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## CONTENTS

Editorial .....	1
Why are Tankerville's Main Lodes where they are? Richard Fowler .....	2
Guide to Carrying out your own Research Project Adrian Pearce .....	6
Ghostly Sounds from Glas Shaft, Esgairhir Mine Bob Southwick .....	14
Steam Engines of Pennerley Mine Ivor Brown .....	15
Field Notes on Shropshire Mines - 1993 Adrian Pearce .....	20
St Just United & Porthledden Mines Roy Fellows .....	28
Near Disaster in Brynfedwen Mine Bob Southwick .....	31
Who Protects our Monuments? Adrian Pearce .....	32
An Anagram, a Legend, a Miscarriage of Justice and a Fake David Coxall .....	41
The High Blantyre Mine Disaster Nick Southwick .....	45
Recent Changes at Snailbeach Mine Steve Holding .....	48
Technical Aspects of Snailbeach Phase 1 Alan Robinson .....	50
Wilderley Copper Mine Malcolm Newton & Adrian Pearce .....	52
Membership List .....	55

## EDITORIAL

This issue has been a long time coming - 13 years in fact! It has been that long since the last Club Journal was produced in 1980, so it is long overdue.

This lack of annual Journals has not been due to a lack of activity in the Club, far from it in fact! In the last few years, Club members have been exploring deeper into mine workings in Shropshire than ever before and venturing further afield to look at caves and mines in other parts of the country. Membership has increased and the meets list offers a full variety of trips every month. So why do we need an annual Journal when we have managed for so long without?

- Kelvin produces "Below" quarterly and this, as well as excellently fulfilling the function of a Newsletter, has tried to fill the gap left by the lack of an annual Journal. There are, however, limitations of space and this means that longer articles cannot be included.
- Accounts are produced on specific subjects but there are many articles which could be written that are far too short to warrant an individual Account.
- Some research material is donated to the Club library but much more is left in members' own records. The obvious danger here is that material could be lost or, through the lack of publication, work can be duplicated by others. In addition, even a small item could be useful to another's research and this opportunity is not offered if material cannot be published.

There is an obvious need for a publication which contains articles that are too short to be an Account but too long for the Newsletter. These can range from a half page to 10 pages or more. This is the purpose of the annual Journal and it is hoped that members will be encouraged to contribute to it. Don't worry about spelling or grammar, that is the Editor's job. If you are not a confident writer, just send in notes and the Editor will be pleased to merge them into an article under your own name.

A number of members have contributed items to this issue and it is hoped that the mixture will be appreciated. Also in this issue, you will find an article on how to start up your own project and how to write up a report on it. Everyone is capable of tackling a project of some sort, however small, and it would be pleasing to see several such reports in next year's Journal. There are lots of things to do out there - go to it!

Adrian Pearce

## WHY ARE TANKERVILLE'S MAIN LODES WHERE THEY ARE?

Richard Fowler

The main westwards dipping lode at Tankerville, when viewed on a map, dips parallel to the bedding when most of the other major mineral lodes in this field cut across the bedding. The answer now seems to be simple, if chemically complex. It is on two intersecting faults F1 and F2 (see Figure 1). This shows why the lode is not seen on the surface because the intersection point is too deep or, and more likely, it has been totally obliterated due to the action of early man and nature.

What must be borne in mind, and this answers why the lode dips as it does parallel to the bedding at  $50^{\circ}$  to  $65^{\circ}$  /  $300^{\circ}$ , is the angle of intersection and the capping properties of the Hope Shale. In other words, the interaction angles between the bedding and the two faults (see Figure 2).

Where two faults meet, the minerals will precipitate due to mixing of the volatile fluids, causing an initial velocity decrease. Also, if two slightly different volatile mineral rich fluids come together then small convection currents will occur. Add to this the high pressure that they are under and a roundish mineralised deposit will result if the cooling along the geothermal gradient isn't disturbed. This would explain the ovenpipe shape.

From evidence around the surface, however, there were two separate precipitation events, possibly two stages of mineralisation. Firstly, the primary sulphides precipitating out in the order Cu, Zn, Pb and then the initial gangue minerals of calcite, a little barytes and possibly quartz. Later, mineral rich fluids rich in barytes with some transitional metal elements would upset the stable chemical configurations of some of the previously precipitated minerals. If, for example, the new volatile fluid was at  $450^{\circ}\text{C}$  and 2KB pressure then the following minerals could be precipitated :-

- primary barytes
- several usually secondary minerals produced by oxidation.

This oxidation process is easily accomplished if the volatile fluids were aqueous or partially aqueous. This could produce a "sulphuric" cell giving the following minerals (which have been found in the dumps in tiny amounts) :-

- Anglesite ( $\text{PbSO}_4$ )
- Wulfenite ( $\text{PbMn}_4$ )
- solid solution of the barytes through to Celestine ( $\text{SrSO}_4$ ).

This seems to support the idea of at least small localised sulphuric cells developing. Also some dissolved carbon dioxide gas was present to form on oxidation :-

Witherite ( $\text{BaCO}_3$ )  
Cerrusite ( $\text{PbCO}_3$ ).

This result is based on three assumptions, the composition of the fluids and the temperature and pressure. The composition of the fluids has been worked out purely on what minerals came out of them and the temperatures and pressures are based on simulated laboratory experiments. However, all of this assumes a

Figure 1 Two Intersecting Faults at Tankerville

Figure 2 Interaction Angles at Tankerville

chemically passive role of the country rock. It is known that the country rock was active in this equation since precipitation of the valuable minerals only occurs within the flags and not in any other unit. This could be due to many reasons, eg water content, chemical composition, etc, but this would require an investigation of great detail to try and understand even the simple reactions that would take place.

To conclude, the two main precipitating volatile fluids are composed of the following elements and the compounds formed from them, based on the minerals seen :-

Fluid 1

Ba, Pb, Zn, Cu, S, SO<sub>2</sub>, H<sub>2</sub>O, SiO<sub>2</sub>, Ca, CO<sub>2</sub>, H, H<sub>2</sub>S, Sr.

Fluid 2

Ba, SO<sub>2</sub>, H<sub>2</sub>O, CO<sub>2</sub>, Sr, Mn, Fe, Ca.

# GUIDE TO CARRYING OUT YOUR OWN RESEARCH PROJECT

Adrian Pearce

## Introduction

At some stage in a mining historians's life, they face the decision whether to remain a passive reader of other people's research or whether to do something on their own. There is no set period of "apprenticeship" before they are capable of this and it is far better to make an early start since they can only improve their techniques with experience. Even persons who have an academic reputation already have made mistakes in their time and will be the first to admit that they are not infallible.

There is no academic qualification for mining history and the vast majority of published research in Britain has been carried out by "amateurs" such as ourselves. Archaeological research today is an exact science but all that is needed is the patience to gather facts, put these together in a logical sequence and make reasoned assumptions from them. There will often be gaps in our knowledge but these can be filled by making suggestions based on comparisons with other areas, etc. It is important, however, to draw the distinction between theories based on fact and those based on supposition. Anyone is capable of such methods with a little practice. The idea that archaeology is the preserve of gentlemen is a complete fallacy. The so-called gentlemen archaeologists of the 19th century were little more than grave robbers!

The whole philosophy of mining history must be based on the desire to acquire and disseminate information as widely as possible. I have little time for people who are only interested in the advancement of their personal reputation or in financial gain. I have often found that the published research of such people is biased towards that end and they write according to what they think their potential readers want rather than advance the knowledge of mining history. Beware also of labelling a writer as an "expert" (a term much-loved by the press) and assuming that their research is the last word. There are few established facts in this subject, only theories. We should always welcome any new ideas proposed, however bizarre, since it may turn out that these are nearer the truth. How long, for instance, did people believe the world to be flat! We should always be prepared to discuss any new theory in a rational manner and weigh up the pros and cons. Conversely, if you have a new theory then don't be afraid to advance it and argue your case against the opposition.

## Choosing your Subject

Having decided to do something, the next question is WHAT? You must be realistic about your capabilities to begin with but don't be afraid to tackle something new, you can only learn through experience. There is sometimes an unfortunate tendency to separate the "cavers" and "academics" but mining history is a unique blend of both and each is complementary to the other. Having said this, there is no reason why you can't concentrate on just one aspect if you wish. If you like exploring underground, then digging into a mine and doing a survey is a valuable basis for someone else to work on the history. Conversely, you can research the history of a mine without venturing underground and this might encourage someone else to tackle the underground survey. There is nothing like the satisfaction of tackling all aspects of a

site but it is just as valuable to lay the groundwork for someone else to continue. You could also share a project with others, each perhaps tackling separate aspect.

You will find it useful to read the published reports of other people's projects since these will indicate how they set about it and what aspects they covered. The usual method is to take a particular site or area and carry out detailed research on that location alone. Some have tackled more general subjects which are not confined to specific places and these are just as valuable, albeit more difficult. One possibility is to compare a certain type of feature at a number of different sites and draw conclusions. There are a great many smaller mine sites in Shropshire that have never been properly looked at - they are just waiting for you. You may even choose a subject related to mining, eg if you are interested in railways then you could deal with the transport of materials from site.

You can obtain valuable experience by assisting ongoing projects carried out by others. They will always welcome your assistance and can pass on useful tips. When you have decided on your project, it is vital that you notify others in the Club so that they don't unknowingly duplicate your work. Another advantage of doing this is that they can pass on information that they may come across. I have always done this in my own research projects and have received many invaluable items of information in this way that I would never have otherwise discovered. It is also useful to publish regular situation reports in the newsletter to let other members know how you are progressing. By doing this, you may encourage other members to tackle their own project. Such items do not need to be detailed and will not detract from your final published report.

### Planning your Project

Take time at the beginning to work out what aspects you intend to cover and how these can be tackled. Don't be tempted to rush things in order to finish, since some projects take years to complete. You will find that information comes in fits and starts - there are depressing periods when nothing new seems to be available and then suddenly you will come across a valuable item that sets you off in all sorts of directions! Patience is an essential commodity.

The first thing is to find the landowner(s) of the area you will be working in and to obtain full permission to carry out your work. This should be done initially by a letter in which you explain exactly who you are, the area in question, the work you wish to carry out and the reasons why. Never put people on the spot by calling "on spec" since it is good manners to give them time to consider all the implications of granting permission. The letter can be followed up by telephone or a personal call at a later date if necessary. You will find that most landowners will be willing to allow access for serious historical research if asked beforehand. Remember that all land belongs to someone and even public property belongs to local councils. If access is refused, UNDER NO CIRCUMSTANCES carry on. Not only do you risk the possibility of prosecution for damages but you will also damage the reputation of your club and mining history in general. It is always possible that access may be negotiated on your behalf by one of the Club's officers or that someone else might be more successful. There is no place for "midnight trips".

If you intend to carry out digging operations on the surface or underground, it is vital that you tell the landowner exactly what you intend to do. Again, if he refuses permission then respect his wishes. If he is worried about liability then you may be able to solve this by arranging for him to be covered under the Club's liability insurance scheme. In any negotiations, be calm and diplomatic and never try to browbeat a landowner into agreement. Most will have little to gain by granting access and it may even interfere with their business activities. Remember that it is far less trouble for them to fill in an entrance permanently. Where you fail, others might be successful.

Once you have obtained permission, keep the landowner informed of how you are progressing and give him a copy of your final report. Most have at least some interest in what is under their land and may supply information of use to you.

Also check to see if there is any restriction on the site under investigation. If it is a Scheduled Historic Monument or a Site of Special Scientific Interest then you MUST obtain permission from English Heritage or English Nature respectively before carrying out work on the site. If it is a bat hibernaculum, then it is protected under the Wildlife & Countryside Act and access is only allowed under certain circumstances. If you carry on without permission, you are committing an offence.

### Surface Survey

One of the first things to undertake is a surface survey of the remains on site. You will find it useful here to obtain copies of old Ordnance Survey maps, which are usually held by the local reference library. These were first published around 1860 with revisions made around 1896, 1910 and 1936. The best ones are the large scale 25 inch to 1 mile maps (known as the County Series). Copyright for OS maps only lasts for 50 years from the date of publication so the library will allow you to photocopy the whole of maps older than 50 years. For maps less than 50 years old, you can take one A4 photocopy from each map for study purposes only. Aerial photos are useful in showing up ground features and may be held by libraries. Another possible source is the Footpath Officer of the County or District Council. The most complete set of old aerial photos is held by the National Monuments Record who will supply copies for a fee. Details from Air Photographic Section, National Monument Record, Fortress House, 23, Savile Row, London W1X 1AB.

This is not the place to cover the actual techniques of surveying and you must learn these separately. Neal Rushton will be willing to advise you on this.

### Geology

It is useful to be aware of the geology of a site since this can give useful clues as to the type of feature underground and why certain working methods were adopted. You will need to give a brief synopsis of the local geology in your final report but you won't need any formal qualification to do this. The British Geological Survey has published a geological survey of every part of Great Britain. These consist of books relating to relatively small areas and the local ones should be held by the local library. The survey will supply the geological information you require and, if you are lucky, it may refer to the mining operations.

### Digging Operations

If your project will involve digging through a collapsed entrance then you must pay attention to safety considerations. It is recommended here that you do not carry out such work yourself until you have assisted at a dig elsewhere. Bear in mind that you must have somewhere to deposit the material you are excavating and this must be agreed in advance with the landowner. He may not be overjoyed at the prospect of a large mound of rubble or unsightly rubbish left lying on the surface and you may have to make arrangements to merge it with the surroundings or even take it away. A more important factor is to ensure that any excavation you make does not become a danger to others. From the outset, you will have to install a safe cover over the entrance to prevent others (especially children) from gaining access. If someone else is injured as a result of your negligence then you may be prosecuted. It is not sufficient to erect a sign - there must be an effective barrier. If you decide to abandon a dig then you must make it safe, even if this means filling it in again.

The easiest dig is one where a level entrance has been backfilled with earth or rubbish. In such cases, the mine passage itself is usually stable and it is only a case of digging out the infill. Where a level has collapsed, it usually means that the rock is unstable and this will have to be shored up as you proceed. Never dig out the infill and shore up behind you since it may collapse onto you before you have finished! The safe way is to use "forepoling" where you force horizontal timbers into the fill at roof level. As they become exposed through digging, you support them with vertical timbers. Timbering is an art and you can never make it too safe. Once a dig is completed, you can consider making a more permanent entrance by inserting strong oil drums or concrete pipes.

Digging in shafts is the most difficult, especially where the top has collapsed. Again, you must ensure that the sides are timbered as you proceed downwards. You can never know how far the fill extends since it may only be jammed a few feet down. It is thus vital to lifeline anyone working in the shaft. All spoil has to be wound up the shaft and it is useful to install a pulley system and headgear at surface. Make provisions to ensure that the bucket does not accidentally tip spoil back down onto the digger.

Once you have access to a mine, you have a responsibility to ensure that it does not become a danger to others. The best method is to install a lid or gate which can be locked, possibly leaving a key with the landowner unless he wishes someone else to control access.

### Underground Survey

The adage that a picture is worth a thousand words is particularly true with mine workings. Even a simple survey is better than attempting to describe mine passages with words. Surveying techniques are fairly easy to learn but you can get another member to carry out a survey if necessary. Once done, it forms a permanent record which is particularly useful if access is subsequently lost.

### Photographic Record

When it comes to writing up your report, it will be far more attractive if you can include photographs. These should not only include the actual features themselves but also general location scenes to place the mine into its surroundings. If you come across old photographs of a site then get permission to take copies, even if these are not subsequently published. Many invaluable photos held in family albums are lost

because subsequent generations do not appreciate their value. The classic case of this was the pioneer photographer J C Burrow, who took hundreds of underground photos of the Cornish mines in the 1890s. When he died, the majority of his glass negatives ignominiously ended up as panes of glass in a greenhouse!

If possible, take two copies of each scene - one as a black & white print and one as a colour slide. The former will be used to illustrate your report since colour prints do not always reproduce effectively in monochrome. The latter will be useful if you give a subsequent slide talk.

### Archival Research

You will be very lucky if you find records belonging to the mine itself, eg account books. What you must do is build up a jigsaw of facts from all kinds of sources until these begin to form a picture. Even then there will be gaps which you must attempt to fill with guesswork. The best thing is to keep a file in which you enter all the information as it is found, including items which only seem of minor relevance at the time. It is surprising how even a minor item can assume major importance at a later date when linked with fresh information. There is nothing so frustrating as trying to think where you saw something in the past but didn't bother to note it down!

How much detail you keep depends on how much you are prepared to spend on your project. The ideal thing is to take photocopies of everything that might be relevant so that you can quickly refer to them in your file. This tends to become expensive, however, so you might compromise by making manuscript extracts from items you know will not be of relevance. What to note is something you can only learn from experience but always note the full title (and archival reference if appropriate) of any book or item you check in case you need to look at it again. This list will eventually be of use in compiling the reference section of your final report.

Before you set out on your archival research, check to see what has already been written on the subject of your site or similar ones. This may save you duplicating work and may provide references to material you will find of use. Just because someone quotes from a source, don't assume that this is the only information contained in that source. They will only be concerned with items relevant to their own research and there is often other snippets of other information in that source which could be of use. The moral is - ALWAYS READ THE ORIGINAL SOURCES YOURSELF. In addition, always check the references section of any book you read and list items worth checking. This leads to a chain reaction since those items may provide further sources. Be prepared for disappointment, since you will often find nothing of value in a book, but patience will eventually reveal an invaluable item somewhere along the chain.

Armed with your list of references, you can now go to the local reference library, local studies section of the county library service or the local records office. Since the staff are usually very busy, you may find it better to write beforehand listing the items you want to see and saying when you will call. This gives them time to find the items and have them ready for you, thus avoiding the necessity for you to wait. Reference libraries may not have all the required items but they will have a computerised index covering the county library service. They can thus tell you which library holds the item and may be able to borrow it on short loan for you to see at their premises. If items are not held within the county, there is a national inter-library lending service where

such items can be traced and borrowed on short loan. There is a charge for arranging such loans to your local branch but this is only about 20p per item.

If you explain that you are a serious historical researcher, the staff are very helpful and may suggest other sources you haven't considered. Don't be embarrassed if they go to a lot of trouble to obtain a book which you quickly find is of no use. If you explain that you are "fishing" for information on a specific subject they will understand. Don't feel obliged to sit reading a book for a long time to justify their efforts! If staff of a library have been particularly helpful, write to the Head Librarian and express your gratitude - the staff will know that their efforts are appreciated. For a detailed list of sources of information, see pages 8-11 of the NAMHO Handbook.

### Local Information

Local people in the area can be a useful source of information, even if it is only based on rumour. It is worth having a letter published in the local newspaper (including the free trade journals) asking for information. Also write to the matrons of local Old People's Homes to see if any resident can remember the mine. Talking to locals is an art for which you must have a great deal of patience and tact, especially if they are elderly. Be prepared to spend a great deal of time listening to reminiscences and don't try to force the issue by interrupting when they wander off the point. You will come across a great deal of unfounded rumour, which may be frustrating, but never show disbelief since this will only alienate them.

There will be times when you will learn nothing at all and others when it seems to be heading that way, but then you will learn something of great value. It may be worth gathering several older locals together since they may be reminded of something by what another says. Remember that all rumours are based on some fact - the art is in recognising it! Rumours with a re-occurring theme are worth following up, especially when they come from different sources. Take old maps and photos with you since these can stir memories. Also ask if they have any old photos themselves and if they can recommend anyone else who could help.

Whenever you wish to talk to a local, it is better to write first rather than suddenly turning up on the doorstep. This prevents older locals from being worried by strangers at their door -they don't know that you aren't a thief! It also gives them time to recollect and they will be more responsive when you call as arranged. You wouldn't be too happy yourself if a stranger knocked on your door in the middle of dinner or a domestic dispute to talk about your childhood memories! Mines may be the most important thing in your life but many will regard you as a crank.

### Social History

Remember that no mine can be taken in isolation, it will have had an effect on the community and vice versa. You should extend your research to include the lives of the miners and their families - what about education, religion, leisure activities, etc. Look also at other aspects, eg transport, smelting, etc. Was the area in the middle of an industrial revolution or was the mine in isolation?

### Publication

The difficult decision is when to publish. Research can carry on for years and still not find out all the answers. We all want to produce a complete package but there is no reason why you cannot publish a later supplement when new information has come to light. You will eventually arrive at the point where you know that hardly any new information will come to light and you have exhausted all your sources. This is the time to sit down and put together the jigsaw puzzle.

It is impossible to produce a good report by just sitting down and typing out facts as they come to you. You must decide in your mind how the report is to be set out and consider whether the available facts are sufficient to make positive theories or mere conjectures. Don't be afraid to admit to conjectures, this is acceptable practice as long as you identify them as such. Your wording should reflect this so that known facts can be described as "the facts suggest that" or "it is known that". If you are guessing, use "it is possible that" or "it can be conjectured that".

There is a fairly standard format for setting out a report and, although it is not obligatory, you may find it easier to adopt this at first.

The INTRODUCTION should briefly describe what the report is about and put the mine into its context with the surrounding area. Remember that your reader may not be familiar with the area so include a location map, showing nearby landmarks such as towns.

The GEOLOGY of the area will explain what the predominant local strata are, as well as any special features which have affected mining operations, eg faults.

The SURFACE FEATURES describe the site as it appears today, including any visible remains. A surface plan is necessary, identifying the location of any entrances with their national grid reference.

The UNDERGROUND FEATURES describe the presently accessible mine workings and their condition, together with any artefacts found. A survey is necessary, even if only a simple sketch plan.

The HISTORY will probably form the bones of the report unless records are non-existent. Most writers use a chronological sequence, describing the various periods of working from commencement to closure. Any subsequent use of the site can be included at the end.

The BIBLIOGRAPHY is a vital part of your report. Here you list all sources of information with the author, full title, date of publishing and publisher. If available, include the ISBN number. Other sources such as plans, documents, etc should include where they are held and any identification number. Other researchers may use your bibliography in their work and full details will save them time.

The ACKNOWLEDGEMENTS is the section where you list all the people and organisations who have helped you in any way. Included here should be anyone who has allowed access and any library/record office used. It is often difficult to decide which people have helped more than others. The obvious answer is to list them in alphabetical order and to stress this.

You will probably change your mind about things while writing up your report. This is normal and it happens to everyone so write the first draft and leave it a few days before reading it through. You will be coming back to it fresh and reading it almost as your intended readers will. It is surprising how you will note grammatical errors and badly phrased sentences that you missed first time. This is the time to correct any errors.

Have your draft proof read by at least one other mining historian before sending it for publication. They will have an independent mind and can make suggestions for improving the grammar, as well as commenting on the text itself. If you don't know anyone to proof read your report, the editor of the journal will gladly do this. To allow the editor (or proof reader) to enter comments, leave a wide margin and a space between each line. Include references in the text to diagrams, photos, etc and number these accordingly. Most publications have their own "house style" so don't be offended if the editor changes your report slightly to fit in with this.

### Conclusion

I hope you will see from the above that some kind of project is not beyond the capabilities of anyone. Research into mining history has a certain excitement and there is nothing like the satisfaction of finding out all the answers for yourself. It is up to you to decide how much time is spent on a project, you can start small and build up. Who knows - perhaps your report will be in next year's Journal!

## GHOSTLY SOUNDS FROM GLAS SHAFT, ESGAIRHIR MINE

Bob Southwick

In 1983, John Davis, Rob Davis and myself explored the surface remains of Esgairhir Mine (NGR SN735912) near Machynlleth in Wales. As we were examining Glas Shaft, and trying to estimate its depth, we heard a strange sound from the bottom. It was like someone or some thing crawling over a gravel tip and we all lay flat around the shaft collar to hear it better. At the time, we thought that someone was exploring the underground workings but we knew that the "Long Adit" was blocked some distance from its portal. There were no ladders or SRT gear rigged in the shaft so how could anyone be down there?

We shouted down the 150ft shaft in case someone had survived a fall and was crawling about the shaft bottom. It was now approximately 1½ minutes since the sound began and we had no response at all to our shouting. It was at this point that the sound became extra weird - like mumbling that you would hear if a group of people were talking at the shaft bottom. The mumbling sound then changed to laughter which became quite hysterical. It was almost if the demons of the deep workings, known as "knockers", were trying to entice us down the shaft. After what seemed to be ages the strange sound stopped and, none of us believing in ghosts, we tried to come up with a logical explanation for the sounds.

We eventually came to the conclusion that it was due to the excellent acoustic properties of the shaft and through it having a slot for a balance bob some 15ft below the shaft collar. This configuration acted as some sort of sound collector and amplifier. We thought it possible that some children were playing on the mine tips further down the valley and the sound was focused through the balance bob slot and down the shaft. This of course was only a theory as we could not find anyone in the area to cause this eery sound of the deep.

Some 18 months later, Nick Southwick and myself bought our first SRT gear, complete with 150ft and 300ft of SRT rope. We practised on an oak tree for a couple of days and then we thought it was time to have a go at the real thing! So we returned to Glas Shaft to see what was down its eery depths. We were very uneasy about the descent, not only because of its depth and it being our first time at SRT but also because of our previous experience at the shaft. Armed with a telephone system, we descended the shaft and passed the wooden pump rod still in place. Half way down, water issued from the side of the shaft and, some further 70ft below this, we came to Deep Adit level. The shaft was blocked with rubble at this point with the remains of a wooden ladder showing through the debris.

We explored Deep Adit in the direction of the blockage for about 200ft but decided to return at this point due to the unstable nature of the roof, with chains and pulleys hanging from rotten timbers, etc. We returned to the surface, not seeing or hearing anything strange. The mystery of the haunted shaft still remains to this day.

# THE STEAM ENGINES OF PENNERLEY MINE

Ivor Brown

## Introduction

Pennerley Mine lies on the western flanks of the Stiperstones Hill, about 4 miles from Minsterley and between the celebrated lead mines of Tankerville and the Bog. Its history goes back over 200 years but workings were on a small scale until the area was drained by the Boat Level in the 1780s, the latter's outfall being nearly a mile away. This adit was only 300ft deep at the mine and, since the workings went deeper than this, the water had to be pumped out. By 1860, a depth of over 1,000ft had been reached.

## The Mine

The mine has been worked on the usual stop-go basis, often in association with the neighbouring mines mentioned above, which have tended to overshadow it. It has, however, for short periods produced good quantities of lead ore (by local standards) and produced zinc ore between 1870s-1890 and barytes from 1890. The peak year for employment was 1883, when 146 persons were employed. The mine worked six principal veins of ore from four shafts, viz, Gin, Engine, Blands and Potters Pit. Until the 1830s, some ore was also removed from the mine by boats along the drainage level, hence the name.

Pennerley Mine produced 600-900 tons of lead ore per year from 1871-1876 with an anomalous peak of 1,150 tons in 1883, in which year it also produced 2,300 ounces of silver. Its peak for zinc was 50 tons in 1884 and for barytes 625 tons in 1892, the mine closing in 1895. During the 1870s, the mine was owned by the Pennerley Company and for most of the 1880s by the Tankerville Great Consols Company. After 1890 (the date of the principal inventory) it was controlled by Arthur Waters Jnr. During the 1860s, mine management included Arthur Waters Snr and, from 1881-1887, both father and son were involved as A Waters & Son. Arthur Waters Jnr was agent from 1888 until taking full control in 1890 (his father died in 1887 aged 53).

Although the mine looks derelict at the present time, only one building being recognisable as such, the site is remarkable. It has one of the most complete records of equipment that was present during its 1870/80s heyday that is available for any mine during that period. It had on site at least 10 steam engines, ranging from a large Cornish engine through beam and horizontal to small portables. Some of these were single cylinder and some compound, perhaps one of the widest combinations of such equipment at any mine of its size at that time. Archaeological research would, it is certain, produce much more evidence of the equipment and buildings than is immediately possible from documentary and site inspections. It is useful to note that most of the clumps of trees now on the site mark the foundations of groups of buildings shown on early O.S. maps.

There are no records of any late 18th century Boulton & Watt engines at Pennerley, despite there being up to five at the nearby Bog and Roman Gravels Mines. By the 1830s, however, Pennerley had at least one steam engine. In 1870, Liscombe recorded 3 engines at Engine Shaft :-

Figure 3 Sections of Pennerley Mine from Old Mine Plans

- pumping engine
- horizontal engine for lifting pump rods or capstan engine
- winding and crushing engine.

Liscombe also records a fourth engine at Blands Shaft, which was almost certainly "old" then and which wound from three shafts. By 1880, a further large engine had been installed as a compressor at Engine Shaft and, by 1890, several smaller specialist engines were to be found about the mine. These engines are all described in two inventories :-

- a) Licence to search for minerals, etc. from Earl of Powis and A R Lloyd to A Waters, dated 2nd July 1890 (Shropshire Record Office No.1709/6/Box 2).
- b) Pennerley and Tankerville Mines Catalogue of Sale dated 5th September 1902 (copy in Shropshire Local Studies Library SLSC24/misc and several copies in private hands). The catalogue has also been published in the Shropshire Mining Club Journal 1972/73, pp.17-21.

The only known illustrations of features on this site (see Figure 3) are those shown on some abandonment mine plans. These are now preserved in the Shropshire Record Office No.5607/2/116-8 and are dated 1878 and 1928. Although many buildings are shown on the 1883 and 1902 maps, there is no identification of use given. The locations of engines described in this paper have therefore been deduced from other information and site evidence (see Brown 1993) and they cannot be guaranteed. The most important remains to be seen at present are around Engine Shaft where, south east of the shaft and alongside the road, two engine house foundations can be made out complete with engine beds and flywheel pits.

In summary, the engines and their locations are as follows (the numbers refer to positions shown on Figure 4) :-

<u>PROBABLE LOCATION</u>	<u>ENGINE</u>
1a	1830s pump
1b	1860s pump
2	winding crushing
3	capstan/sawmill
4	compressor
5	"old" capstan
6	jigger
7	link motion
8	portable/orebins
9	beam (Blands)
10a	"short term" horizontal 1870s (Potters)
10b	semi-portable (Potters)

There was a total of 12 known engines but no more than 10 at any one time.

### Details

Gin Shaft probably dates to the late 18th century and, taking account of its name, it almost certainly had a horse gin for many years. In later years (1860s-80s) there

Figure 4 Location of Engines at Pennerley Mine

was a pitch pine headframe at the shaft with winding from Blands Engine 60 yards away (see Figure 4). There is no record of a steam engine at this shaft. Engine Shaft was probably commenced in the 1820s and deepened in the 1840s, at which time it had a 24" pumping engine which was sold shortly afterwards. From the 1860s, engines were built to the south west of the shaft (Cornish pump about 1865), north east (winding) and south east (probably the old capstan and later the compressor).

The pump (1) was a Cornish beam pumping engine by Harveys of Hayle, Cornwall. It was 250 HP, 60" cylinder, stroke 10ft inside and 9ft outside and fitted with a large balance bob filled with scrap iron. There were two 30ft x 7ft boilers alongside, each with two tubes. The pitwork consisted of 16" pumps, perpendicular rods (13" x 13" & 12"), 15" pumps, 9" pumps, plunger poles, working barrels & winch boxes and 15" drawing bucket lift, all of which are fully described in the 1890 inventory and the 1902 sale catalogue. It is said that the sale of 1902 was precipitated by a severe storm when lightning struck the engine and the catalogue states "... she now lies partly fallen over the shaft". The headgear with pulley and the capstan pulleys with their pedestals are also described as being fallen "... across the shaft" so it must have been quite a catastrophe.

The winding engine (2) was described as a horizontal engine with 22" cylinder, 4ft stroke and 14ft 6ins flywheel. It had its own pump fitted and had gearing to allow it to be used also to drive the crushers. There was a 30ft x 7ft boiler with two tubes, together with 250 fathoms of 1" wire rope "... only fit for fencing" (in 1890). The winding drum was 5ft 9ins in diameter with a shaft 10ft 6ins long and 8ins square.

A second horizontal engine (3) was used to drive the capstan and sawmill. It had a 16" cylinder, 2ft stroke with capstan gear complete and about 200 fathoms of 5" hemp rope. A compressor engine (4) was added in the late 1870s. This was a horizontal engine with compressor made by the Sandycroft Foundry Company, with 14" steam cylinder, 12" air cylinder and 2ft stroke. Adjoining the compressor there seems to have been an old capstan engine (5), described in 1890 as "... old and not in use". It had a 9" cylinder and 12" stroke but was described in the 1902 sale catalogue as "disconnected".

In 1890, there was a horizontal engine (6) nearer the dressing floor for the jiggers, with a 9" cylinder and 12" stroke. A similar engine was for sale in 1902, probably the same, having a flywheel, force pump and fittings by John Fowler & Co of Leeds (8). It had a 9ft 9ins x 2ft 4ins portable boiler which was also made by John Fowler & Co and which was sold for £3.

The changing cabin was a stone structure 66ft x 17ft and, in 1902, it contained part of a link motion steam engine (7). This had a 6" cylinder and 6" stroke but its use has not been identified. The building was probably on the south side of the Shelve road.

At Blands Shaft, sunk in the 1850s, the engine (9) was initially described as a 13" beam engine but as a 12" "very old" engine in 1890. In 1902, the sale catalogue mistakenly gave it a 12ft cylinder! It was obviously a very early beam engine and probably the oldest at the mine. The stroke was 3ft and it brought a fair price of £33 at the sale in 1902. Prior to the middle of the 1870s, this engine had wound from three shafts, viz. Blands at 30 yds distance, Gin at 60 yds and Potters Pit at about 350 yds. After this time, it only wound from Blands and Gin Shafts.

Potters Pit Shaft was probably sunk in the late 18th century and deepened in the 1860s, after which it was wound from Blands Engine until about 1875. After this, a separate engine (10a) seems to have been built, probably in the large field as shown in Figure 4. The drawings indicate that this was a horizontal engine with outside drum for winding. It seems to have been removed by 1880 and replaced by a later engine (10b) nearer the shaft. This was described in 1890 as being a 20 HP patent compound semi-portable winding engine with 8" & 14" cylinders and 16" stroke.

It is stated elsewhere that all boilers (other than for the smaller engines) were "Cornish or Galloway" and each set seems to have supplied steam to several engines. There were probably other engines on site of which nothing is known, eg there was an aerial ropeway to take ore from Potters Pit to Pennerley dressing floor but which engine powered this can only be guessed. Without doubt, however, this must have been one of the finest collections of steam engines available at the time and a search for the foundations on site could be quite fascinating.

The story does not end in 1902, however, for several attempts have since been made to reopen the mine. In 1953, for example, the local newspaper reported that a new shaft was being sunk. At that time it was 30ft deep and the company was anticipating the arrival of the winding equipment. It is not known whether an engine arrived but it probably wouldn't have been steam. Much equipment did arrive, however, and when the writer first visited the mine in the late 1950s it looked more like a scrapyard. Recent research by M Gill has shown that some of this modern mining equipment was sold on in the 1960s to Beever Mine and others in Yorkshire.

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#### FIELD NOTES ON SHROPSHIRE MINES

Adrian Pearce

In March-April 1993, George Hall and myself spent some time accompanying officers from South Shropshire District Council around the metalliferous mines of south west

Shropshire. They were carrying out a survey of mine entrances to see how many were open and what sort of programme was required to make them safe. One benefit from our involvement was that we persuaded them that any shaft capping scheme should retain some form of access for bats and mine explorers. The other main benefit we obtained was that we were able to systematically check on all the mines in the area and thus update the information published in Account No.12.

It was from this initial survey that the Club's South Shropshire Project started and the following brief notes detail the situation as we found it. Towards the end of our visits, the Council had obtained a hand held device for determining position. This used signals from satellites to give a 10 figure grid reference. Although non-military versions of this were said to be de-tuned, it still seemed to give a great deal of accuracy, especially in wooded areas where it is difficult to place features accurately on a map. Readers should remember that these mine sites are on private land and, if they wish to pay a visit, they should obtain permission from the landowner.

#### Adstone

16/4/93 - no trace of level at SO391941.

#### Batholes

2/4/93 - Brick Kiln Level (SJ340008) open with brick dam at entrance but shaft further back collapsed at surface. Flooded shaft in trees near road (SJ339009) flooded to just below surface - is this an old shallow drainage level? Upper Level open but all other shafts in near vicinity collapsed. Hole into collapsed level just to south. Open shaft at SJ337006.

#### Boat Level

23/4/93 - portal not visited but reported to be open at SJ358001. Hoskins Shaft (SO355983) appears to be filled.

#### Bog Mine

12/3/93 - Somme Tunnel gate open. Collapsed building to east of road at SO360979 may be aerial cableway terminal. Collapsed shaft mound to east of this. Swag Shaft at SO356971 open but filled with conifer cuttings. Unable to find Tews Nos.1 & 2 Shafts in trees.

#### Bromlow

16/4/93 - open level by side of stream at SJ3210401961. Fast flow of water, 1ft deep with 1ft air space in entrance.

#### Burgam

19/3/93 - collapsed shaft just west of road at SO357998 with possibly a filled one just to north. Large tip at SO357999 but no obvious sign of a shaft - could this have been the base for an aerial cableway tower? Open level just east of road at SO358998. Line of 6 levels just east of road at SO358997 but only 4 of them open. Open shaft associated with one of levels. Further open shaft with tree growing out just to right of large tip above. Over fence is a gated level at top of tip. To left of this are buildings and, further left, a narrow open shaft. Above gated level is open shaft and further up hillside collapsed shaft. Diagonally right from gated level up hillside is a short open trial level with ruined buildings beyond. Below these is a nearly filled shaft and a collapsed level further down.

### Chittol Wood

16/4/93 - large tip with collapsed level at SO3481395043. Collapsed shaft on top of hill at SO3493094959. Two collapsed trial levels in valley bottom.

### Cefn Gunthly

12/3/93 - line of collapsed levels up north east side of hill at SO333955. Line of collapsed shafts on hill top at SO331950. Open shaft in wood at SO327945, level below to south east of Pultheley Farm not checked but large pond at entrance. Badly filled shaft on top of hill at SO330945. Level at SO334950 collapsed but issuing some water, two collapsed shafts above on hillside. Level by stream at SO336952 collapsed. Level at SO336953 open but deep water inside. Open shaft above level and badly covered shaft just above that. Shaft higher up near track collapsed.

### Cliffdale

9/4/93 - Weston and Bowers Shafts filled, Sump Shaft filled and ploughed over. Powis Shaft not checked. Several concrete bases for engines. At SO298976 is a collapsed level below road with a collapsed level and shaft above road. Drainage Level at SO298980 used as domestic water supply and blocked.

### Crowsnest Dingle

23/4/93 - collapsed level at SJ372015 with filled shaft just above. About 200 yards further up side valley is open level in large tip. What appears to be arched levels in farm opposite and on right of track further up main valley are only potato stores.

### Cwm Dingle

9/4/93 - open level at SO297979 with line of workings going up hillside. Three collapsed shafts at SO295982. Filled shaft and collapsed level at SO296984.

### East Grit

18/4/93 - Old Grit Engine Shaft open at SO328981 and one wall of engine house still standing. Other shafts in immediate vicinity collapsed.

### East Roman Gravels

2/4/93 - all shafts filled and only stub of engine house chimney left next to road. Three open levels by mine reservoir at SJ336002.

### East Wotherton

26/3/93 - open shaft with iron fence round at SJ279004. Open stope with rubbish in but side passages appear to lead off. Narrow opencut has planks still in place.

### Far Gatten

19/3/93 - collapsed level at SO388985 with blocked shaft on top of hill to north west. Open level north of track at SO388987 which appears to have been dug open recently. Subsided workings at SO384986. No trace of level supposed to be at approx SO383987.

### Gatten

19/3/93 - two concrete capped shafts and open stope at SO386992. Shallow level has collapsed, probably due to reworking of tips. Base of winding engine, fuel tank supports and brick magazine remain. Climbing shaft to west of road at SO385992 is filled. Drainage level at bottom of valley to east at SO391992 is collapsed. Appears to

be hilly ground to east of this, on opposite side of stream, and suspicious wooded area to right of this - neither of these checked.

#### Huglith

25/4/93 - main shaft and stopes open at SJ404016. Numerous buildings, concrete machinery bases and a metal chimney adjacent. Open flooded shaft to south west with open level into it. Open levels, shafts and stopes to north west on Riddleswood Vein. All levels and shafts on Mud Vein north of Huglith Farm have been filled.

#### Ladywell

2/4/93 - Air Shaft (SO329993) coned but open with trees growing out of top. Ladywell Pit collapsed. Second Roman Shaft (SO327985) covered with corrugated iron and rubbish, may be open underneath. First Roman Shaft filled. Three iron kibbles at SO330991.

#### Leigh Level

26/3/93 - level open in wood at SJ331035 and issuing small flow of water. Tree roots pushing out arching at entrance and may cause collapse. Blue Barn Shaft at SJ333024 collapsed, as are two more air shafts at SJ332022 and SJ331032. Milne Shaft at SJ340008 capped with concrete (local claims there was a stable block built at shaft bottom).

#### Maddox Coppice

2/4/93 - bottom level (SJ382031) open and draughting but no water seen (dry winter?). What appears to be upper level is collapsed.

#### Meadowtown

16/4/93 - level on west of stream beside hut at SJ3144001512 but blocked with earth bank to provide a water supply. Spoil tip on east of stream.

#### Medlicott

16/4/93 - shaft behind farm at SO400946 is filled. Level in valley bottom to north with large tip is collapsed.

#### Myndtown

16/4/93 - collapsed level with small tip at SO3893788820 below road. Rock outcrop above road shows traces of malachite.

#### Myttonsbeach

9/4/93 - level open on large tip at SJ369005, as is shaft above. Remains of buildings. Further up valley, gridded open shaft on left and level opposite. Latter only blocked with soil and easily opened. Body of tipper truck down valley from first level.

#### New Central

23/4/93 - stub of chimney and some buildings remain, as well as preserved Lancashire boiler. Main shaft filled. Trial level at SJ369016 open. Just to west appears to be a collapsed day level issuing water. Two air shafts on Deep Level collapsed, as is portal.

#### Nick Knolls

16/4/93 - extensive bulldozing has removed most of the features on top of the hill. No trace of engine house. Two collapsed levels and two collapsed shafts at SJ34320089.

Open stope into lower levels filled with rubbish. Deep level below collapsed but issuing water.

#### Nipstone

12/3/93 - Deep opencut (?) at SO355969. Square depression just to north on large mound -was this the Bog climbing shaft? Collapsed level to south at SO355968 - may be level explored by David Bick. Nipstone Level collapsed with large tip on west of road at SO354969, appears to be used as water supply. Inspection pit full of water - very shallow so was it an incline?

#### New Venture

19/3/93 - Deep Level gated at SO366998 with collapsed shaft above in large depression. Buildings adjacent. Open shaft in wood to east at SO367998, presumably one explored to 90ft. Gated level further down hillside to north west. Deep shaft at SO367999 now capped with concrete but base of winding engine remains. Several collapsed levels and buildings in valley leading up to col at SJ369000, where there is a collapsed shaft and tips. No trace of the level explored here in 1960.

#### Pentirvin

16/4/93 - large tip at SJ3303201510. Level used as a water supply and dammed with concrete.

#### Perkinsbeach

19/3/93 - no trace of Maddox Shaft. Two open levels at SO354997. Level to west of these is collapsed. Vein workings leading up hillside have several entrances into stoping. Vein can be followed on top of hill by traces of opencuts and collapsed shafts. Aerial cableway booster station at SO362995 with two pier bases further north. Second one below cutting excavated for buckets to clear lip of hill when descending.

#### Pitcholds

23/4/93 - level in quarry at SO330929 has been blocked for a water supply. Short open level just above.

#### Potters Pit

9/4/93 - level open at SO355993. Shaft above is collapsed.

#### Rhadley

12/3/93 - main level is open on large tip by side of track at SO344958. Two trial levels open at SO341956 plus some collapsed shafts. Collapsed level near top of hill at SO342956. Workings on top of hill at SO344957 have been bulldozed. Very long tip on east of stream at SO337962 with collapsed level at end. Remains of building - compressor house? George Hall says latter level driven in 1920s to search for veins.

#### Ridge Hill

26/3/93 - collapsed shaft at SO279980 with adjacent base of winding engine and machinery footings. Vertical girder construction associated with farm generator operated by gas engine earlier this century. To east is a vein going up hillside with collapsed level. Just to south of this is short open level. May be another level to south not checked.

#### Ritton Castle

18/4/93 - remains of engine house and chimney at SO3416897780. Oval engine shaft open to blockage a short way down but has good ginging. Winding shaft in valley bottom at SO3436097558 open to water 10ft down. Adjacent masonry structure said to be waterwheel but obvious sign of water supply. Trial shaft at SO3443797776 blocked a short way down. Climbing shaft at SO3464497792 open to water a few feet down, with opencut workings just to east. Opencut workings above on opposite bank behind shed with blocked shaft at SO3459897603. North of climbing shaft is collapsed level on left bank of stream and open arched level on right bank. This is said to be collapsed a few yards in and there are signs of a collapsed air shaft on hillside above. George Hall says that this was the original drainage level for Bog Mine.

### Rock

18/4/93 - open shaft to west of outcrop at SO349961. Collapsed level to south west and collapsed shaft beyond this. Large tips with much galena. Collapsed shaft at SO350962. Collapsed level at SO349960 with collapse features a few yards to north west. Buildings adjacent to level mouth.

### Roman Gravels

2/4/93 - Spring Vein Pit (SO331997) open with flad rod channel running into shaft top from north.

### Rorrington

26/3/93 - Deep Level open at SO303999 and air shaft open at SO304998. Engine Shaft and No.1 Shaft collapsed. Two short levels open by No.1 Shaft and what appears to be a stope head filled with plastic containers of a corrosive liquid. Another short level open on left side of dingle heading south. No.2 Shaft appears to have been filled and ploughed over in field. On hill to east, two parallel lines of workings with two open levels on left line at SO306997. By large tip there are offices, waterwheel pit and flatrod tunnel.

### Roundhill

19/3/93 - mine buildings built on by coal yard. To south of these is the collapsed main shaft in large cone at SO351995. Opencut workings go north of this and there are old bellpits on top of hill to west of opencut. Collapsed level at SO350996 and collapsed shaft at SO351997. Deep Level at SO352997 is collapsed with a large tip. No trace of shaft shown in field to north west - appears to have been filled and ploughed over. Watercress Level at SO348998 is open and issuing water - purported to go to Pennerley Mine.

### Sallies

24/4/93 - open level blocked by timber gate at SJ396001, turntable just inside. Used as water supply and several features outside associated with this. Collapsed shaft at top of line of workings above and a filled shaft at top of field on left. Complete brick magazine and many concrete machinery bases. Concrete cap of the trial shaft is split and beginning to tilt. A small hole on right of track 45 yards north of ford appears to lead into a collapsed level. There seems to be a spoil tip for this on opposite side of stream.

### Santley Trial

16/4/93 - filled shaft at SJ3417000293, looks like tip pushed in. Smaller filled shaft about 50ft lower down.

#### Shelve

2/4/93 - More Shaft (SO339991) filled on top of large tip but no surface remains identifiable. 16/4/93 - Deep Level at SO3410499335 collapsed but issuing water. Air shaft to south east on other side of track is collapsed.

#### Shelve Trials

23/4/93 - open adit at SO3313598577 with concrete step and 3ft deep water behind.

#### Shuttocks Wood

23/4/93 - collapsed shaft on right of track at SO373923. In southern edge of wood is an opencut with a depression at western end. Water flows into a hole here but this may be a land drain.

#### South Roman Gravels

16/4/93 - large tip with rubbish filled shaft. Engine house only just distinguishable. Collapsed shaft to west next to stone quarry. Shaft to right and level not searched for at time.

#### Squilver Hill

23/4/93 - no trace of level at SO327932, hillside appears to have been covered by quarry spoil.

#### Stapeley

9/4/93 - open level at SO309991 with collapsed shafts further uphill. Level further down blocked and used as a water supply.

#### Tankerville

9/4/93 - New Shaft open with trees growing out of top, engine base nearby. Lewis Shaft filled, as is an adjacent level to right. What appears to be an open arched level behind pottery is a potato store. Short open level on vein (SO356995) opposite to pottery has a tight inclined drop of unknown depth. Filled shaft to right of pottery.

#### Westcott

25/4/93 - engine house, chimney and boiler house present in garden of Westcott Birches. Some repointing has been done. Two levels nearby have collapsed. In field to south, two open levels and several more collapsed ones. May be open shaft on top of hill.

#### White Grit

18/4/93 - Rider Shaft open at SO324981 with open stopehead a few yards to north. Hampsons and Flat Rod Shafts open but all others blocked. Arched drainage level open in wood west of road at SO3191197658 and issuing water. Line of air shafts heading north east, mostly collapsed. One open at SO3200997912 is 3ft diameter with ginging, blocked at 10ft depth. Another just to east of road at SO320978 has been filled but this is slipping.

#### Wood Level

2/4/93 - portal open at SJ337007 but blocked with concrete to leave a 9 inch slit, fast flow of water coming out. Older portal collapsed to left next to old footbridge.

Collapsed air shaft right next to west of road. Two open air shafts at SO336005 blocked part way down, as is another at SO336004.

Wotherton

26/3/93 - all shafts filled. Engine house on Old Engine Shaft not lived in and deteriorating. Ruined building next to New Engine Shaft could be engine house.

## ST JUST & PORTHLEDDEN MINES

Roy Fellows

These mines are situated at Cape Cornwall near St Just in Cornwall and were visited by SCMC members during the Easter meet. I would like to apologise to the members concerned, since it appears that I passed on misleading information at the time. The following article is one of a series that I am writing for the West Cumbria Mine Research Group Journal and I hope that it will redress the balance.

These two separate but connecting ventures are probably the largest complex of accessible underground mine workings in the St Just area, or at least they will be when Geevor Mine floods up to adit level. The lodes worked trend more or less easterly or south easterly and have been worked from early times. The last reworking was from 1902-16 from an adit driven into the Porthledden cliffs. There are rumours of connections with the Kenidjack workings to the north and Bellan Mine to the south but these have yet to be proved.

The following narrative concerns my own explorations and conclusions so must therefore be regarded in part as conjectural. There are three possible entrances as follows :-

a) Priests Cove Adit (NGR SW352316)

This is a meandering cross-cut and, after about 60 metres from the entrance, a heading on the right reaches a flooded understope after a short distance. The level of the water suggests to me that there is no connection with the other workings. About 30 metres further on an obvious fault can be seen then, after another 40 metres, it cross-cuts what I believe to be Bozands Lode at an oblique angle. This can be explored to the right for a short distance but the way on is left, along a narrow ledge on the footwall of the stope. The drop here is about 8ft but the last bit of the ledge has a long drop into water. As I have always regarded this section as slightly dangerous, I recently fitted a handline secured to bolts put into the footwall.

A crawl comes next where some surface debris can be seen, this could possibly be Bozands Shaft which would place us under the golf course. After another section of ledge, but not so narrow, you reach a point where the way on has to be either up or down (see section E-F on Figure 5). Down is easy and enables you to explore more of the same lode up to a point where a collapse stops further progress. A flooded winze or understope can be seen. Return to the rise and head upwards. This would be easy for an experienced rock climber but difficult and dangerous for anyone else. A length of nanky rope tied to some boulders at the top is in situ to assist here but, at the time of my visit, this had chafed due to contact with the rock above. I have now fitted a good SRT rope to proper bolts so as to give a "clean pitch". It is to be hoped that it is left in situ. As we are now at the end of the south cross-cut in Porthledden workings, I will go to the Porthledden entrances to begin my description of these workings.

Figure 5 Accessible Workings in St Just United & Porthledden Mines

b) Porthledden Drainage Adit (NGR SW354319)

This is an obvious entrance which appears to have had an iron gate fitted at some time and was the drainage adit from Trelewack Lode. It is a meandering drive, which at the time of my first exploration some years ago was almost up to the roof in water, and it has pieces of floating maritime debris to add to the interest. The entrance has now been cleared by some local people and it is only knee depth at the most. The mark from the old water level can still be seen however.

At one point, there are some fine ochre columns to be seen and, after passing an underwater hole in the floor, the level ends at a rise (see section C-D on Figure 5). Looking up, you can see old man's workings high up and a stream of water comes down through a mass of dangerous boulders. Although it is possible to climb up into the main workings, it would be very dangerous in my opinion. More on this later.

c) Porthledden 1902 Adit (NGR SW355320)

The entrance to this adit has collapsed and entry is by what looks like a foxhole. This is impossible to see from below and, to place it, you need to stand on the beach by a section of large diameter pipe. Looking up, you will see a small diameter pipe with water running out and the entrance is just above this. It is impossible to climb up directly but you can climb up about 20ft to the right and traverse across. The workings previously described were old man workings and are generally sound, packwork being supported by stone slabs. These more modern workings, however, consist of large spacious levels driven through the granite to connect with the old man's workings on the various lodes. It is very reminiscent of Cligga Head and Kit Hill Mines.

Quite a lot of these workings are in poor ground, either left unsupported or where the timber has rotted. Falls and areas of dangerous ground are commonplace, be warned. There are quite a lot of minor artefacts from this period of working. The adit follows a south east trending vein in which old man's workings can be seen high in the roof. To the left, a cross-cut has been driven to the north east as described in Dines (BGS Survey). This is blocked after about 50 metres. It is possible that it may have reached Wheal Call Lode.

The main drive continues to a blockage but it is possible to climb up and view the passage beyond (see section A-B in Figure 5). It is an easy 20ft pitch but the granite in this area is either breaking up or rotten so it was not possible to place a bolt. Before this point is reached on the main drive, the south cross-cut goes off to the right. This can be followed to Trelewack Lode and finally to the 30ft pitch on Bozands Lode, already described. Trelewack Lode can be explored in both directions. To the left (east) you pass through a dangerous fall to where deep water prevents further progress. To the right (west) you reach a very dangerous fall of loose rock (it moved while I was standing on it) where water escapes down to the drainage adit (see section C-D in Figure 5).

## NEAR DISASTER IN BRYNFEDWEN MINE

Bob Southwick

This mine (NGR SN858972) is near Machynlleth in Wales and in 1985 John Davis, Nick Southwick and myself had been trying to gain access by digging out one of the adits. After a short dig we managed to clear the entrance but we were soon confronted by a further blockage in the adit. Not to be put off, we tried to dig out the blockage but were confronted by a large boulder blocking all further progress.

By chance, hidden in the woods some 80ft further up the hillside, we found another adit. This went for approximately 30ft before ending in a large stope working. Some 80ft below this, we could see what we thought was another level which possibly connected to the adit we had previously been digging. So, setting up the SRT gear, all 3 of us descended to what appeared to be a rock-covered level.

On examination to the right, we did indeed come to the adit we had been digging and could see why we could not remove the boulder because of its massive size. Turning to the left, however, we walked over big boulders to the large open shaft to surface. We estimated that this carried on down another 200ft below where we were standing. It was at this point that the near fatal rock was thrown down the shaft in order to re-estimate its depth. It dislodged some other rocks which had jammed across the large open stope, causing the whole floor on which we were standing to start to drop. The noise was horrendous as tons of rocks started to fall from under us. It was only by luck that we managed to get to a small solid area before the whole floor dropped 15ft, where it jammed again.

We could now see open air through the remaining rocks which were jammed across the stope. This had indeed been a close encounter with death and we made a quick exit. As we were climbing up the SRT rope, the rocks were still falling from below the false floor. I often wonder if the floor is still there or whether it has disappeared to the bottom of the workings.

## WHO PROTECTS OUR MONUMENTS?

Adrian Pearce

Most people know that a government department is responsible for protecting buildings and other structures of national importance but, beyond this, they are a bit hazy. There are in fact several organisations that have an interest in this field and this article attempts to explain who they are and what they do.

### 1. Royal Commission on Historical Monuments of England (RCHME)

This is part of the Department of Environment and their function is to maintain records of all types of monument, carrying out surveys themselves where necessary. An important branch is known as the National Monuments Record (NMR) and this collects information from all sources for safekeeping. It is split into 3 sections :-

- a) Architectural Records Section - who keep plans and photos of buildings.
- b) Archaeological Records Section - who keep miscellaneous information on archaeological sites.
- c) Air Photographic Section - who keep a collection of over 2½ million aerial photos, many dating from mid-20th century.

There are equivalent Commissions which cover Wales and Scotland.

### 2. Historic Buildings & Monuments Commission (English Heritage)

This is sometimes confused with RCHME but it is a separate part of the Department of Environment and is concerned with the actual protection of sites. Again, it only deals with England and there are equivalent commissions for Wales (CADW), Scotland and Northern Ireland. Their major activities are :-

- a) Listing Historic Buildings - in 1982, the Commission began a survey of historic buildings in England and about 400,000 are expected to be listed when the survey is completed. Applications are normally only accepted for buildings over 30 years old but those only over 10 years may be considered where they are in danger of being lost. This means that some of our familiar red telephone boxes are now being saved! Where a historic building is at risk, the Commission can make grants to local authorities to purchase it. Once a building has been listed, no alterations can be carried out on it until listed building consent has been obtained from English Heritage. This ensures that the historic value is not destroyed and grants are available where extra expense is involved.
- b) Scheduling Ancient Monuments - where a structure is of national archaeological importance, the Secretary of State for the Environment can rule that it is a Scheduled Monument. This means that no work can be carried out at the site until scheduled monument consent has been obtained from the Secretary of State and strict standards of

workmanship are specified. Where appropriate, the Commission can make grants for the repair and preservation of such monuments.

- c) Protection of Sites - the Commission can prosecute persons who cause damage to protected sites but only a small percentage of potential cases ever reach the courts. One loophole is that prior consent is not needed for emergency treatment of a structure in the interests of health and safety. Thus an unscrupulous landowner could possibly demolish a structure and say that it had been a potential danger to the public. A site can also be "de-scheduled" when it is no longer of national importance or a change of use renders it ineligible for protection. One scheme being investigated is the possibility of designating "environmentally sensitive areas" and compensating landowners for sympathetic management of the land.
- d) Monuments Protection Programme (MPP) - Until recently, very few industrial structures had been scheduled and many important sites were in danger of being lost. As a result, it was decided to institute a programme to evaluate industrial structures in England and to protect a representative sample of these. The first stage was to prepare a list of industries and to organise these so that they could be tackled in a logical sequence. The current list is :-

1) METAL BASED INDUSTRIES

1Aa) Extraction & Production - Ferrous

- i) Iron mines - including manganese
- ii) Iron smelting sites
  - bloomeries
  - blast furnaces
  - bulk steel making plants
  - "pre-bulk" steel making

1Ab) Extraction & Production - Non-Ferrous

- i) Mines
  - lead mines
  - copper mines
  - tin mines
  - zinc mines
  - gold mines
  - silver mines
  - other metal & vein mineral mines
- ii) Ore dressing & preparation sites (by metal)
- iii) Smelting & furnace sites (by metal)

1Ba) Metal-Based Manufactures - Ferrous

- i) Iron works
  - wrought iron works
  - wire works
  - foundries & factories
  - steel mills

1Bb) Metal-Based Manufactures - Non-Ferrous

- i) Lead works
  - red & white lead works
  - pipe works
  - shot works
  - sheet works
- ii) Copper works
  - battery works
  - wire works
  - bronze works
- iii) Tin works
  - pewter works
  - tin plate works
- iv) Zinc works
  - brass works
  - muntz's metal works
  - bell metal works
  - galvanising works
- v) Rare metals
  - rare metal works (eg mints)

2. NON-METALLIC INDUSTRIES

2a) Inorganic Raw Materials - Extraction

- i) Coal mines
- ii) Clay pits & mines
  - china clay
  - fireclay
  - brick clay
- iii) Stone quarries & mines
- iv) Chemical pits & mines
- v) Turbaries

2b) Inorganic Raw Materials - Manufactures

- i) Coal
  - coke works
  - coal gas works
  - coal tar & shale oil works
  
- ii) Clay products
  - brick works
  - tile works
  - fireclay works
  - potteries
  - glass works
  
- iii) Stone quarry products
  - building stone manufacture
  - lime producing works
  - cement works
  - plaster works
  - flint mills
  
- iv) Chemical products
  - salt works
  - arsenic works
  - alum works
  - phosphorus works
  - sulphur works
  - gunpowder works
  - other/general chemical works
  - ice making/storage

3. ORGANIC RAW MATERIALS

3a) Organic Materials - Production Sites

- i) Timber production sites & structures
- ii) Agricultural sites & structures
- iii) Animal husbandry sites & structures

3b) Sites Making Organic Products

- i) Timber products works
  - charcoal sites
  - sawmills
  - wheelwright works
  - shipyards
  - paper mills
  - other timber working sites

- ii) Agricultural products works
  - corn drying
  - flour milling
  - bakeries
  - maltings
  - oastings
  - breweries
  - cider making
  - distilleries
  - roperies
  - flaxworks
  - linen works
  - cotton works
  - dye mills & houses
  - tobacco works (including snuff)
  - soap works

- iii) Animal products works
  - silk works
  - fulling mills
  - textile mills
  - dairies
  - slaughterhouses
  - tanneries
  - bone mills
  - horn works
  - oil, fat & wax works

4. MACHINES & ENGINES (WHERE NOT ALREADY ALLOCATED)

- i) Muscle power
  - horse mills
  - treadmills
  - capstans & winches
- ii) Wind power
  - windmills
  - sails
- iii) Water power
  - watermills
  - turbines
  - hydraulic engines & systems
  - steam engines
- iv) Other power sources
  - atmospheric engines
  - gas engines
  - petrol & oil engines

- electric engines
- atomic engines

## 5. TRANSPORT

- i) Overland routeways
  - trackways
  - roads
  - sledgeways
  - tunnels
  - staircases
  - fords
  - bridges
  - railways & tramways
  - mechanical inclines
- ii) Water routeways
  - river works
  - canals
  - locks
  - tunnels
  - boat lifts
  - port & harbour installations
- iii) Air routeways

## 6. ACCOMMODATION & OTHERS

- i) General warehousing
- ii) Workers housing (where associated with the workplace)
- iii) Buildings & structures connected with industrial training
- iv) Structures associated with public services
  - water supply facilities
  - drainage & sea defence works
  - waste disposal structures
  - gas & electricity supply
- v) Structures associated with leisure industries
- vi) Print works

For each industry, a consultant will be engaged to act as national co-ordinator. There will then be 6 steps as follows :-

STEP 1 - a report will be prepared on the industry, including the main stages of development, chronology, regional diversity, components and

known existing records. Individual experts will also be identified and invited to comment on the draft Step 1 report.

STEP 2 - existing records and individual experts will be consulted to identify those sites considered to be of importance. Some site visits will be carried out but this will predominantly be a desk study.

STEP 3 - a further report is prepared, listing the sites identified as being of importance. Each site will have a description and evaluation.

STEP 4 - the Step 3 report will be assessed and recommendations drawn up for action on each site, eg scheduling, listing, etc.

STEP 5 - bodies such as RCHME, etc will be consulted regarding which sites are the most important.

STEP 6 - recommendations will be made to the Secretary of State for the appropriate action.

To date, the following steps have been completed for mining industries :-

	Step 1	Step 2	Step 3	Step 4
Lead	completed	completed	completed	completed
Tin	completed	completed	in progress	
Copper	in progress			
Zinc	in progress			
Iron/Steel	in progress			
Coal	in progress			
Other	in progress			

The Club has been sent the relevant Step 1 reports and has returned comments with suggested sites for protection. These reports are in the Club library for anyone who wishes to inspect them. It is hoped that the important surface remains of Shropshire mines are given some protection as a result of the MPP scheme.

### 3. County Councils

Each County Council is required to maintain Site & Monument Records (SMRs) for important features in their county. These include anything that has been listed or scheduled but can also include any feature which is felt to be of local importance. Whenever a planning application is made, it is compared with the SMRs and the county archaeologist or conservation officer notified if the application affects anything listed on a SMR. If so, recommendations can be made to the planning committee when they consider the application. Although this is not a guarantee of protection, it is better than nothing and we have ensured that all metalliferous mining sites in Shropshire with significant surface remains are now on a SMR. The council can also take on responsibility for preserving important structures, especially where they can be interpreted for the public. A good example of this is Snailbeach Mine, where the council have spent their own money, as well as being grant aided, to preserve some of the buildings.

#### 4. Local Societies

Some mining history societies have been active in preserving mining features by carrying out re-pointing, etc. In this way, features that have not been granted statutory protection can still be preserved for future generations, even if the work is not to a high professional standard. They also have an important function in monitoring sites which have been protected, thus giving early warning of any danger of damage from nature or human hand.

#### 5. The Vicious Circle

Say, for instance, that there is an engine house which has been accepted as an ancient monument but is in danger of collapse. Under the terms of the protection, remedial work must have prior consent from English Heritage and it must be up to the highest professional standards. This can only be done by specialist firms and the amateur mining historian is not allowed to do anything, even in an emergency. If there is no grant, however, the work will not get done and the engine house will fall down. Unless it is known in advance that a grant for professional remedial treatment is available, it can thus be a negative move to get such protection, since this sterilises all potential treatment by amateurs (which would at least keep the structure standing!).

## AN ANAGRAM, A LEGEND, A MISCARRIAGE OF JUSTICE AND A FAKE

David Coxall

Any historian trying to piece together the history of an area should always have due regard to evidence, from whatever source it comes. But to form an accurate image requires all references to be scrutinized for their accuracy and reliability, for no reference should be taken as sacrosanct. Sometimes stories are written down as an anagram, a kind of riddle, which only gives a clue to the real tale indirectly.

No better example of this can be found than in the Aris's Birmingham Gazette of January 21st 1767 :-

*On Tuesday last at the Lilleshall Lime Works, near Newport (Shrops), a pool 9 yards deep, which has not been fished for ages, was let off by means of a level brought up to drain the works, when an enormous pike was found. He was drawn out by a rope fastened around his head and gills, amidst hundreds of spectators, in which service a great many men were employed. He weighed upwards up 170 pounds, and is thought to have been the largest ever seen.*

*Some time ago, the Clerk of the Parish was trolling in the above pool, when his bait was taken and seized by the furious creature, which by a sudden jerk pulled him in and doubtless would have devoured him also, had he not by wonderful agility and dexterous swimming escaped the jaws of this voracious animal.*

This appears to be a reference to a quarry being drained by a level, probably Collier Side Quarry, but who or what Pike was is a mystery? There is a tendency to think that this was the surname of a person trying to evade the rest of society for some reason?

Similarly, a legend persists that there is a secret passage between Lilleshall Abbey and the Church in the village. It seems astonishing that a major engineering feat of this kind, involving the driving of a tunnel about half a mile long between two locations, could have been constructed and kept a secret. Any such tunnel must have had a very steep gradient immediately south of the Church if it was to avoid coming out at the surface, since the topography drops significantly towards the lower lying Abbey to the south. If there is an anagrammatical explanation to this legend, it has long been lost.

Now let us consider a miscarriage of justice. Normally this is associated with people being convicted of offences they did not commit. In this case, it was someone who was let off the hook because his master was a power magnate for all. So much for equal justice for all.

Unlike the two humorous episodes that took place at Collier Side, there is no doubt about the facts and the interpretation of this case. Before delving into the details, it is important to set the scene when it took place. You should never make the mistake of judging history as a whole by any one set of criteria of what is right or wrong. In the same way, what is socially unacceptable in one part of the world today may be considered as normal and perfectly natural in another, depending on the predominant culture. History can only be judged by the standards that were regarded as ethical at that time and no other. Otherwise, everybody will condemn all other historical periods as either too carefree or oppressive, revolutionary or sterile conservative.

The case in question is that of the killing of "Cock" Powell of Pitchcroft by Matthew Challinor, that took place along the Donnington Wood Canal at Willmoor Bridge, Lilleshall in the 19th century. Matthew Challinor was a traction engine driver for the Duke of Sutherland and had a fiery temper that earned him the nickname "Danger", which did nothing to pacify him. Calling Matthew by his nickname was as safe as throwing a lighted match into a petrol tank, as "Cock" Powell found out to his bitter cost. One night, "Cock" met Matthew on the bridge and called him by the forbidden word. Matthew's "Jeckle & Hyde" personality took a turn for the worse upon hearing the magic phrase, which promptly resulted in him drawing out a stick with which he hit "Cock" so severely that he instantly died.

Matthew was committed to Shrewsbury Gaol for a while. Eventually the Duke secured his release, in the meantime easing his displeasure of living in such uncomfortable accommodation by keeping Matthew in stock with tobacco. Was this murder or manslaughter? Quite a debatable matter but it was hardly an act of self defence. In those days, murder was a capital offence, as it would be today in some cases if it was put to a referendum. But what does it matter if you have got friends where it matters, up top.

Finally, let us end this comical article with a 20th century farce. If this is going slightly off the subject for a mining historian, I'm sure you'll forgive me this once as those of you who are used to reading my more scientific accounts, which I do actually tone down for the lay person, will be refreshingly relieved by this easy to digest style. The setting is Lilleshall Abbey and the excuse of including it is that it lies by the Donnington Wood Canal, along which many a barge of coal and lime passed.

The theme to this story is how gullible people can be to tales from the "Twilight Zone". In 1928, the custodian of the Abbey and his family moved into a cottage standing on ground that was originally within the Abbey walls. They claimed to have heard "mumblings from the ground". Their initial reaction was that it was from workings at the nearby Granville Colliery but the mine did not work coal from underneath the Abbey until the 1960s! They became more concerned when the sounds continued, comprising muffled footsteps, low whisperings and the quiet chant of men and boys. It is claimed that one night the custodian's son saw a spectre close to his bed and heard a rippling sound. When these paranormal incidents did not stop, the inevitable investigation started. Before continuing, it is worth remembering that, during the period of these incidents, the world was in a catastrophic economic depression and, with times being so hard, the Abbey was not attracting much tourist interest. That's enough clues for the moment.

Inevitably, the sounds and the legend of an underground passage were connected. In 1932 the following article appeared in several newspapers.

*Diviner or Archaeologist who can locate entrance to underground passage believed to run from Lilleshall Abbey will be rewarded £50 - Apply in writing to Estate Agent, Lilleshall Hall.*

This was all the convincing that Fleet Street required and the Daily Mirror came out in 1932 with the headline *MYSTERY OF HAUNTED ABBEY - £50 REWARD*, with an aerial photograph and the caption *GHOSTLY MOANINGS AND BLOODSTAINS*. Excavations took place between 28th August and 15th September 1932. The Sunday Despatch reported a *GHOST HUNT WITH GOVERNMENT SANCTION* and stated

*FOR THE FIRST TIME SINCE IT WAS CONSTITUTED, THAT STAID CIVIL SERVICE DEPARTMENT HM OFFICE OF WORKS IS ENGAGED ON A GHOST HUNT.*

Local newspaper headlines were *WATCH FOR SPECTRE OF MURDERED MONK*. A reporter went with a night party on Saturday 3rd September 1932. *OUR EXPECTATION WAS A MEETING WITH A MEANDERING MEDIEVAL MONK, WHO IN THIS YEAR OF GRACE HAS RETURNED TO LOVELY LILLESHELL ... NONE CAME*. I think those who want great expectations are better sticking with Charles Dickens. Not surprisingly, the tourists flocked to Lilleshall but all those with high hopes of an occult experience went away disappointed, or never lived to tell the tale! Ah, Ah.

#### THE ABBEY GHOST MYSTERY : THE FINAL SOLUTION

No, the answer does not come out of any book written by Stephen Knight. I have already given a few clues, now for the truth. It is quite straightforward actually. Visitors to the Abbey had reached a low level and, in order to boost tourism, the ghost story was contrived, or so I'm told. The real ghost was very much warm blooded and, if he has now gone to the great beyond, it has not been until many years have passed since the publicity.

Still it did the trick and it appears that visitor numbers rose for a while. Incidentally, there is a legend that the monks were murdered by Cromwell's troops and, at that very spot, their blood stains the stone floor, refusing to go with time. Whoever thought of that tale does not know much about the history of either the Reformation or the English Civil War. Lilleshall Abbey was surrendered by the Abbot, Robert Watson, to Henry VIII on 13th October 1538, who dissolved it in a bloodless fashion. The monks, like most of their kin throughout the land, were left homeless and a lot resorted to begging. The worst that happened to them would have been to be branded with a hot iron, as permitted by the Vagrancy Laws.

The Civil War did not reach Lilleshall until 1644, when parliamentary forces took the house of the royalist Sir Richard Leveson, which was a conversion of part of the Abbey. That was 106 years after the monks left. Where is the credibility in that story? As regards the blood stains, there are red stains in the Abbey that never disappear. That is true, I could say more but I'll let you work it out.

As regards the hidden tunnel, I could have fun with you and say it was a miners' drivage and the noises are of tommy knockers. But I won't since I want future articles I write to be taken seriously. The theme of this amusing article is to make you all think carefully about what you read and hear. Critical objective analysis is the only way to make logical deductions. Take nothing for granted, regardless of how authoritative the source.

Don't be frightened to question theories in order to get at the truth. But equally, don't go off into the realms of fiction. Always remember that serious thinking is based on making theories and hypotheses fit the facts. It is when the opposite happens that you get the nonsense like I have just talked about. There are no certain absolutes, so take everything with a pinch of salt.

## THE HIGH BLANTYRE MINE DISASTER

Nick Southwick

Some years ago in my folk singing days, I came across a ballad entitled "The Blantyre Explosion" which was a story about a colliery disaster in the Scottish mining fields near to Glasgow. Locked away and forgotten in my head for some time, the song was rekindled when my next door neighbour handed me some old paper cuttings of mining scenes. Amongst these, to my great delight, was the original report on the High Blantyre disaster dated November 3rd 1877.

I have reproduced the words of the song from memory and the reports are at Figures 6 & 7. Some day, if well oiled, I may even sing the song!

Figure 6 Newspaper Report Dated November 3rd 1877

Figure 7 Newspaper Report Dated November 3rd 1877

## The Ballad of the High Blantyre Colliery Disaster

*By Clyde's bonnie banks as I slowly did wander  
Among the pit heaps as the evening drew nigh  
I spied a young woman all dressed in black mourning  
Weeping and wailing with many a sigh.*

*I stepped up beside her and slowly addressed her  
Would it help you to talk of the cause of your pain  
Weeping and wailing she slowly did answer  
Johnny Murphy kind Sir was my true lover's name.*

*Twenty one years of age full of youth and good looking  
To work down the mines of High Blantyre he came  
The wedding was fixed and the guests were invited  
On a calm autumn evening my Johnny was slain.*

*The explosion was heard by the women and children  
With grey painted faces they ran to the mine  
When the news was made heard all the hills cried with mourning  
Two hundred and ten Scottish miners were slain.*

*So mothers and daughters and sweethearts and lovers  
The Blantyre explosion you'll never forget  
Come all you good people who hear my sad story  
Remember the miners who lie in their rest.*

## RECENT CHANGES AT SNAILBEACH

Steve Holding

For many years there have been discussions regarding the possibility of reclamation work at Snailbeach. Recent plans for major reclamation and restoration work on the buildings were opposed by local residents in that they did not want the area to become a "tourist trap". However, the plans were revised and some work started last year.

Since most of the proposals for development of the restored buildings and new buildings were dropped, there has only been limited funds for the restoration of the old mine buildings. Despite this, funds were found for limited restoration and work commenced on the Loco Sheds. In addition to the Loco Sheds, the work on the Blacksmith's Shop has been completed. With the Compressor House, the dangerous roof has been removed and the walls stabilised. Some work has been undertaken on most of the buildings near George's Shaft and major work is currently under way on the much needed restoration of the Lordshill Engine House.

Although the restoration of the mine buildings is having a distinct impact on the area the treatment of the underground workings are probably of more profound significance. The treatment of the shafts and underground areas is being carried out in two phases; the Phase 1 involves treating the shafts and the stopes in the vicinity of the buildings and this is currently nearly complete. It is understood that the second phase of this work will involve major changes in the white spoil tips and the in-filling of the stopes on the hillside. It is intended that Phase 2 be actioned during 1994.

All of the lower stopes have now been filled and the shafts treated. Both George's Shaft and Black Tom Shaft have been capped but the top part of George's Shaft has been retained and a shaft top simulated close to the original Black Tom Shaft. It is understood that the headframes will eventually be reconstructed over these 'shafts'. Visitors will also find that Chapel Shaft has changed considerably. This shaft has been excavated to the rock and a "beehive" like structure constructed over the open shaft. Lordshill Engine Shaft is to remain open but grilled at surface and accessed via the Day Level. Other shafts have been filled with either no sign remaining or a concrete "Trig Point" structure being left to mark the site.

The entrance to Perkin's (or Robert's) Level has been excavated and, in preparation for Phase 2, the level has been re-driven to connect the entrance with the upper stopes. The original wooden bridge over the stope adjacent to Perkin's Level has rotted away but has been replaced with a modern crossing of the stope.

The details of Phase 2 of the reclamation work have not yet been agreed but it is understood that the earlier plan to fill the stopes to the floor of Perkin's Level has been revised. It is now proposed to fill to the roof of the level and hence maintain ventilation and access to the deeper stopes. A lot of the fill material is proposed to come from the white spoil tips which would then be re-contoured.

The combination of reclamation work and restoration of the buildings is changing the appearance of the village considerably. I feel that the local residents must appreciate the changes but they are likely to have reservations over the impact of Phase 2 and are probably concerned at the prospect of attracting too many tourists. It is hoped that club members and associates will respect the privacy when walking around the area.

## *Supplementary Note by Adrian Pearce*

*On 10th September, I was lucky enough to be invited to explore the recently opened Perkin's Level in the company of officers from South Shropshire District Council. At present, the entrance has been slightly extended out from the rockhead by the use of arches. Under Phase 2, it is intended to extend the arching still further towards the track and to infill on top with soil. A substantial wooden bridge has been built over the stope by T & L Mining Construction Ltd and this even has a handrail! The T and L by the way stand for Terry Worthington and Les Riley, who are also long standing members of Peak District Mines Historical Society. They have cleaned some of the rubbish out of the stope and dug out the previous blockage in the level. All the spoil from these operations has been tipped down the stope. Since they expected a major roof collapse at the blockage, there is a very substantial metal arching here (even Neal would be impressed!). In the event, it was found that the level breaks out into the stope at this point and it was from here that the infill came. The way is now clear to walk from surface right to the top of the sand slope where we descend to the lower levels.*

*We were accompanied by Harley Thomas, the County Council Conservation Officer, and we checked out the surface after the trip. There are only two secure buildings on site at present, the loco sheds and the blacksmith's shop. The former is to be turned into an interpretative display area which can be opened up for visiting parties and the latter can be used for temporary storage of artefacts. The Club were asked to assist in measuring and recording various artefacts on site such as the spiral classifier and jigs. The wooden engine shed at Black Tom Shaft is worth saving and the Club has been asked to measure it up. Harley hopes to obtain some funds to replace the roof and side planking. The reconstructed shaft here not only looks like a cheap wishing well but it is not even over the original shaft! It is hoped to prepare a mine trail around the site and it is likely that the Club will be involved in this.*

## TECHNICAL ASPECTS OF SNAILBEACH PHASE 1

Alan Robinson

The main contractor for the reclamation work at Snailbeach is Kinmain Construction of Oldbury, who are working under the direct supervision of Wardell Armstrong, the County Council's technical advisors on this project. M & J Drilling Services were subcontracted to Kinmain to undertake all the drilling and infilling of the underground stopes and shafts. Most of the underground works were carried out by T & L Mining Construction Ltd who had a major involvement with the scheme. The value of this six month contract is presently estimated at just over £700,000.

In this present phase of works it is intended to "make safe" as many of the mine entries as possible, with the exception of the Lords Hill stopes.

Starting in the valley, the Wagbeach Adit will be gated at the "old" portal. The old air shafts along the Drainage Level (which have long been infilled) have had reinforced concrete caps cast at rockhead over the shaft tops.

George's Shaft was backfilled with minespoil from the blockage at 60 metres (?) to just below the connecting level to the climbing shaft (39 metres deep). A concrete slab was then cast to bring it up to the same depth as the level, forming an impermeable seal for grouting. At this stage, the climbing shaft was filled back to surface with a coarse grade of spoil from the white tips. Next, a drilling rig was set up over the shaft and a borehole drilled to the base of the shaft through the coarse infill. This was then grouted such that the connecting level was flooded in grout too. Once the grout level was clearly visible in George's Shaft, it was also backfilled with granular spoil to ground level. Both shafts were then fully grouted by withdrawing the drill string in 3 metre stages and injecting grout until a pressure of 60 PSI was achieved.

Throughout the contract, a 9:1 grout mix of pulverised fuel ash and sulphate resisting cement was used. Occasionally a fine sand was used as a bulking agent to restrict the flow of the grout.

Lords Hill Engine Shaft and Day Level also received a lot of attention during the contract with a considerable quantity of steel being used to form the two grills and two gates required to keep the public out. Substantial efforts were made to restore the shaft ginging at the top of the hill. A grill was fitted at the top of the shaft and another within the shaft at the floor height of Day Level. The gates were fitted at the Day Level portal and immediately before the shaft inset. Excavations in this area revealed a multitude of very short drill holes, as if miners had been trying out new or resharpened drills from the nearby blacksmiths shop.

During these works I had the opportunity to descend Engine Shaft on T & L's winch and to explore along the 112 Yard level with Les Riley. Rubbish in the shaft was perched (?) about 2 metres above the cross cut from the shaft on the 112. Water level here was initially waist deep but becoming increasingly deeper until we presume the level sumped out about 150 metres from the shaft. Low oxygen prevented us from pursuing the level to the inevitable sump but we were able to conclude that the level had been driven from both directions, with a 15 metre dog leg showing both misalignment in the vertical and horizontal!

Chapel Shaft saw a major excavation to remove much of the surface spoil and the very loose brickwork around the top of the shaft. A hefty concrete slab was cast at rockhead with a provision for bat grills and winch entry point. Some tidying up was done of the still collapsing sides of the "Adit R" stope at the northern extreme of the mine.

The major part of the infilling works has taken place in the region of Black Tom Shaft in both the stopes open to surface and the underground sections. Where surface end tipping into the voids was possible, coarse mine spoil was used. Otherwise large diameter boreholes were drilled into the tops of the stopes and a mixture of grout and fine material from the white tips injected. If there was a risk of grout passing through the rubble floors of the stopes, then ready-mix concrete was first poured down the boreholes to form a splatter seal or plug as appropriate.

The results of this were particularly impressive! A final topping up exercise was carried out by pressure grouting after all the primary bulk infilling had been completed.

The small stopes to the rear of the Black Tom workings were also treated in a similarly manner after the adit entrances had been blocked. It has been estimated that 8,000 cubic metres of mine spoil have been removed from the white tip for backfilling and well over 2,000 tonnes of grout have injected.

A new spillway has been constructed through the embankment of the reservoir to bring it in line with the current safety practices laid out by the Safety of Reservoirs Act.

Dust and noise levels have been monitored over the contract to ensure that the degree of disturbance was within acceptable limits for the village.

## WILDERLEY COPPER MINE

Malcolm Newton & Adrian Pearce

Malcolm recently came across a set of photographs of the above mine dated 1917, together with a letter and report concerned with its progress at that time. Copies of these are now in the Club library and this short article summarises the information therein.

The work was being carried out by the Anglo-Rhodesia Investment Co Ltd and the mine lies 3 miles south of Pontesbury at NGR SJ412006. The Annual List of Mines shows this company as owning the mine between 1916-18 with an average of 9 men working underground and 6 on the surface. It seems that work had only recently commenced and the letter dated 30th November 1917 was an attempt to attract the Rev T R Walker and friends as investors.

*"... our work is at present centred in three directions namely (1) Sinking the Main Shaft, (2) Driving the Main Level (to cut the Main Shaft at a depth of 253ft) and (3) Sinking of Boreholes to intersect the lode 420ft from the surface, that is about 150ft below the Main Level.*

*The Main Shaft is down over 110ft and at 90ft a cross-cut out into the Hanging-Wall exposed the lode with very favourable results. We are sinking down to 140ft with all dispatch, and to cross-cut into the lode again, when our Engineers are of the opinion Sulphide ore will be reached and suitable also for the manufacture of Sulphuric Acid. In other words we can expect to reach actual production from Sulphide ores at quite an early date.*

*The Main Level is being driven from the valley below and to be continued through the hill. Owing to height of the hill (rising over 500ft) above our Main Level, an immense tonnage should be obtained from this Level alone, to say nothing of values from many hundred feet below the Main Level.*

*The Boring is to be undertaken now in order to prove values below the Main Level and to indicate quickest and cheapest method of attacking the lode at depth.*

*A local colliery proprietor - himself a fully certificated Mining Engineer with many years practical mining experience in our neighbourhood also gives us much assistance. The survey plan he had prepared for us shows that this copper lode has already been proved for about 1000 yards. He is also of the opinion ours is the Master Lode of the district and of no small value. Further, that under the Barytes valuable copper will be found running East-West and intersecting our North-South lode as indicated in photo No.7.*

*Outside our Northern boundary and on our Northern extension, level headed businessmen are opening up the same lode [is this Huglith?] and spending capital like water in mining operations upon a big scale and in installing costly and large plant.*

*Our results obtained to date involve an expenditure of about only £4,000 provided by local, Yorkshire, London and South of England friends, including Lord Kenyon, director of the L. & N.W. Rly Co and other equally influential gentlemen.*

*As our Engineers indicate we should undertake Boring operations and generally accelerate our work, we are now raising further funds. Seeing we can confidentially anticipate a quite reasonably and satisfactory early return, your friends need have no hesitation whatever as to interesting themselves in our company.*

*Yours sincerely*

*P.S. Have just started a contractor on the Main Shaft. I hope to run it down very quickly -I think we may be able to make the 2nd cross-cut into the lode before Xmas, when its more than likely production will follow quite reasonably soon afterwards."*

The typed letter is not signed unfortunately and appears to be an office copy retained by the company. At some later date, it has been overwritten in ink "Mrs H A Ransome Private & Confidential". Attached to the letter is a further sheet.

*"During the month of July it became necessary to approach the Ministry of Munitions for Permits to purchase materials for working; the Department before granting this required to be satisfied that the prospects of the Company would warrant the grant of such permission, and asked that a Report from some approved Mining Engineer should be obtained. The name of Messrs Hooper, Speak & Co, of London Wall Buildings, was submitted and accepted by the Department and Mr Speak visited the mine on July 18th and 19th. Mr Speak furnished an exhaustive and satisfactory report.*

*Subsequent working rendered it advisable to send new samples to Mr Speak, on receipt of which he writes in favourable terms, the following being extracts.*

*'These samples are decidedly encouraging, for the amount of pyritic matter they contain is almost a sure indication that you are nearly down to a depth where the ore-body will exist in a more massive condition. The sulphides are coming in earlier than we anticipated, and we feel fairly sure that if you carry down the shaft a further 50ft and crosscut again you will then obtain satisfactory results ... We consider it highly probable that about 50ft deeper will reach the limits of surface oxidation, and the ore-body will then show something of interest to sulphuric acid makers ... we certainly consider that you have an excellent prospect of discovering a valuable ore-body at a small cost ... When our expectations are great, as in the present instance, we can strongly recommend the spending of the necessary money, properly to test the ore-body. It is a speculation with excellent prospects, there are chances of great reward ... We have no hesitation whatever in stating that the prospects fully warrant the work we have recommended.'*

*Have executed about half of the 50ft required and, having a contractor now, the balance footage cannot take long.*

*P.S. (NOTE) The manufacture of Sulphuric Acid is a bye-product, and by so removing the Sulphur, the ore is then in a more satisfactory condition for extraction of the Copper."*

We don't know if the Reverend Walker and friends were tempted to help finance the scheme but the whole operation closed the following year. By that time, the shaft had presumably been sunk to the required level but it would seem that the "bonanza" was

not forthcoming. It is interesting to note the use of sulphide minerals in the production of sulphuric acid. The latter was used in making munitions and, during the First World War, the country obviously needed as much as possible. The note in the report seems to indicate that the ore was treated to produce sulphuric acid before copper extraction began. If so, this might well have been on site but it is not known what apparatus would have been used.

The photos are a useful insight of a mine in the process of being equipped. The Main Level has rails and a wooden door and, if it reached the shaft, would have been ½ mile long. The accompanying plan shows that it was north of the Pulverbatch - Bishops Castle road and this would place it approximately at NGR SJ409011. The main shaft was apparently on the site of an earlier adit and was being equipped when the photos were taken. The headgear had a single pulley wheel and it was enclosed within a corrugated iron building. The survey actually shows two parallel and adjacent shafts but it is not clear from the photos if both these were in the building. Nearby was the winding engine which was a steam winch, possibly off a trawler. The boiler was upright and all of these were enclosed in another corrugated iron building.

Ore appears to have been wound up the shaft in a kibble which was placed on a flat wagon and wheeled on rails out of the shaft top building. Just outside, the kibble was upturned and ore fell down a shoot onto a platform below. Here it was treated on washing and grading tables, water coming from a large mine reservoir. Other buildings on site included an orehouse, cabin and offices. One of the photos shows the morning shift and the miners have very basic equipment. The standard method of dress was a flannel shirt, waistcoat, thick trousers, clogs and a flat cap. There is even a photo of the managing director in the company's Ford car, suitably dressed in a straw boater!

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