Treasurer at the recent General Assembly, but he made it clear that for personal reasons he will need to be relieved from the post at sometime within the next twelve months. Would any one willing to take over the job contact Mike Gill. The Treasurer's job is busiest at the start of the year. At this time, the last year's accounts have to be prepared and sent for inspection, subscriptions need booking and membership cards got ready for sending out with the February Newsletter. The rest of the year is much quieter and is spent keeping up with address changes and dealing with new members.

2003 MEMOIRS

Members will by now be aware of the delay in production and dispatch of the 2002 memoirs. This was due to a busy personal schedule at the beginning of the year in combination with some confusion at the printers. Please accept my apologies for this lapse of service, which hopefully is compensated for by the prompt issue of the next monograph, BM72 – "The Mines of Yorkshire", by Mike Gill and Roger Burt.

I have a few provisional offers of papers for the 2003 memoirs but I will definitely need more material to produce a complete publication, so if any readers have some research to write up and would like to submit it, I would be pleased to hear from you. In addition to the memoirs articles, I have received a draft script for the next potential monograph and there is also another possible book in preparation. The future publications schedule is not entirely secure, however, so I would encourage any prospective monograph authors with partially completed drafts to finish off their work and contact me in the coming months.

John Hunter Publications Editor

LIBRARIANS REPORT.

Members continue to be generous with donations to the library. Ian Francis has contributed several volumes of "The Science and Art of Mining", "Transactions of The Institution of Mining Engineers", "Modern Mining Practice", "Coal Mining Practice" and books on coal mining. Other recent additions include copies of "The Mine Explorer" - the Journal of the Cumbria Amenity Trust (from Don Borthwick), a mining map of Sardinia (from Peter Claughton) - lots of fascinating and understandable detail even though it's not in English; Robert Hunt's "One Mines and Mining: Mining Fields, Working Methods and Mineral Statistics of the 1870s" (from Peter Hughes), John Rowlands' "Copper Mountain" (from Tony Fretwell) and David Judson's "Caving Practice and Equipment" (from Mike Gill). Many thanks to you all.

Sallie Bassham, NMRS Librarian

MAJOR DONATION TO THE SOCIETY RECORDS

The Recorder wishes to thank John Hobson, a non-member, for his generous donation of slides and prints of lead mining sites in the Yorkshire Dales to the Society. Mostly taken in the 1970s, the photographs represent a major historical resource because many sites have deteriorated.

Mike Gill

NAMHO 2003

The Mining Heritage Trust of Ireland is hosting the NAMHO 2003 conference (Saturday 7th - Sunday 8th June 2003). The conference will be located at Avondale House in County Wicklow, close to Avoca ("Ballykissangel"), about 40 km south of Dublin

The conference will consist of talks, surface and underground trips. In the week following the conference there will be opportunities to visit some additional mine sites in western and southern parts of the Country, plus a visit to the active Tara lead-zinc mine (the largest in Europe). In addition to the talks and visits, there will be a reception in Avondale House on the evening of Friday 6th June and conference dinner on Saturday 7th June.

Accommodation will be available at Avondale House, in local B&B's, hostels and camping

For details, see the Mining Heritage Trust of Ireland's web site: www.mhti.com

For further information contact the Conference Co-ordinator -

Matthew Parkes Email matthewparkes@gsi.ie

MHTI

c/o Geological Survey of Ireland

Beggars Bush, Haddington Road

Dublin 4

Tel +353 1 678 2858

NAMHO SEMINAR

A one-day seminar on the Underground Archaeology of Mining is currently being organised as a NAMHO event to be held at in the Yorkshire Dales at Grassington on October 11th 2003.

The seminar will raise awareness of the wealth of archaeological information which survives underground and is currently playing a very small part in the understanding of one of the oldest and most continuous industries in the UK. The seminar will explore three themes:

- What exists underground.
- Why should underground sites be recorded.
- And how can underground sites be recorded.

Full details will be available soon at <http://www.nmrs.co.uk/seminar.htm> or alternatively write to me at 7a Moor Close Parade, Queensbury, West Yorkshire, BD13 2JG.

Martin Roe

GREENHOW HILL

The society has successfully been awarded funding to carry out a GPS survey of mining remains around the village of Greenhow Hill. This is adding a considerable amount of detail to the maps produced by Mike Gill and published in the Greenhow memoir. One of the most interesting things found so far is the amount of water management features. These are in the form of dams and water leats and indicate that water was being collected and distributed across a wide area. As well as serving ore dressing areas, which probably date from the mid eighteenth century when much of the mining was carried out from shafts, water was also collected for use at the Cockhill and Gillfield dressing floors and smelt mills.

Martin Roe

KETTLEWELL SMELT MILL

A substantially intact smelt mill stood just outside Kettlewell village until 1942 when it was blown up by the army. A recent survey carried out on behalf of the Yorkshire Dales National Park has identified the remains of two mills on the site and suggested that the mill demolished by the army may date from the late 18th or early 19th century. Smelting is recorded from the 17th century and it is possible that the second mill dates from this period. Since the survey more evidence of smelting in the area has come to light. A copy of a 19th century tithe map shows a nearby field called Smelt Mill Close which could suggest the site of another mill. A reference to smelting in the village in the 15th century has been found by Steve Moorhouse, which could prove to be one of the earliest references to a smelt mill in the Yorkshire Dales and add to claims that Kettlewell was the longest running smelting site in the region.

Martin Roe

NMRS WEB SITE

The Society has a very good web site at <http://www.nmrs.co.uk>. It is not accurate enough just to search for NMRS, you will get, among other things North Middlesex Referees Society.

MEMBERS WANTS

Mining in Cleveland and the North Yorkshire Moors

Cleveland Potash and Durham University are currently conducting a research programme into coastal erosion. As part of this work they are assembling a large database of mining activity covering a surprisingly wide area. This extends from the mouth of the river Tees to Flamborough and inland to Easingwold.

Within this area there has been a wide variety of mining activity – ironstone, alum, jet, whinstone, coal etc. The company would be keen to hear from anyone with maps or plans of any mines in the area. Any information will be digitised and the company would be happy to supply contributors with copies of the final data set.

Neil Rowley neil.rowley@clevelandpotash.co.uk
Cleveland Potash Ltd
Boulby Mine
Loftus
Cleveland
TS13 4UZ

MEET REPORT- HUDESHOPE, TEESDALE — Leader Tony Fretwell

Six NMRS members met at the Bainbridge Memorial Fountain in bright sunshine at Middleton in Teesdale. After examining the Low Skears portal stone, rescued from the Hude stream bed, and now resting in a cottage front garden on the Market Place, the party proceeded to the former London Lead Company's Chief Agents residence, Middleton House (built & designed by the Architect Ignatius Bonami); and to view the clock tower, and Company workshops, stables, and weigh-bridge at the rear of the Agents residence. The workshops, listed Grade I buildings, have now been tastefully converted into mews type residences. The party then drove along Kings Walk to view the Skears Lime Kilns, Low Snaiggill, and Low Skears Low levels, and the remains of Jack Scar cottages. The next stop was at the Fir Tree exploratory level, in the Middle of Skears Hushes, where further views were obtained of Elphatory, Maribek, & Pikestone Brow levels & their attendant spoil heaps.

A stop was made at the head of the road round the Hude, to view Lodgesyke and its reworked spoil heaps, and to see Coldberry Mine with its seven levels, Water Balance incline, mineshop, powder house, and numerous spoil heaps. The cars were parked at Coldberry, and Hunt's Coldberry, North (or Dog), and Richardsons level portals were examined in detail, as was the mineshop itself and the integral stables. Lunch was taken on the bankside at Coldberry, with views across to Hudeshope, Pikestone Brow, & Lodgesyke mines. A short drive after lunch took the party to Low Skears Firestone level, and after donning underground gear, they proceeded via the horse level to the present forehead, and then up 60' of fixed ladders into Raine's Vein, and to its present extremity via the wooden box. After returning to the horse level, the party descended into mud level and visited the 'Blue Pools', and passed through the barrels to the Far Windy Shaft (the start of the through route down to Low Skears Low level) The party returned to day after a good three hour trip.. The Meet Leader is indebted to his colleagues Messrs E.M.Pinkney and P.Riley of DDMS for their assistance on the day.



Hunt's Coldberry level portal with water balance incline above

INFORMATION REQUESTED

Richard Harker, born 1714, migrated from Muker in Swaledale to Alston Moor. Needless to say he was a lead miner, and he found employment working for Sir Lancelot Allgood at Capelcleugh between 1762 and 1766, and Mary Lorraine at Thorngill 1765-66. He married a local girl, Jane Harrison, and lived at Pry House, Nenthead. He had two sons and a daughter. His son James died in 1773. In about 1790 the family returned to the West Riding of Yorkshire.

Any further information about the Harkers' would be greatly appreciated. P. & G. Harker, 33, Stanley Grove, Richmond, N. Yorks. DL10 5AU.

GEOLOGICAL MAPS, 1 inch to 1 mile, free to a good home (postage payment appreciated). Clitheroe, Sheet 68, solid and Brough-under-Stainmore, Sheet 31, solid.

sbassham@nildram.co.uk

BOOK REVIEW

FLUORSPAR IN THE NORTH PENNINES.

Edited by R. A. Fairbairn,

ISBN 09518939 39

Published by The Friends of Killhope

2003, 132pp. 36 b&w photographs, 12 line drawings

Perfect binding. Price £7.50

This book is a joint venture by seven contributors each with his own point of view on the subject, whether it be about the history, the manufacturing processes, the mineralogy or the social impact of the industry in the area.

Ian Forbes of Killhope Museum has written the opening chapter and the final retrospective, covering the first commercial extraction of fluorspar in 1883 near Stanhope to the eventual demise of the industry at Frazer's Grove Mine. The fine headframes at Rookhope still stand out in defiance, a memorial to the last shift in July 1999, the culmination of 116 years of fluorspar mining and 2 million tonnes of extraction. I am led to believe that these are now listed and will not be demolished like so much of our mining heritage has been.

The mineralogical section has been written by Brian Young of the BGS who, with his geological background, wades through the morass of figures and symbols and describes the attractions of fluorspar and its fluorescent capabilities which make it such an important mineral to the specialist collector.

Mineral dealer Dave Hacker then gives a brief synopsis of various important specimens and introduces us to some of the original collectors like Jacob Forster who, in his Paris shop in 1788 was complimented on his fluorite specimens by a mine Captain from Prussia.

The next chapter is approached in a different way by geologist F.W. Smith who describes in detail the art of processing fluorite accompanied by some very interesting photographs.

The following chapter, courtesy of M. R. Graham deals with the commercial aspect of fluorspar mining. Fluorspar is used for the manufacture of hydrofluoric acid and as a flux in steel making. The steel industry was the main user but when China entered the world market, their much cheaper fluorspar signalled the demise of the extractive industry in this country.

The first real mining section is written by Paul L. Younger and covers the history of Grove Rake Mine from its beginnings as a lead mine through to its closure in 1999.

The next chapter is by J. K. Almond and describes many of the main operating plants in much detail. Mentioned here are Stanhope Burn, Whiteheaps, Blackdene, Broadwood evocative names in the world of the mine explorer and historian, and there are some excellent old photographs here.

My overall view of the book is that a tremendous amount of research has gone into its presentation by the authors, the photographs are excellent and bring the content to life. I did especially like the poem on page 70. The book does cover, very successfully, the story it sets out to tell of the fluorspar mining in the North Pennines and at 132pp, with the many photographs and diagrams and with this amount of technical information, it is a snip at £7.50.

Ian Tyler 29.4.2003.

THE GUNPOWDER MILLS OF CUMBRIA

The History of Cumbria's Gunpowder Industry 1799 - 1937

by Ian Tyler.

Published by Blue Rock Publications, Threlkeld Quarry and Mining Museum, Cumbria CA12 4TT.
296pp with over 200 photographs, plans and illustrations, soft backed.

Price £17.99. Postage and packing is £2.01. (Cheques to Threlkeld Museum Shop)

email: coppermaid@aol.com Tel: 017687 79747/01228 561883.

This is the fascinating history of the gunpowder mills which operated from 1799-1937 in Cumbria, an industry which flourished and prospered in the hidden backwaters and valleys for nearly 150 years.

Embracing the illicit slave trade, infamously referred to as the Trade Triangle until an Act of Parliament sought to prevent this, the trade ties with Africa and the Americas had become well established and continued to flourish. The Western ports of Sunderland Point, Lancaster, Glasson Dock, Milnthorpe, Arnside and Greenodd along with the great Port of Liverpool all played their part and it was from these places that the powder was shipped all over the country and to distant shores. Later on, the canal and railway systems became the major transport routes and the shipping trade gradually diminished.

But it was the brave men, women and children who are the heroes of our story, arriving at work not knowing whether they would survive the day! People were killed, mutilated and burnt but many worked all their lives at this dangerous craft. As they toiled the long hours away, they learnt to live with the attendant dangers and the dread of the first crack of a thunderstorm or the first flash of lit powder. The industry employed many hundreds of people both directly and indirectly but the death toll of 102 men and boys plus the dozens mutilated and disfigured was a high proportion of these very small communities. This is the story of a little known industry which thrived in the Cumbrian villages of Elterwater, Sedgwick, Gatebeck, Lowwood and Blackbeck.

MY ANCESTOR WAS A COALMINER

Most of us have one, if we look, so David Tonks wrote this book to help trace ancestors employed in the British coal industry. It looks at a wide range of sources for different aspects of a collier's life and death. They include regional and national collections as well as parliamentary commissions, parish records and printed matter.

The book (ISBN 1 903462 71 1) costs £7.50 plus £1.50 p&p and is available from: Society of Genealogists Enterprises Ltd, 14 Charterhouse Buildings, Goswell Road, London, EC1M 7BA.

Mike Gill

INDUSTRIAL HERITAGE 28(3) (WINTER 2002), Industrial Heritage, Yorkshire History, Procter house, Kirkgate, Settle, BD24 9DZ

A selection of articles the following relate to mining:-

Steven **Oakden**, (pp.11-14) The enigmatic railways of Fimby Woods, Cumberland running inland between Maryport and Workington- evidently served collieries and brickworks.

Bill **Blinkhorn** (pp. 29-34) Stadttmoers Country Park, Whinston, Lancs. Describes history / traces of coalmining and brickmaking.

Brian **Skipsey** (pp.46-52) A first look at Burtsett stone mines, North Yorkshire. describes exploration of underground workings for stone slates and flagstones c. 1870s-1930s includes field observations and sketch plans of sites and mines- about 10 mines altogether.

Paul W. Sowan, Subterranea Britannica.

THE PRACTICE OF BRITISH GEOLOGY, 1750-1850,

by Hugh Torrens. Ashgate, Variorum Collected Studies Series, March 2002,
372 pp., ISBN 0 86078 876 8.

Price £59.50

This collection of papers explores an area seldom considered by mining historians, the contribution made by geological practitioners to the advance of mining in the growth period of the Industrial Revolution. The papers, listed below, largely focus on the advantages of understanding the stratigraphical column in mineral prospecting, confining attention to the search for clays, limestone, ironstone and, of course, coal which are found in stratified form. Prospecting for minerals occurring in veins is given only passing mention and there the author assigns supremacy to other countries whose 'mining traditions were very much longer', whereas there is good evidence for prospecting in English non-ferrous metal mines as far back as the early 14th century.

We are apt to forget that it was not until the beginning of the 19th century that the stratigraphy of rocks was understood and it took a lot longer for that understanding to permeate to the mining community. The concept of coal as a stratiform mineral and the means by which it might be prospected were known in the 17th century. Percussion boring rods, the principal tool for coal prospecting, continued in use well into the 20th century despite being rendered obsolete in 1805. An excellent account is provided of the development of the core drill by an Irish-born mining surveyor, James Ryan, and the failure of the British mining establishment to appreciate its advantages, even when its use was reduced to the provision of low cost, large diameter bores capable of ventilating mines. Torrens' papers are punctuated with accounts of futile trials for coal in unsuitable strata, some well into the 19th century, where better understanding or the use of appropriate techniques would have quickly curtailed the waste of time and money.

The use of percussion boring rods destroyed the very evidence that might identify the rocks through which they passed. Up to the late 18th century fossils had been studied as curiosities in their own right but it was William Smith who, in the 1790s, used them to identify the rocks in which they were found. In doing so, Smith could unravel the stratigraphy of rocks, establishing a sequence in which the principal coal bearing strata, the Carboniferous Coal Measures, could be placed with accuracy. Smith built on the work of his predecessors and was often assisted by that of other practical men of the period. Torrens has identified the role of these men, practical surveyors and miners, men with little or no formal training. Men like John Williams, who identified and worked the coals at Brora, in Sutherland, and died whilst surveying for minerals in the Venetian republic in 1795, or Arthur Aitkin whose mineralogical survey of Shropshire preceded, and provided a basis for, that of the better known work by Murchison. Others took the new, scientific approach of mineral surveying to new mining fields in America, to Chile in the south, Virginia in the north, and laid the foundations for the geological survey of Canada.

Friction between the practical geologists and the 'gentlemen' of the Geological Society of London is highlighted in Torrens paper on Sir Joseph Banks, and a second, co-authored with Dr Trevor Ford, exploring the work of John Farey. Banks' early patronage of the practitioners brought him into conflict with the new scientific establishment. The economic benefits of the former were clearly in evidence on Banks' own estates in Derbyshire, and he made representation to the Society on behalf of both Smith and Farey, yet he and the establishment tend to be at the forefront of geological historiography whilst the practical men seldom warrant a mention. Torrens' work has countered that tendency. Despite what he describes as the 'papyrophobia' of such practitioners his accounts paint a credible, well researched picture of men who influenced the direction of mining in Britain and abroad at a time of increased industrial demands, but whose work has largely gone unrecognised.

As in all such collections in the Variorum Series, the papers retain their original pagination. The original language of publication is also retained which, in the case of one paper in French and

substantial sections of another in Italian, still makes them inaccessible to a largely English speaking audience.

Contents:

Some thoughts on the complex and forgotten history of mineral exploration, *Journal of the Open University Geological Society* 17 (1997).

The British 'mineral engineer' John Williams (1732-1795), his work in Britain from 1749 to 1793 and as a mineral surveyor in the Veneto and North Italy between 1793 and 1795, *Le Scienze della Terra nel Venteto del Ottocento*, (Venice, 1998).

Geological communication in the Bath area in the last half of the 18th century, *Images of the Earth: Essays in the History of the Environmental Sciences*, ed. L. J. Jordanova and R. Porter, (Faringdon, 1997).

Le 'Nouvel Art de Prospection Minière' de William Smith et le 'Projet de Houillère de Brewham': un essai malencontreux de recherche de charbon dans le sud-ouest de l'Angleterre, entre 1803 et 1810, *De la Géologie à Son Histoire: Livre Jubilaire pour François Ellenberger*, ed. G. Gohau (Paris, 1998).

Patronage and problems: Banks and the earth sciences, *Sir Joseph Banks: A Global Perspective*, ed. R. E. R. Banks et al. (Kew, 1994).

John Farey (1766-1826), an unrecognised polymath, with Trevor Ford, *General View of the Agriculture and Minerals of Derbyshire*, John Farey sen., vol. 1, (reprint, Matlock Bath, 1989)

Coal hunting at Bexhill 1805-1811: how the new science of stratigraphy was ignored, *Sussex Archaeological Collections* 136, (Lewes, 1998).

James Ryan (c.1770-1847) and the problems of introducing Irish 'new technology' to British mines in the early 19th century, *Science and Society in Ireland: The Social Context of Science and Technology in Ireland, 1800-1950*, ed. P. J. Bowler and N. Whyte (Belfast, 1997)

Arthur Aikin's mineralogical survey of Shropshire 1796-1816 and the contemporary audience for geological publications, *British Journal for the History of Science* 16 (London, 1983).

The Scientific Ancestry and Historiography of The Silurian System, *Journal of the Geological Society* 147 (Bath, 1990)

Joseph Harrison Fryer (1777-1855): geologist and mining engineer in England 1803-1825 and South America 1826-1828 - a study in 'failure', *Geological Sciences in Latin America: Scientific Relations and Exchanges*, ed. M. M. Lopes and S. F. Figueirôa (Campinas, 1995)

William Edmond Logan's geological apprenticeship in Britain 1831-1842, *Geoscience Canada* 26 (St. John's, 1999)

James Buckman (1814-1884), English consulting geologist and his visit to the Guyandotte coal-fields in 1854, with William R. Brice, *Southeastern Geology* 38, (Durham NC, 1999)

*Peter Cloughton,
Blaenpant Morfil, Rosebush, Clynderwen,*

COPPER MINING IN SOUTH AUSTRALIA

Members who research the activities of British miners in other countries prior to the 20th century may be interested to read an article on the history of copper mining in South Australia in the latest issue of the MESA journal (Quarterly Journal of Minerals and Energy Resources of the Government of South Australia, Vol.28, Jan 2003, pp38-44). To quote from the conclusions; "South Australia's history of 19th century copper mining has left a legacy of 'little Cornwalls' throughout its rural landscape. There are ubiquitous pepper trees, miner's cottages and a colloquial taste for Cornish pasties. Stone and brick chimneys – round for the Cornish miners, square for the Welsh smelters – abound in conjunction with the largest number of surviving enginehouses (8 of 33) outside of Cornwall." The article contains several colour photographs of these enginehouses and a few black and white reproductions of historical mining scenes.

John Hunter

SIR CLEMENT LE NEVE FOSTER (1841 - 1904)

Clement Foster was Inspector of Mines and Professor of Mining at the Royal School of Mines and was the second son of Peter Le Neve Foster, secretary to the Society of Arts from 1853 to 1879. His mother was Georgiana Elizabeth, daughter of the Revd. Clement Chevalier. He was born at Camberwell on March 23, 1841 and was educated first at the collegiate school in Camberwell then later at the College Communale of Boulogne.

In 1857 he graduated Bachelier de Sciences of the Empire of France. In the same year he entered the School of Mines in London, where he took many prizes and established a brilliant record. Thence he went to the Mining School of Freiberg. In 1860 he was appointed to the Geological Survey of England and for the next five years was engaged in fieldwork in Kent, Sussex, Derbyshire and Yorkshire. His first scientific publication was a memoir prepared with William Topley on the subject of the valley of the Medway and the denudation of the Weald, which was published in the Quarterly Journal of the Geological Society (Vol.xxi).

In 1865 Clement Foster graduated as a DSc at the University of London, and in the same year he resigned his post with the Geological Survey and became lecturer to the Miners' Association of Cornwall and Devon, and secretary to the Royal Cornwall Polytechnical Society. In 1868 he was employed by the Khedive of Egypt on an exploratory expedition to examine the mineral resources of the Sinai peninsula. He also reported in the same year on a Venezuelan goldfield and from 1869 to 1872 he was engineer to a gold mining company in northern Italy. In 1872 he was nominated Inspector of Mines under the new Metalliferous Mines Regulations Act, being appointed to Cornwall. Eight years later, in 1880, he was transferred to North Wales, where he remained for 21 years.

In 1890, on the death of Sir Warrington Smyth, he became Professor of Mining at the Royal School of Mines, an office which he held concurrently with his inspectorship. He proved to be an excellent teacher. In 1897, as Inspector of Mines, he investigated

the cause of an underground fire in the Snaefell lead mine on the Isle of Man. The cage in which he had descended with an exploratory party became jammed in the shaft and the party was then subjected to a process of slow poisoning by the carbon monoxide generated by the fire. All the contemporary accounts of this accident attest to the courage with which, in the face of apparent certain death, Foster noted his own sensations for the benefit of science. Foster never fully recovered from the cardiac injury sustained during the process of gradual suffocation. He was incapacitated for nearly a year.

Besides his official work, Foster produced numerous reports and advised on many questions connected with mining legislation. He served on various departmental committees and Royal commissions, including those for the Chicago and the St. Louis Exhibitions. He was a juror at the Inventions Exhibition in 1885, at Paris in 1867, 1878, 1889 and 1900 and also at Chicago in 1893. He received the Legion of Honour at Paris in 1889 for his services, became an F.R.S. in 1892 and was knighted in 1903. In 1901 he resigned his inspectorship, but the professorship he retained until his death, which occurred on April 19, 1904 at Coleherne Court, Earls Court, London. He was serving on the Royal Commission on Coal Supplies at the time.

Foster translated a work by Peter van Diest, in Dutch, on Banca and its tin stream works, learning the language especially for this purpose (Truro, 1867), and in 1876, together with William Galloway, he published a translation from the French Professor Callon's treatise on mining. His principal work was a textbook on 'Ore and Stone Mining' (1894. 7th edition revised by Professor S. Herbert Cox in 1910), and he wrote the article on Mining in the 9th edition of Encyclopedia Britannica. He was also author of a textbook on 'Mining and Quarrying' (1903) and of numerous memoirs and papers in the Proceedings of the Geological and other scientific societies and in various scientific periodicals. From 1894 he edited the mineral statistics issued by the Home Office and the annual reports on mines and quarries.

While he achieved a considerable reputation as a geologist and metallurgist, it was as a miner and a mining expert that he was really eminent. Though at the beginning of his inspectorship his energy in imposing novel restrictions and in insisting on the reform and improvement of existing methods was little appreciated by the mining community, he ultimately gained in both of his districts the esteem of miners and mine owners alike. In 1872 he married his cousin, Sophia Chevalier, second daughter of Arthur F. Tompson of Belton, Suffolk, and together they raised one son and two daughters. His widow received a civil list pension of £100 in August 1904.

Proc. Roy. Soc. Lxxv.371 (by Prof. Judd) Nature, 28.4.1904 (H.Bauerman)
Journ. Soc. Arts 29.4.1904 (by H.T.W.) Trans. Am. Soc. Min. Eng. 1904 Vol 35,
p362.
Engineer 22.4.1904.

Tony Fretwell

MOLES and THRELKELD MUSEUM OUTING TO SEATHWAITE GRAPHITE MINE

The outing to Seathwaite took place on March 8th, it was the first day of a two day annual event organised by MOLES and the Museum. The mine is situated in Borrowdale, once the wettest place in England and it certainly lived up to its past reputation as the rain hammered down on 12 bedraggled adventurers, the other 170 members staying in the warmth of their homes. Led by Ian Tyler, the society's Chairman and founder, the group climbed the fell for some 1,200ft. to see at close quarters the tremendous power of water as Sour Milk Ghyll heaved its white torrents down the fell side. It was this inspiring sight plus the competition with another group who were ascending by a parallel path, to reach the top first that kept morale high, and we won! From our vantage point, Seathwaite Farm looked quite diminutive and the thought of food and warmth brought on pangs of hunger, soon satisfied by a rain soaked lunch.

The graphite mine was worked from as early as the 16th Century and indeed was perhaps the most valuable mineral mined in the Lake District. Its value of around £3,600 per ton in 1805 reveals the importance of the mine, when ordinary lead was around £20 a ton. The mine was unique, this being the only known deposit in the UK which was later established as the purest in the world. Indeed the product was so valuable the mine was protected by armed guards stationed at the entrances to the mine. The uses of graphite (known also as wad, plumbago, black cawke) were various: as lubrication for ships' rigging, moulds for the casting of musket and cannon balls, rust-proofing and of course the manufacture of the pencil and from 1811 this last industry thrived in Keswick creating many jobs.

The explorers first visited Harrison's Stage, the top working which was protected by a guard house, the ruins of which remain, and then proceeded down to Gill's Stage, an area which can only be described as labyrinthine. Descending the fell we visited Farey's Stage where the first deposit of graphite was discovered when a mountain ash was blown over revealing the metallic grey mineral, which brought untold wealth to some and death to others. The rain had now increased to torrential proportions and the sodden party descended to Gilbert's Stage. This was the main drawing adit and had a large guardhouse where the miners were strip-searched for any graphite they may have been trying to steal and sell. It was from this illicit trade that the expression "Black Market" stemmed. Gilbert's Stage was where the mining company had special vaults for storing the valuable mineral, safe from thieves and robbers, before it was despatched to London for sale.

From here the party descended to Robson's Stage, the lowest working, now surrounded by a plantation of larch trees and below here the site of the processing mill was visited. Seathwaite Mine has a tremendous history of skullduggery, dark deeds and enviable commerce over a period of 400 years, a terrific place to visit but perhaps in more clement weather!

The second day, Sunday the 9th, was the fifteenth Open Day for Threlkeld Mining Museum, which is also MOLES Headquarters, the day started with a guided walk to Glenderaterra Mine after which the Museum was declared open and a buffet lunch was had by all.

(M.O.L.E.S. = MINES OF LAKELAND EXPLORATION SOCIETY)

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