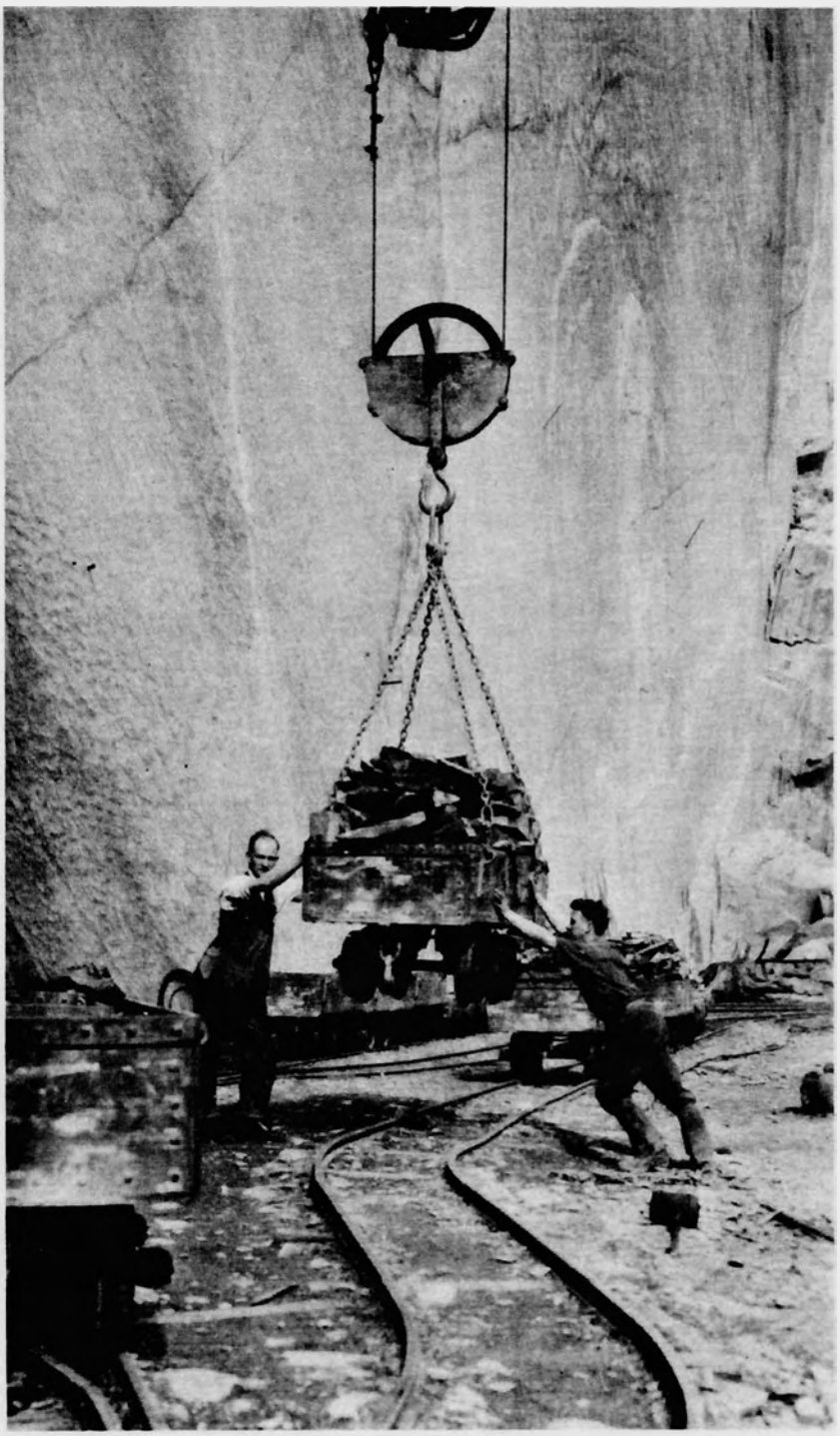
CUMBRIA AMENITY TRUST MINING HISTORY SOCIETY

The Newsletter

No.52

January 1998



COVER - HODGE CLOSE QUARRY CONISTON

The date is March 1936 and Percy Rawes (left) and an assistant manoeuvre a slate tub into position as it is being lowered by the Blondin cableway onto the track. The tub has been hoisted from a lower part of the quarry to the right.

Tubs loaded with slate would then be taken through a tunnel to the adjoining Parrock workings and out via the Parrock incline.

Percy was Forman at the Quarry for a number of years and when he left he took over the Cartmel Village Bakery which he ran with considerable success until he retired.

Alastair Cameron

CONTENTS

EDITORIAL

Many thanks to all those who have sent in material for the newsletter its nice to be in a position to have more material than I need for an issue so apologies to Ian Matheson and Billy Griffin whose material has been held over until next time.

Special thanks to those members who are now submitting material on disc this is a greet help. To assist me in inputting your contribution please could you submit it in one of the following formats :-

Microsoft Word 6.0
Microsoft Works 2.0
TXT

if you are not a computer Wizard and you don't think you have any of the above you can save as TXT simply by scrolling down the list of options available when you get the "save as" menu come up on the screen. If in doubt give me a ring. If you are not using Microsoft Word 6.0 or an earlier version of Word please do not include tables and other "fancy bits" such as odd fonts sub or superscripts etc.

My thanks goes to Karen Beer and Dave McAnelly for the Hudgill advert !

MEMBERSHIP NEWS

We warmly welcome Stewart & Moyra Holme from Norfolk to our ranks.

A number of people have recently moved house and their new details are as follows :-

Mark Simpson & Faimily
Rantree Farm
Keasden
Clapham
North Yorks
LA2 8EZ

015242 51426

Jon & Kate Knowles
46 Dukewood Road
Clayton West
Huddersfield
West Yorkshire
HD8 9HF

01484 860662

Sheila Barker
The Rise
Alston
Cumbria

01434 381903

HOW OLD ?

There seems to be much confusion over how old CAT actually is ! After the editorial in the last newsletter the person who gave me the information said that all was not what it seemed and maybe our 20th birthday was a little premature. Candidates for giving the wrong information include Sheila Barker, Mark Simpson and Peter Fleming. They all look old enough to have been about at the time to me.

Peter Fleming has produced written evidence that CAT was formed on Tuesday 9th October 1979 at Old Stainton Hall. By my maths this makes CAT 18 years old so put your party frock back in the cupboard for a while.

Ed.

FOR SALE

Three spare candles, surplus to requirements. Apply to Sheila Barker.

SINNERS LIST

This months contenders are :-

Tilberthwaite -	Alastair Cameron
Old Man -	Alastair Cameron
Grand Furness Tour -	Paul Timewell
Nenthead -	Sheila Barker ?

DOCTOR DESCENDER

Dear Doctor

I am having a bit of trouble with my maths. I thought I could count to 20 or possibly 21 but I can really only manage 18.

Anon, The Committee

EXPLORATION

Don't forget this meet which takes place over the weekend of 17th & 18th January. See the last newsletter for full details.

Jon Knowles

COMMENT

What follows is not written as a personal criticism of those involved but as a means to increase awareness and discussion on how we can continue to be a safe club.

On Sunday 19th October a large party consisting of members of CAT, BMSC, and PDMHS were taken through the Greenside Mine. Whilst all exited safely I strongly believe that the majority of the people present were not competent at the grade of the meet - S-Severe which is defined as :-

Long or awkward SRT pitches, false floors and unstable (or serious) ground may be encountered.

Whilst there is a good case for arguing that the correct grade for the meet should have been D a large number of those present would not have been competent at that grade either.

I am personally aware of the following having taken place on the meet :-

- People without sit harnesses. There is one abseil pitch and one which is safest to descend by abseiling.
- People with no experience of abseiling.
- People with poor lights. In one instance I remember standing at the top of a 60' ladder pitch seeing my light being brighter at the bottom than a lad who was already down there !

As I see it the things we need to do in future are as follows :-

Limit numbers on difficult trips, particularly when those attending are not known to us. It is easy to take one or two beginners in an experienced group.

Make leaders of visiting clubs ensure that all their members understand the grade and have the experience and equipment required. Before they come on the meet.

All of us need to be prepared to take that difficult decision of telling people who are poorly equipped or inexperienced that they can't come. A leader of a group that exceeds 40 people cannot check everybody and we should not criticise a meet leader for failing to do things that we could have done ourselves.

Jon Knowles

GREENSIDE MEET 19.10.97.

I have never led a meet before. Like Baldrick I had a cunning plan. I had prepared thirty tally discs, number stamped and held on a karabiner. I had also printed forms for everyone to sign to enable us to keep a record of just who was in the Mine.

I arrived at Glenridding early, wandered over to Sharman`s for a can of orange juice, ignorant of what was brewing at Greenside.

Meets secretary John Davies had asked PDMHS and CATMHS to meet at the Glenridding car park. While talking to John and others it suddenly occurred to me that one or two others may have slipped through and gone straight up to Greenside. I left John to walk up with the rest of the group while I drove up to greet the one or two that may have gone on ahead.

Shock can affect people in different ways! There was a large throng of people blocking up the car park. I assumed they were walkers until I spotted their helmets, sit harnesses, caving suits etc. Must be about thirty here alone, I mused. " Have you got some sort of a system?" asked Peter Fleming ."I did have." I replied nervously, "I am not sure that it is adequate for this number of people though. "I exclaimed, quickly discarding the karabiner holding the discs. Another quick count and it was starting to look more like fifty people eagerly awaiting my leadership. The other unknown which was weighing heavily on my mind was how many more had joined the group in the bottom car park?

By now it was 10.15 and I had just had that look of incredulity from Warren Allison, with that familiar side to side head movement. I must get things moving, I thought to myself. Warren was one of those I had hand picked along with Peter Sedgewicke and Colin Woollard who were amongst some of those responsible for the opening of the Lucy Tongue level after many years of hard digging and who also have an intimate knowledge of the Mine and a fair knowledge about the history of the place. They were going to lead the small groups of people through the mine. By now I was casting my eye around for other potential group leaders.

I got the first group away quickly after they had signed their form. This form was to help establish that nobody was left in the mine at the end of the trip. This group was made up of CAT and BMSC members led by the very capable and youthful looking (when you consider his age) Peter Sedgewicke. This strong group of nine would put in place the ropes on the weaker ladder sections and below the boulder where the old and dangerous ladders had in fact been removed, awaiting their replacement in the near future (much work needed to be done here).

Things were starting to fall neatly into place. Groups had formed, signatures taken, each person then knew the number of the group in which he/she was, who their group leader was and the time at which they were expected to be at the Glencoyne Level entrance.

COMRU appeared on the scene with the arrival of the Ambulance driven by Paul Timewell. This could have put the wind up the Park Ranger had he been around. Paul Witheridge, Mike Mitchell and Clive Barrow entered the Mine via the Lucy Tongue Level with the last group to leave the car park, myself included. My mission was to reach the bottom of the ladderway and prussick up to the boulder on the rope we had left in while carrying out work on the ladders a few months earlier. There was no sign of the first group and so I continued on up the ladders until I reached the Alma Level. This seemed like the right moment for lunch. After what must have been about half an hour, the first group arrived with John Davies leading. We went down to the boulder and rigged the pitch with the rope that John had brought in.

Nightmares are made of what was about to follow. Two of this first group made their descent to the Lucy Level where they had been instructed to await their leader. The next gentleman was lacking the basic rudiments of SRT, was poorly equipped, lamp nearly out, and it was clear he did not hear my words of caution in the car park with a clear warning of what lay ahead. What do you say to someone when they hold out their figure of eight and ask "What do I do with this?" (could Dr. Descender have removed it, I ask?) with over one hundred feet of what I would describe as a difficult first time abseil due to the delicate nature of the timber staging, boulders, loose rock and various steel pipes and rail hanging off the walls. Luckily I had around me two very experienced practitioners in the art of SRT Jon Knowles and Ian Matheson. Between us we assisted him in a safe descent. I followed the first group to the bottom of the ladderway who then moved off to explore the Lucy Tongue level.

I was pleased to see the faces of COMRU at the foot of the shaft, all lending a great deal of support and being there just in case anything should go wrong. Mike Mitchell and I positioned ourselves at the top of the first ladder, providing guidance to those who were not familiar with the surroundings. Most people made their descent without incident. There was a slight problem with the last couple of groups catching up with the group in front. With hindsight I should have extended the gap between the last two or even three groups. I do apologise to those who were kept hanging around. One slightly amusing little incident that took place, amusing to Mike and myself but probably not to the unfortunate gentleman who was kindly de-rigging the pitch at the time. Muffled shrieks mingled with profuse cursing gave us

cause for concern. He was some thirty feet above us and unable to explain his predicament to us. A few more minutes and a few more groans, then we heard "I am going to have to cut it off!" "Cut what off." shouted Mike with some concern in his voice. "My ponytail ." came back the strained reply "It's caught up in my descender!" Moments later he was down and standing at the top of the last ladder with us showing us his tattered ponytail. "That was extremely painful." he said. We tried to appear concerned but the laughter broke through. With a sense of relief that everyone was down safely and an awareness that time was pressing, we pushed on down the final ladder and started the long walk out to day (night), stopping briefly to look at some of the more interesting features of the mine and the extensive work done to open up the level.

A quarter to eight and the lid was finally slammed shut on this momentous through trip. A quick check of the forms in the file left at the exit from the Lucy Tongue confirmed that everyone had signed out. With that we returned to the car park. A brief discussion took place before leaving and one of the topics was about the folly of such a large number of people through this mine. "Never again!" was the cry. We should ensure that this should never be repeated.

It was on Sunday 8th December 1996 that the break through was made on the final collapse in the Lucy Tongue Level. Since then the LDSPB have expressed concern about the numbers that could visit this mine, now that it has been made more accessible. Behind the scene discussions with "The Board" by John Davies and Peter Fleming deserve our heartfelt thanks and gratitude for handling the negotiations to allow this trip to go ahead.

My thanks go to all those who led the groups with such efficiency :- Peter Sedgewicke, Warren Allison, Peter Fleming, Colin Woollard and Mark Scott.

Thanks must also go to all those from COMRU :- Mike Mitchell, Paul Timewell, Clive Barrow and Paul Witheridge.

John Brown

A COMPARISON OF RADON MEASUREMENTS

In view of the continued interest in the risks of exposure to radon, measurements relevant to CAT's activities are given here and compared with current safety recommendations. The National Radiological Protection Board has issued advice on the limitation to radon exposure during recreational pursuits and this is covered by Jon in CAT Newsletter No 45. Previously the safety levels for mine workers laid down by the Health and Safety Executive according to the 1985 Ionising Radiation's Regulations were reported in CAT Newsletter No 21. In September 1996 the NCA published a set of guidelines for caving and mine exploration in consultation with the HSE and the NRPB entitled 'Radon Underground' which is reviewed by Jon in CAT Newsletter No 49. In the last Newsletter Ken Geddes drew attention to a recent article in 'Chemistry in Britain' which explains the basic mechanism in some detail and points to high radon levels found in some limestone caves.

Briefly, damage can be caused to lung tissue by the solid alpha-active daughter products from the decay of radon isotopes, the main contributor being Rn222. Being in an ionised state the daughter product atoms attach themselves to particles of dust or smoke or to water droplets in the mine atmosphere which may then be inhaled and a fraction retained in the lungs. Rn222 has a half-life of 3.8 days and is maintained at an equilibrium level in the mine atmosphere, governed by the balance between its rate of release from the rock walls, its decay rate, and its rate of removal by venting. Although Rn222 itself is an alpha emitter, being an inert gas it is not retained in the lungs and is relatively unimportant. By far the most damaging nuclides are its solid alpha-emitting decay products such as Po218 and the Bi214/Po214 pair which have half-lives of several minutes. Pb210 further down the chain with a half-life of 10.4 years would be expected to produce damage at a much slower rate over a much longer period after inhalation.

Three sets of radon measurements are considered here.

1. In October 1988 radon levels were measured in Coniston mine on our behalf by members of the Wirksworth Mines Research Group and are reported in CAT Newsletter No

22. Force Crag mine and Greenside mine were also included in the survey.

2. In connection with NW Water's efforts at Paddy End to seal off Woodend's Level with concrete their surveyors measured radon levels in that part of the mine in October 1996.

3. The radon exposure accumulated by a party of CAT members during a week's exploration of 9 Cornish mines in September 1995 was measured using a track etch detector, which is a simple form of dosimeter, worn by one of the party (see Jon's article in Newsletter No 45). The dosimeter was provided by the National Radiological Protection Board who analysed the results.

To compare these measurements some conversion is necessary as different units were reported in each case. The first measurements were air levels of the radon daughter products expressed in Working Levels, the second were dose rates received from the daughter products in micro-Sieverts per hour, and the third were integrated radon concentrations in air in Becquerels per cubic metre hours. The first and third units are described in Newsletter No 45. All three are compared in the Appendix to this article.

The NRPB advisory limit for recreational pursuits(1) is expressed as an integrated radon exposure per year of $1x10^6$ Bq $m^{-3}h$ which can be compared directly with the track etch detector results. This limit is roughly equivalent to an annual dose of 1 Working Level Month (WLM) or 10 milli-Sieverts (mSv). In these calculations the conversion 1 WLM = $1.26.10^6$ Bq $m^{-3}h$ = 10.4 mSv is used (see Appendix).

By comparison, for homes the NRPB recommend a radon level of 200 Bq m^{-3} above which action should be taken (2). The NRPB equate this to an annual dose of about 10 mSv, which implies about 60% of the year spent indoors.

Having myself clocked up 30 years at Sellafield I was also interested to see how the underground radon exposures compare with the HSE limits for a working environment which are somewhat different. The occupational annual dose limits specified in the 1985 Ionising Radiation's Regulations are given in Table I together with Working Levels. The annual dose limit of 5 mS for non-employees is about one half of the NRPB advisory limit for recreational pursuits whereas the maximum permitted annual dose for employees is 5 times the NRPB limit. (For extended periods of exposure these occupational limits have since been revised downwards according to the Health and Safety Commission's recommendations given in the footnotes to the Table.)

The results of the radon measurements are presented in Table II where they are converted to comparable units. Only maximum values are given for Force Crag and Greenside as the measured levels in those mines were very low (the full results can be found in CAT Newsletter No 22).

Comparing these measured values with the NRPB annual recreational limit of 1.10^6 Bqm^{-3}h the highest measurements at Force Crag and Greenside would allow just over 1000 hours of exploration per year. When the Working Levels are compared with the occupational limits in Table I they barely justify 'controlled area' status. The levels of radon recorded in 1988 at Coniston in Grey Crag Level would allow about 700 hours of exploration per year and for mine employees this would be classified as a 'controlled area'. The radon in Deep Level at the end of Shaw's cross-cut was below the limit of detection. The highest level measured in these mines (i.e. 0.2 WL in Grey Crag Level) is equivalent to a radon concentration of 1484 Bq m^{-3}.

The NW Water surveyors in October 1996 recorded a dose rate of between 100 and 150 micro-Sieverts per hour in the vicinity of Woodend's Level at Paddy End which is equivalent to an annual dose of up to 1314 mSv assuming continuous exposure or an annual working dose (based on 170 hours per month) of up to 29.4 WLM. According to the NRPB recreational criterion this would allow only 55 hours of exploration per year at the highest radon level and full time mine workers in this area would receive up to 6 times the permitted annual occupational dose of 4.8 WLM. The fact that the highest radon level here was well over 10 times that recorded in Grey Crag Level possibly reflects the lack of ventilation at the Woodend shaft. The highest level measured is equivalent to a radon concentration of just over 18000 Bq m-3.

The Cornish results gave an effective accumulated dose of about 1.1 mSv received during the 20 hours underground which is equivalent to an annual dose of 488 mSv (integrated radon exposure of $5.91.10^7$ Bq m^{-}

^{3}h) assuming continuous exposure, or an annual working dose of 10.9 WLM. This would allow about 150 hours of exploration per year (though some mines of course will have higher radon levels than others - see Newsletter No 45) and is over twice the permitted annual dose for mine employees. The average measured radon concentration was 6750 Bq m-3.

These measurements should only be taken as an indication of the dose rates likely to be encountered at these underground sites. For instance the rate of radon release into the mine atmosphere is, as for other mine gases such as CO_2, dependent on changes in the barometric pressure and is likely to peak after a sudden drop in pressure. The degree of ventilation is another important factor. This varies with the seasons and may be negligible in blind headings and shafts or in sumps, the latter being of particular concern as radon is almost 8 times heavier than air. Furthermore when the humidity is high water droplets will act as additional carriers for the daughter products.

In limestone areas higher radon levels may be encountered. For example radon concentrations in North Pennine caves of up to 27136 Bq m^{-3} have been measured and can reach even higher levels in the Peak District (see Table below of radon measurements in caves(3) and Ken's article in Newsletter No 51).

	Radon Concentrations Bq m^{-3}		
Region	Mean	Min	Max
Portland	454	10	974
North Pennines	1116	14	27136
Mendip Hills	1129	99	3621
South Wales	2601	127	19968
Peak District	8258	9	46080

The health risks arising from exposure to radon are cumulative and as most annual dose limits quoted here allow for repeated exposure over a period of years one would expect the risks incurred by a single visit to any of the areas considered here to be very small. In 1993 the International Commission on Radiological Protection derived a risk relationship of 0.056 chance of death per Sievert(4). According to this figure a person spending one hour in the highest radon levels measured at Woodend's Level would have a 1 in 120,000 chance of subsequently dying from lung cancer as a result of the radon exposure received. We have been told that more recent measurements at Woodend's Level made in September of this year by lowering an instrument down one of the boreholes gave lower readings, so the above figures may not be typical.

As further evidence becomes available estimates of the risks are liable to be updated. For instance in 1990 the ICRP advised a reduction from 5 mSv to 1 mSv in the annual dose limit for non-employees(5). A year ago this was still awaiting an EU Directive and had not been incorporated into UK legislation though the Health and Safety Commission now recommend this reduction for long periods of exposure (see Table I footnote 2)

To put things into perspective, according to NRPB figures the annual recreational radon dose limit is little more than the increase in annual body dose that one would expect to receive from natural radiation if one moved from Cumbria to Cornwall to live (6) (see Fig 1). Nevertheless it is clear that high levels of radon may be encountered underground from time to time and anyone who makes regular trips underground and feels that they should be monitoring their radon exposure should contact Jon Knowles for details regarding dosimeters.

APPENDIX

The Sievert

The most direct way of expressing the damage potential of exposure to radon is in terms of the irradiation dose received from the daughter products. This is related directly to the energy absorbed, the old unit being the Radiation Absorbed Dose (Rad) which is equal to 100 ergs absorbed per gram of tissue. To allow for the biological effectiveness of the particular type of irradiation the absorbed dose is multiplied by a factor to produce a unit of exposure called the Rem. For beta-gamma radiation the factor is unity but for the more harmful alpha radiation's a factor of 10 is used so that for alpha-decay 1 Rem = 10 Rad. The Rem has now been replaced by the Sievert, where 1 Sv = 100 Rem. The Sievert (or in more practical terms the milli-Sievert (mSv)) is a general unit of irradiation dose.

The Working Level Month

For mine workers more practical units specifically derived for exposure to radon are

the Working Level Hour (WLH) and the Working Level Month (WLM), where 1 WLM = 170 WLH on the assumption that a working month is equivalent to 170 hours spent underground. These units relate to a level of total alpha energy ultimately emitted by the short-lived decay products of Rn222 called the Working Level (WL) where 1 WL is defined as $1.3.10^5$ Mev (or 208 ergs) of energy per cubic metre of air. The Working Level is in effect an air concentration of the short-lived decay products but when associated with an exposure time it becomes a unit of accumulated dose, e.g. the Working Level Month. According to the Ionising Radiation's Regulations 1 WLM is equivalent to 10.4 mSv.

Radon concentration

A less direct way of expressing the damage potential of exposure to radon is in terms of the radon concentration itself, which is measured as a decay rate or number of disintegration's of radon per second (dps). The old unit for decay rate is the Curie but this has now been replaced by the Becquerel where 1 Bq = 1 dps, and the radon concentration in air is expressed in Becquerels per cubic metre. Calculating received dose from the radon concentration involves an equilibrium factor between radon and its daughter products which can vary. A 1994 assessment by the NRPB(7) using an equilibrium factor of 0.5 equated 1 WLM to a time integrated radon exposure of 144 Becquerels per cubic metre years (Bq m^{-3} y) or $1.26.10^6$ Bq m^{-3}h, which is the exposure experienced by someone breathing air with a radon concentration of 144 Bq m^{-3} for a whole year. This conversion factor has been used in Table II.

REFERENCES

1. Kendall, G M 1995. 'Limiting radon exposure in caves and abandoned mines'. NRPB Radiation Protection Bulletin 165, 16-17.

2. NRPB 1990. 'Human exposure to radon in homes'. Doc NRPB, 1, No 1, 17-32.

3. Hyland, R Q T 1995. 'Spatial and temporal variations of radon and radon daughter concentrations within limestone caves'. Unpublished PhD Thesis, University of Huddersfield.

4. International Commission on Radiological Protection 1993. 'Protection against Radon 222 at home and at work'. ICRP 65, Annals of the ICRP, 23, No 2.

5. International Commission on Radiological Protection 1991. '1990 recommendations of the ICRP'. ICRP 60, Annals of the ICRP, 21, Nos 1-3.

6. Hughes, J S and O'Riordan, M C 1993. 'Radiation exposure of the UK population - 1993 Review'. NRPB R-263.

7. Kendall, G M et al 1994. 'Exposure to radon in UK dwellings'. NRPB R-272.

Dave Bridge
1/10/97

TABLE I IRR 1985 Occupational Dose Limits

		Annual Dose mSv	WLM	Air Concentration WL
Controlled Area	Dose limit for employees	50	4.8 (4.0)	0.4 (0.33)
Supervised Area		15	1.44 (1.2)	0.12 (0.1)
	Dose limit for other persons	5	0.48 (0.4)	0.04 (0.03)
Approx NRPB recreational dose limit (for comparison)		10	1.0	0.83

NB

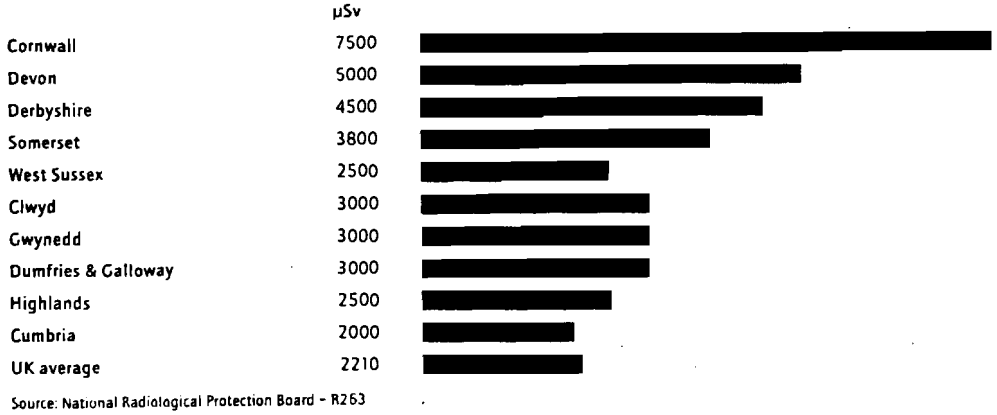
1. In addition the Health and Safety Commission now recommend that the maximum annual dose for employees should not exceed 75 mSv over a period of 5 years (ie an average dose of 15 mSv per year)

2. In addition the HSC now recommend that the average exposure for any other person over a lifetime (taken to be 70 years) must not exceed 1 mSv.

3. The reduced values in brackets take account of associated ionising radiation not detected by instruments measuring Working Levels.

Figure 1

Average annual doses (approx.) from natural radiation in certain areas of the UK/Expressed in microsieverts (μSv)



Source: National Radiological Protection Board - R263

TABLE II

TABLE II Results of Radon Measurements

		Measured values			Derived values			
		Integr Radon Conc	Dose Rate	Air Conc	Radon Conc	Annual Int Rn	Annual Dose*	
		$Bqm^{-3}h$	micro Svh^{-1}	WL	Bqm^{-3}	$Bqm^{-3}h$	mSv	WLM
October 1988 Survey								
Force Crag (max) '0' Level				**0.13**	965	$8.45.10^6$	70	1.6
Greenside (max)	Blind X-cut in Low Horse Level			**0.13**	965	$8.45.10^6$	70	1.6
Coniston								
Grey Crag Level	Brimfell X-cut			**0.2**	1484	$1.30.10^7$	107	2.4
	Belman Hole Vein			**0.19**	1410	$1.30.10^7$	102	2.4
	Paddy End Old Vn			**0.19**	1410	$1.23.10^7$	102	2.3
Deep Level	End of N X-cut			**ND**	-	-	-	-
Paddy End (Oct 96)								
Woodend's Level (min)			**100**		12110	$1.06.10^8$	876	19.6
	(max)		**150**		18160	$1.59.10^8$	1314	29.4
Cornish Mines (Sept 95)								
	20 h accum dose	**$0.135.10^6$**			6750	$5.91.10^7$	488	10.9

* mSv based on continuous exposure for 1 year which is approx 4 times that for a working year. WLM based on a working year (assumes a working month of 170 hours).

MEET REPORT - RED DELL 27.8.97 & 10.9.97

The purpose of this meet was to rebuild the collapsed half of the stone arching which passes under the lower section of the Triddle incline and forms part of the leat (circa 1760) and carried water from Red Dell Beck to the New Engine Shaft waterwheel (after 1850).

It was necessary to obtain scheduled monument consent for this work from English Heritage. We are fortunate that the Lake District National Park Authority, through John Hodgson their archaeologist, granted us £80 expenses to purchase the timber required to construct the arch profile/former.

It was evident from the start that an evening meeting in late August would not allow us to do very much before it got dark at 8.30 p.m. There was a good turn out of nine members, in addition SISIS, our automated traction unit was brought out of retirement after its sterling work at Logan Beck mine some years ago. It was intended to use this to carry the timber as far as possible up to Red Dell. However the machine had a mind of its own and refused to respond to coaxing. It gave up well short of the intended destination and the timber was therefore off-loaded, man-handled up to the site and concealed just as darkness fell.

Our in-house craftsman/joiner, Marl Simpson, spent most of Friday 29th constructing the wooden arch former. Special thanks are given to Mark for this work.

For the second of the two scheduled evening meets, on 10th September, we had again nine members. Construction was started and after one or two false starts the stone arching began to take shape. We worked until darkness fell again, and it was agreed to return and finish the job on Saturday 13th September.

Seven members arrived in the afternoon and work commenced. By about 4.00 p.m. the stonework was complete. We then began to remove the wooden supports and held our breath. All was well. the stonework stayed put. The top of the arching was turfed to finish off and the site tidied up. We left it looking as if it had been there for a hundred years, but cannot guarantee it will last the next hundred !

Thanks to all who saw the project through.

Peter Fleming

THE OPENING OF THE LUCY LEVEL - THE EARLY DAYS

In November 1996, a combined team of devout CATMHS and MOLES members became the first people to walk the length of the Lucy Tongue adit since it was sealed on the closure of Greenside mine in 1962. The project had taken the best part of four years, during which time, sadly, both groups have lost dedicated members who were present at the early meets leading to the opening of the adit.

These notes are an attempt to place on record the sequence of events prior to the commencement of the internal digs and major construction work within the level.

Work began on November 8 th. 1992, when having received approval and undeterred by stories of a 10 feet thick concrete wall having been built to seal the adit, those present located the original brick lined entrance and began to clear the rubble in an attempt to locate the sole of the level. Eventually, after much effort and little progress, it was agreed that entry through the roof of the level, 20 feet beyond the entrance, would be an easier option and could, with luck, bypass the concrete wall.

After a sustained dig where it was assumed that the level entered the bed rock, the sound of rocks falling into water boosted morale and entry via a small hole was achieved. On squeezing into the level, it was found to be knee deep in water, with the previously abandoned collapse outbye, and inbye - a concrete wall. Examination of the wall revealed that it had been constructed using beck stones of various sizes embedded in a matrix of mortar, probably a mixture of mill fines and cement.

To allow water to drain from the level, 3 inch diameter pipes had been embedded in the wall during its construction, 12, in two rows, within the lower half section, and 3 approximately 1 ft below the roof of the level. From the rate of flow, it was clear that the majority of the lower pipes were either totally or partially blocked, and since there was a flow through one of the upper three, the water inbye of the wall was estimated to have

a depth of at least 5 ft . From these, the water flowed a short distance along the level before entering a further set of larger diameter pipes buried in the sole. These, outbye of the level mouth, fed an external, underground chamber and conduit system which discharged into Swart beck.

In preparation for further work, all pipes were cleared using a set of drain rods, and the level left to drain. On returning a week later, water from inbye of the wall was flowing through the lower pipes only, and the depth in the entrance chamber had reduced due to the improved flow out to Swart beck. This made working conditions somewhat easier, so, as some of the party concentrated on further reducing the water level and securing the entrance, others began to attack the concrete wall using hammer and chisel or Mike's Kango hammers supplied from a generator on the surface. In the usual democratic manner, or possibly because the majority of those present were right handed, it was agreed that efforts should be concentrated on the upper right hand corner which was pierced by one of the upper three pipes.

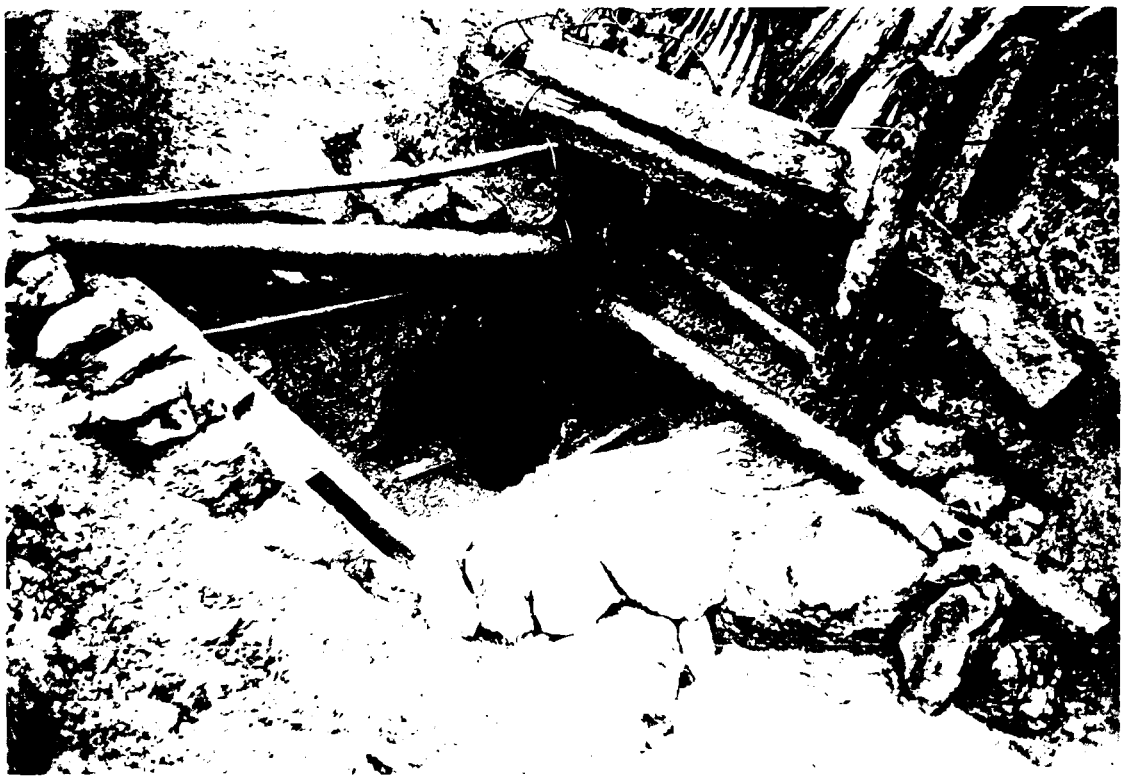
Progress was slow and noisy. Chisels bounced off the rounded beck stones and the mortar was unbelievably hard, but it was soon found that use could be made of the small gaps formed as the concrete had slumped away from the level roof and the upper pipes before it had set. By late afternoon, with frequent shift changes, and numerous bruised wrists, a cavity approximately 1 ft deep had been excavated in the vicinity of one pipe.

Repeated hammering of the pipe assisted in removing material, and eventually, as effort began to wane with members disappearing for tea and scones, someone noticed that the pipe could be moved longitudinally within the wall. This led to a renewed effort and implied that the thickness of 10 ft could be an exaggeration. Within half an hour, the pipe had been removed and the true thickness of the wall, approximately 4 ft, revealed. At the subsequent meet, the hole was soon enlarged sufficiently for the party to crawl through into the level where the water was thigh deep with a surface layer of rotting timber.

As they began to wade up the level, the group came to an abrupt halt when, after about 10 ft, they encountered a second, submerged, wall presumably built to hold back the water while the concrete of the main wall set. On walking along the level, three further rubble dams and several minor roof falls were encountered prior to progress being halted by the first of the major collapses approximately 800 yards from the entrance. Numbers painted on the walls indicated the survey stations, and at 230 yards a short drive to the left led to a blind heading.

The Lucy Tongue vein, along which this section of level was driven, contained cavities with signs of mineralization, and, in several areas had been stoped away and replaced by deads supported on a roof of rails and timber. Sleepers were still in place, and the remains of insulators used to support the overhead conductors for the loco, prior to its conversion to battery power, were screwed into wooden pegs driven into the level roof. At the region of the final collapse, the level had brick walls supporting a roof of rails and timber as it entered the clay vein which the miners were to follow as a means of speeding up progress to the Greenside vein beyond, and along which, three further collapses were to test the ingenuity and stamina of the team which ultimately reached Smith's shaft in November 1996.

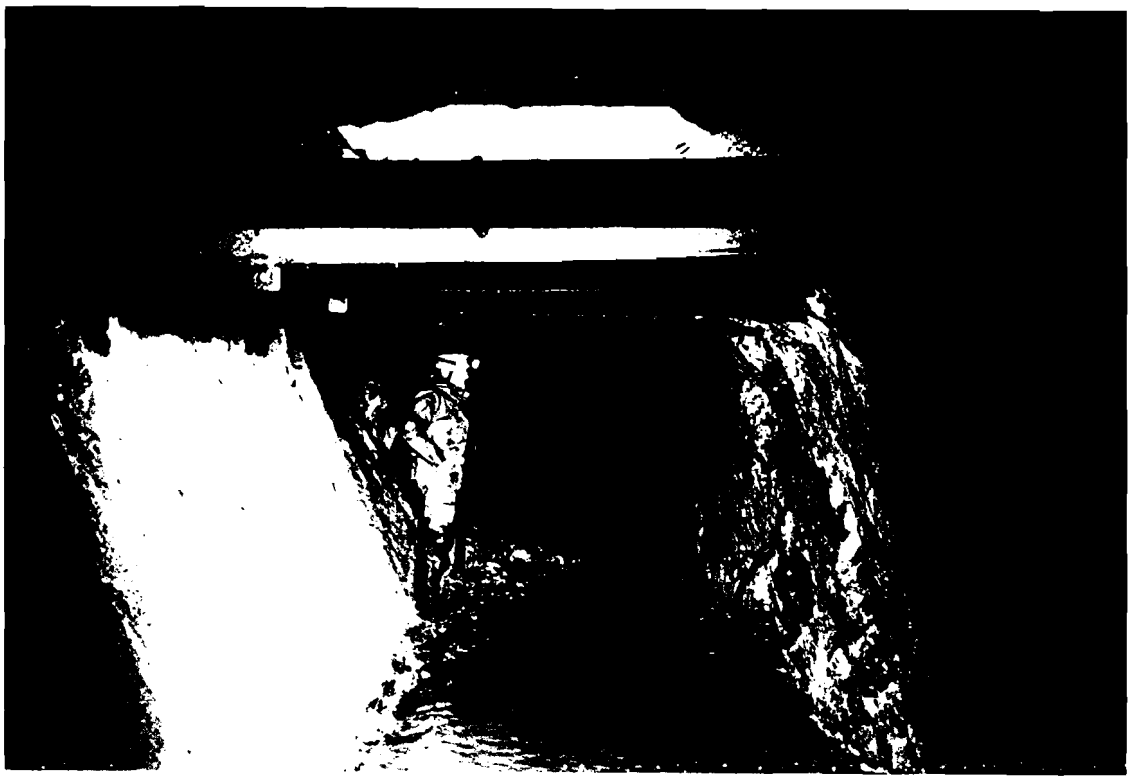
Clive Barrow



The entrance during the early stages of the project

Attacking the concrete wall

The concrete wall from the inbye side



A section of level with rails supporting the roof

CONISTON COPPER MINES MEET REORT 30.11.97

I had been looking forward to a Coniston meet (that would not coincide with work) which would give me the opportunity to explore parts of the mine that I had not yet been to, so the above sounded just the ticket.

Leaving the B&B in Keswick bright and early, I arrived at the hut at 9 o'clock. the next hour passed with many vehicles coming and going but without any sign of a CAT member until finally I was relieved to see Mike Mitchell arrive.

Whilst heading for the warmth of the hut he proceeded to inform me that it seemed no one else would be coming due to a mix of circumstances ranging from illness through to DIY vehicle mechanics that ended in failure ! (at least it goes fast now - Ed), Hudgill was also mentioned.

Yet another hour passed and with no further mortals joining us we put together plan B. Mike suggested a tour of the top level extension which I happily agreed to as I had not been to this area of the mine and I was pleased at the prospect of having the chance to photograph many artefacts that could be seen in this area.

The slog up to Levers Water was made easier thanks to Mike's interesting accounts of the early days of discovery at Coniston. On reaching the shore we looked at the bore pipes which the water authority had sunk into woodends level.

Once we were in and over MAGS catwalk, Mike proceeded to explain more of CATS earlier triumphs as well as a few horror stories ! I went on to photograph the ore tub, the wooden air pipes, earthquake passage and the jackroll, all with Mikes grateful assistance. Taking a moment to look down the cobalt passage it became apparent that someone had removed the pink "bloom" on the walls as only a trace could be found. Before returning to surface we took a detour up to Woodends Level where for the first and probably the last time I was able to see the oak plug. Also the previously mentioned bore holes could be seen.

It was mid-afternoon by the time we descended back to the hut and set off for home. Many thanks again to Mike for a very informative tour. Perhaps a chance to see middle level extension will arise on one of the early spring Coniston Meets. In the mean time a plea ! Would anyone be prepared to lend me any negatives they may have of the blue copper carbonate formations and other artefacts within the middle level and also the Taylors Level area ? I would be vary grateful to anyone who could oblige.

Tristan Goldsack

POLLUTION - FROM ROMAN PLUMBERS

This, despite what the title might infer, is nothing to do with Mike Mitchell's drains but an article which appeared in the Daily Telegraph recently. Thanks to Nils Wilkes for bringing into to my attention.

Roman pollution wafted as far as Greenland, where its traces can still be found deep in the ice, chemists say today.

Studies of a 9000 ft ice core from the Greenland ice sheet have revealed lead contamination which the researchers were able to trace back to mines in southern Spain work by the Romans and Carthaginians.

The study also quantifies how important lead was for the Romans - they used it for plumbing, architecture and ship building. Some believe its poisonous nature contributed to the fall of the empire. The scientists report in today's *Environmental Science & Technology* that they tested a layer in the ice core that was laid down between 600 BC and AD 300.

The lead they found provided "unequivocal evidence of early large-scale atmospheric pollution by this toxic metal".

They tested four different natural forms - or isotopes - of lead.

As the ratio of these isotopes varies around the globe they were able to show that it must have come from Spain.

Spain was famous for its prodigious output of silver during ancient times. It was successively controlled by the Phoenicians, the Carthaginians and the Romans.

Much of the lead the scientists found came from the Rio Tinto mine in the west of Spain between 150 BC and AD 50.

It is estimated to have produced nearly seven million tons of slag during the Roman period.

Dr Kevin Rosman of the Curtin University of Technology in Perth, Australia, who led the research, said: "Our work proves that human activity and not natural phenomena significantly altered the composition of the atmosphere, even as far back as Roman times."

NAMHO Field Meet '98

Hosted jointly by:
The Friends of Killhope
and
The North Pennines Heritage Trust

15th to 17th May 1998
Nenthead Village Hall, Nenthead, Alston, Cumbria.

Provisional Programme

Surface Field Trips
Cowshill and Coptcleugh, Weardale
Allenheads Mine and Village
Mining in the Rookhope Valley
Rotherhope Fell Mine
Nent Valley, mining and geology

Underground Field Trips
Brownley Hill Mine
Rampgill Horse Gin
Killhope Mine
Brewery Shaft winch
Tyne Bottom Mine
Caplecleugh to Rampgill
Smallcleugh Mine
Barhaugh Coal Pit
Rotherhope Fell Mine
Frazer's Hush Mine

ACCOMMODATION
An accommodation list will be sent out with the booking form, it will cover B&B's, hotels, bunkhouses and campsites. A number of touring caravans can be parked in the yard at the back of the Nenthead Mines Centre. If you are thinking of camping, please remember Nenthead is at an altitude of 1400 feet, it can be very cold and snow is not unknown in May.

MEALS
The village pubs and the cafe at Nenthead Mines Centre will be open for meals. Groceries will be available from the village shop or from Alston (4 miles).

SATURDAY NIGHT EVENT
The Saturday evening social gathering will be held in the Village Hall, there will be a meal, bar and an informal slide show. Price of meal £5.

FIELD MEET FEE
There is a fixed field meet fee of £5 for each person attending plus £2 for honorary club membership if BCRA insurance is required (see below).

INSURANCE
Insurance via BCRA is essential in order to ensure adequate cover for the weekend. Attendees who are non-club members or who's club is not insured will be asked to pay an additional £2 for honorary membership of the NPHT.

FURTHER DETAILS AND BOOKINGS
Send for further information, trip details and booking forms from:
Sheila Barker, The Rise, Alston, Cumbria, CA9 3DB

CUMBRIA AMENITY TRUST MINING HISTORY SOCIETY

Committee Meeting held on the Monday 22nd September 1997 at the BMSC Hut, Coniston.

Agenda.

1	Apologies for absence	2	Minutes of the last meeting
3	Matters arising	4	Secretary's Report
5	Treasurer's Report	6	Membership Secretary's Report
7	Meets Secretary's Report	8	Furness Projects
9	Hudgillburn Mine	10	Newlands Furnace
11	Coniston Coppermines Site	12	Video Film Project
13	Date and venue of next committee meeting	14	Any other business

Present D. Bridge(DB), P. Timewell(PT), S. Barker(SB), I. Matheson(IM), J Davies(JD), F. Fleming(PF), M. Mitchell(MM), M. Scott (MSc) and A. Wilson (AW). 9 Members in total.

The meeting commenced at 7.30 p.m.

1 Apologies for absence
M. Simpson(MS).

2 Minutes of the last meeting

The minutes of the committee meeting held on Monday 22nd July 1997 had been previously circulated to members. It was PROPOSED by IM and SECONDED by DB that the minutes be signed by the chairman as a true and correct record of the proceedings. This was carried unanimously.

3 Matters arising

3.1 Item 3.3 SB had received a letter from Cumbria Public Art, they reassured the society that stone from historical mining remains would not be re-used to repair the sheepfolds.

3.2 Item 4.3 PF corrected the information in this item, CAT's twenty first anniversary is not till 1999.

4 Secretary's Report

The Secretary had received:

4.1 A letter from J. Joinson, Events Officer (LDNPA), thanking us for our contribution to the success of their Archaeology and Local History Day held at Brockhole, thanks are due to A Cameron and P Fleming for organising our display.

4.2 A copy of the last NAMHO council meeting minutes. Next meeting will be held on the 26th October at Matlock.

4.3 A copy of the latest Speleoscene and the NCA AGM 1997 minutes.

4.4 The CLHF newsletter (No 16)—their AGM will be held on 1st November at Newton Rigg College.

4.5 A copy of the LDNPA's draft plans of Skiddaw and Helvellyn, for comments.

4.6 A copy of the LDNPA's Management Plan for Greenside Mine. There is to be a meeting of interested parties to discuss the plan, PF will represent CATMHS.

4.7 A copy of the LDNPA's Management plan for the whole of the Lake District. This included a questionnaire, the questions were discussed and PF agreed to write to the Authority giving our answers.

5 Treasurer's Report

The treasurer presented a balance sheet covering the period since the last committee meeting. He made the following comments:

5.1 PT reported that book sales had been good this month.

5.2 Could members check that they had returned their covenant forms. Did the committee think it would be a good idea to ask new members if they would like to covenant their subscription (a note on the membership form). All agreed to this suggestion.

5.3 The newsletter is now printed by Office World, who appear very efficient.

5.4 Please could all committee members let the treasurer have any expenses and book money by the 31-1-97.

5.5 PF had been contacted by Alastair Cameron who was almost ready to re-print his 'Slate from Honister', which would contain more information and new photographs. He would like to produce it in a similar format to his recent 'Slate from Coniston'. After discussion it was decided that the Society's finances would only allow for the book to be produced in A4 (as it was originally) this year. The prospect of a visitor centre being opened at the Honister slate working was discussed. The committee thought that if this came about, the book could then be reprinted and would sell well.

6 Membership Secretary's Report

IM reported he had received the first new member who's subscription would run over into 1998. He would send out the subscription renewal forms to all members with the next newsletter.

7 Meets Secretary's Report

J. Davies is compiling the next meets list, he was disappointed with the number of members who attended the meets meeting (2). PF asked if the new meets list could be produced in the old format.

8 Furness Projects

8.1 Woodbine Pit, Newton. The FMA have now finished the work at Woodbine Pit. Congratulations are due to the Furness Team on the completion of this project that has saved the last mine chimney in Furness. PT will do an article for the newsletter to mark the occasion.

8.2 Furness survey. Surveying work is about to start again.

8.3 JD asked if the CAT ladders could be brought to Coniston to be used in the Paddy End survey.

9 Hudgillburn Mine

The September HGB meet went with a swing, with a good attendance, work on the timbering of the level was re-started. Welcome to new member John Lawson.

PF suggested we should have another look at the shaft on the neighbouring farmers land, with a view to descending it and hopefully find the extent of the blockage. It was agreed to do this on the next work meet.

10 Newlands Furnace

The rebuilding of the wall above the wooden beam has almost reached the bulge. The Secretary was asked to write to the EH structural engineer asking for his promised report, to enable this work to continue. The fight with the trees and ivy continues and the concrete capping of the stack is being planned.

11 Coniston Coppermines site

PF Reported the RCHME Coniston survey had arrived and was very interesting.

The saga of North West Water's intention to seal the wooden plug under Levers water continues. They have know shelved the idea of driving a new shaft, due to pressure from BGS and advice from CATMHS. BECTEL who have sunk three bore holes (a lot of useful geological information has been gained) have decided the best thing to do is to re-open the original access shaft. All work has now stopped for the winter.

The John Ruskin Museum—the designers have now been appointed and will be contacting us to discuss our contribution to the display.

Two work meets saw the work of repairing the Thriddle Incline arch completed. Thanks go to Mark Simpson for making the former.

There had been three more survey meets at Paddy End Mine since the last meeting, the area above the Twin Tunnels has been completed. When surveying Jackroll Stope and Simons Nick the team were able to relate to the RCHME's datum point.

12 Video film project

As J. Roskell had now returned to Barrow, MM suggested we re-start the video film meetings. The first meeting to be held on the 8th October.

13 Date and venue of next Committee Meeting

This was arranged for 7.30 p.m. on Monday 10th November 1997 at the BMSC Hut at Coniston.

14 Any other business

14.1 AGM & Annual Dinner-PF had discussed changing the meal to a buffet with the proprietor of the Yewdale Hotel, who was agreeable. This will be followed by members slides and a raffle, as agreed at the last meeting.

There being no further business the Chairman closed the meeting at 10-00 p.m.

SB 14/10/97 Chairman

CATMHS Financial Statement September 1997

Balance July 1997		2886.45
Income		
Subs 1@ £12 and 1@£15	27.00	
Literature sales		
Journal 4	57.50	
SFC	393.60	
Leaflets	153.40	
Honister Slate	6.00	
Bank interest	0.60	
Total	638.10	638.10
		3524.55
Expenses		
Printing		
Leaflets HSP Milner	100.00	
Newsletter	83.16	
Meeting room rent	3.00	
Library		
Coniston Survey (part)	50.52	
Equipment:		
Wood & drills Simpson	40.26	
Secretary's expenses	32.96	
TOTAL	309.90	-309.90
Balance		3214.65
Balance held as:		
Building Society	2753.29	
Bank	461.36	
TOTAL	3214.65	

CUMBRIA AMENITY TRUST MINING HISTORY SOCIETY

Committee Meeting held on the Monday 10th November 1997 at the BMSC Hut, Coniston.

Agenda.

1	Apologies for absence	2	Minutes of the last meeting
3	Matters arising	4	Secretary's Report
5	Treasurer's Report	6	Membership Secretary's Report
7	Meets Secretary's Report	8	Furness Projects
9	Hudgillburn Mine	10	Newlands Furnace
11	Coniston Coppermines Site	12	Video Film Project
13	Date and venue of next committee meeting	14	Any other business

Present

P. Fleming(PF), P. Timewell(PT), S. Barker(SB), I. Matheson(IM), J Davies(JD), M. Mitchell(MM), M. Simpson(MS) and A. Wilson(AW).
8 Members in total.

The meeting commenced at 7.30 p.m.

1 Apologies for absence

M. Scott (MSc) and D. Bridge (DB).

It was PROPOSED by A. Wilson and SECONDED by J. Davies that P. Fleming should act as Chairman for the meeting as D. Bridge was unable to attend. This was carried unanimously.

2 Minutes of the last meeting

The minutes of the committee meeting held on Monday 22nd September 1997 had been previously circulated to members. It was PROPOSED by IM and SECONDED by PF that the minutes be signed by the chairman as a true and correct record of the proceedings. This was carried unanimously.

3 Matters arising

3.1 Item 4.6 PF had attended the meeting along with other interested parties, to discuss the LDNPA's new management plan for the Greenside Mine. Most of the business was concerned with access to the valley and mine. The LDNPA had a £2000 budget to stabilise the tips and make a path through the mine site. Access arrangements into the mine were unchanged, formal consent was still required. PF asked the board if they would look into obtaining funding for the upkeep of the Lucy Level. Artefacts in the mine were discussed, PF told the meeting, that in his opinion there were no important artefacts remaining in the mine.

3.2 Item 4.7 MM asked if PF had sent off our comments on the draft management plan to the LDNPA. PF replied he had.

3.3 Item 5.5 PF had been contacted by A.D. Cameron(ADC) regarding his revised 'Slate from Honister', it will be ready for the printers by March 1998 and he will obtain a printing quote (size A4 /A5). MM reminded the meeting that the committee had decided at the last meeting, to defer printing the book (except in A4) till the visitor centre opened at the quarry.

ADC had suggested that CATMHS should have an oral history and photographic collection in our archive. PT said we already had both of these in the library and it was up to members to add to the collection.

4 Secretary's Report

The Secretary had nothing to report that was not covered by the other items.

5 Treasurer's Report

The treasurer presented a balance sheet covering the period since the last committee meeting. He made the following comments:

5.1 That subs were now due from all members and should be paid to IM. Could members also check that they had returned their covenant forms.

5.2 Now was the time to think about any new equipment, we may need to buy next year.

5.3 We needed to encourage new younger members to join us, which would add strength to the Society. In time they would hopefully replace those who now dig and explore.

5.4 PF reminded the committee that we still needed to buy a copy of 'Grey Gold' for the CATMHS library. Action MM.

5.5 DB had contacted PF asking him to inform the committee that on the Wadd Mine meet the 100m rope had been damaged and consequently had to be cut into two shorter lengths. Could we afford to buy another 100m rope and 3 rope bags. MM to explore the cost of these items.

5.6 SB had been contacted by member R. Calvin RM who wished to buy a copy of 'Beneath the lakeland fells' (only 6 copies remain) to give to a school in Whitehaven, all agreed to this request.

5.7 PF asked permission to have 1000 copies of the Coniston Trail leaflet printed, this was given.

5.8 AW presented a bill for drill bits.

6 Membership Secretary's Report

IM reported there had been two new members since the last meetings. He wished to discuss the format of this year's membership renewal form. After discussion, it was decided to include a request regarding the covenanting forms and an appeal for HGB funds. IM to photo copy the forms and give them to PF ASAP.

7 Meets Secretary's Report

J. Davies had compiled the next meets list, it was to go out with the AGM papers and The Bulletin. The Force Crag Mine meet would now be a surface meet only. The Boxing Day meet was discussed, it was decided to walk up the 'Old Man' and have a cheese and wine party in one of the quarries. Leader to be MM.

8 Furness Projects

The Furness survey team are now working at Nigel Pit and will be moving on to the 'S' Pit at Askam shortly.

9 Hudgillburn Mine

Eight members attended the November HGB meet. We asked the neighbouring farmer (Mr Best) if we could have a look at a shaft on his land, with a view to descending it later and so hopefully find the extent of the blockage in the level. Unfortunately we let our enthusiasm run away with us, his idea of

looking and ours differed and he asked us to leave. We of course greatly regretted having allowed this situation to develop and the Secretary has written to Mr Best to apologise. The level was examined, it was decided as the ground was very unstable that we should use steel supports. As this would be an expensive operation MM PROPOSED that we should launch an appeal to members for funds, SECONDED by JD. All were in favour.

10 Newlands Furnace

The rebuilding of the wall above the wooden beam continues. The Secretary had written to Mr Girdler (EH structural engineer) asking for his promised report, to help this work to continue. PF told the meeting he had found an article in an old Lonsdale Magazine regarding the furnace.

11 Coniston Coppermines site

MS reported that the Paddy End Mine survey was going well but they needed more help to get into difficult stopes. It had been decided to put survey meets on the current meets list, hopefully to enlist the help needed. A good opportunity to explore new ground.

12 Video film project

AW was preparing cue cards. MM suggested we re-start the filming in the Spring to utilise the better light. A meeting to be held after Christmas to view the film shot to date.

13 Date and venue of next Committee Meeting

This was arranged for 7.30 p.m. on Monday 19th January 1998 at the BMSC Hut at Coniston.

14 Any other business

14.1 AGM & Annual Dinner SB had approached the members who were to show slides after the dinner. AW would buy the crackers etc. Members were reminded to bring a raffle prize.

14.2 MS reminded the committee that photograph albums would have to be bought to store the Pennyrigg Mill collection. He would consult with A. Thomas regarding the quality required. An article about the history of the mill is needed to accompany the photographs and survey. Any offers would be appreciated.

14.3 PT asked if any member had a suitable contact who would be willing to audit our accounts?

14.4 IM was concerned by the number of people who attended the Greenside Mine meet, was there a need to control the size of visiting groups in the future. This subject to be discussed as a separate item on the next agenda.

There being no further business the Chairman closed the meeting at 10-00 p.m.

SB 23/11/97 Chairman

CATMHS Financial Statement	November 1997	
Balance July 1997		3214.65
Income		
Subs 1@ £5	5.00	
Literature sales		
Journal 4	68.82	
SFC	106.00	
Misc	4.00	
Bank interest	0.66	
Total	184.48	184.48
		3399.13
Expenses		
Treasurer expenses	32.53	
Secretary expenses	20.00	
Memb sec expenses	74.37	
Printing (CCC)	50.11	
Newsletter	65.70	
Meeting room rent	3.00	
Library Coniston Survey (part)	13.38	
Materials (FMA)	23.23	
Insurance BCRA	147.50	
TOTAL	429.82	-429.82
Balance		2969.31
Balance held as:		
Building Society	2853.29	
Bank	116.02	
TOTAL	2969.31	

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(Local farmer supplied, free of charge.)

Build your own DRY STONE wall.

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CUMBRIA AMENITY TRUST MINING HISTORY SOCIETY

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VICE PRESIDENT	Major Hext

Officers for 1998

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SECRETARY	Sheila Barker, The Rise, Alston, Cumbria, 01434 381903
TREASURER	Paul Timewell, 10 Athens Drive, Barrow in Furness, Cumbria, LA13 9ND, 01229 839708
MEMBERSHIP SECRETARY	Ian Matheson, Lanehead, Coniston, Cumbria, LA21 8AA, 01539 441293
NEWSLETTER EDITOR	Jon Knowles, 46 Dukewood Road, Clayton West, Huddersfield, West Yorkshire, HD8 9HF, 01484 860662
MEETS SECRETARY	John Davies, 1 High Park Cottage, Little Langdale, Ambleside, Cumbria, LA22 9NS, 015394 37354
JOURNAL EDITOR	Don Borthwick, 38 Salcombe Gardens, Tyne & Wear, NE9 6X2, 0191 482 2873
LIBRARIAN/ARCHIVIST	Anton C.P.Thomas, 189 Greengate Street, Barrow in Furness, Cumbria, 01229 835951
PUBLICITY OFFICER	Alistair Cameron, Linden Lea, Pass Street, Eckington, Nr Pershore, Worcestershire, WR10 3AX, 01386 750494

Committee Members

Peter Fleming	Mark Simpson	Paul Timewell
Ian Matheson	Dave Bridge	Mike Mitchell
Angela Wilson	Sheila Barker	John Davies

Honorary Members

John Marshall	Mike Mitchell	Peter Fleming