

SOCIETY FIELD MEET AT NENTHEAD 6th. & 7th. May 1967.

Only John Moon and myself turned up on the Saturday. The weather was shocking so we went over into Weardale to have a look at the water wheel at Killup. The wheel which has been cleaned, painted and fully restored is in excellent condition and is well worth a visit. It is not difficult to reach being almost on the road side. The weather had, by this time improved somewhat so we decided to visit an old level known as

COW SLITTS

The mouth of the level, which is arched, is situated on the right hand side of the Nent just past the Smelt Mill. The level consists of an almost straight drive for some 440 yards where further progress is halted by a collapse. Digging at this point may allow further exploration to take place and the level is quite sound up to this point.

The level contains water below the surface of which is a considerable quantity of wooden mine rails some of which have been salvaged and presented to Bowes Museum.

A survey of the level was carried out on the way out and three rises were found. All would perhaps give up some secrets if examined. The last of these rises is an 'old man' rise and has toe holes on either side for climbing. We made use of the 'old man's' toe holes and climbed the rise to discover a low level leading off at the top. This too may repay further exploration. This rise had been transformed into a thing of beauty by the calcite of many colours which adorned its sides.

Sunday 7th. May 1967

SMALLICLEUGH MINE, NENTHEAD

Fourteen members of the Society and two guests entered the mine at 10.55 a.m. The group split into two parties one party helping with the descent of a 75 ft. shaft whilst the others went on to explore the first 'flat'. The shaft did not unfold its secrets - the ground was in very poor condition and there were roof falls, so exploration was abandoned.

The party joined the others in the 'flat' and all went on to examine a rise. Examination showed that the rise could be negotiated by means of an extension ladder - so it is hoped that this can be tried sometime in the future. The party then went deeper into the mine after which they reassembled in the 'Long Flat' with the object of assisting the transportation of a fan to the surface.

Some members may recall that in 1966 a ventilating fan was removed from the mine - restored and donated to Bowes Museum. This fan was driven by means of a 53" diameter wheel connected to the fan by means of a leather belt. This second fan is obviously a later version of the first one and was powered by means of a winding handle connected to the fan by means of a set of gear wheels. The whole is mounted on a metal frame. The fan is similar to the first one but the bearing housing of the second fan is less crudely finished off.

It is in excellent condition and since its removal has been transported to my workshop where it is being restored.

The party returned to surface about 4 p.m. and by 6 p.m. the stragglers were finally setting off for home. W Everyone seemed to have thoroughly enjoyed themselves.

Workington.
May 1967.

J.D.J.Wildridge.

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SOCIETY FIELD MEET AT BELDI HILL, SWALEDALE

18th. June 1967

Beldi Hill and Plate Hole Mines

A party of seven members and one guest assembled at Keld after having camped overnight at various places in the Dale. At 11 a.m. the party set off at a leisurely pace, towards Crackpot Hall and Beldi Hill. The level visited is slightly to the left and behind Crackpot Hall and is referred to by us as

BELDI HILL MINE

When the mines were in operation the ore from Swinnergill Mine was trammed to surface through Beldi Hill Mine and there is some confusion as to which of the two levels in the gill (one on the left and one on the right) is in fact Beldi Hill Mine and which is Swinnergill Mine. All this provides for research by some member of the Society who perhaps lives near enough to be able to spend some time in the area.

"BELDI HILL MINE"

The level consists of a straight drive for some 126 yards at which point it swings left and continues for a further 78 yards to a fall which effectively bars further progress.

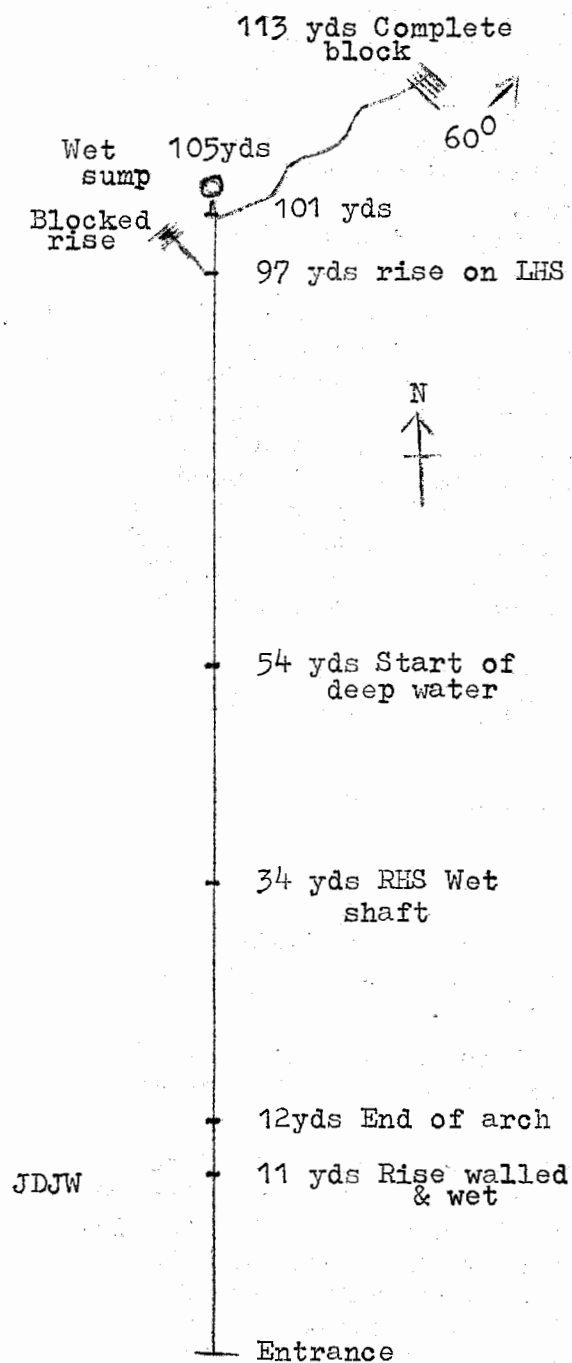
The first two yards is arched. At 11 yards there is a bad side fall which needs careful negotiation. At 97 yards there is a shaft on the left which is some 35 ft. deep and may well repay further examination. A short stretch of arching leads to a level on the right hand side some 116 yards from the portal. There is a rubble filled sump on the left along this level and at 23 yards the ringing becomes very dangerous and narrow due to side pressure. This hazard was carefully negotiated but further progress was halted almost immediately by a roof fall.

Continuing along the 'main' level a water filled sump was seen at 117 yards and a number of small falls occur a little further on. At 126 yard from the portal chisselled on the wall are the initials P C C and the date 1835. From this point the level deteriorates and the ringing is in a most unstable condition. The leader proceeded cautiously along this portion of the level past a narrow rise on the left (which was not climbed) only to find that at 204 yards from the portal a complete collapse barred further progress.

The party returned to daylight and after a short breather went down river to explore Plate Hole.

ROUGH SKETCH "PLATEHOLE" MINE

Visited 18th June 1967



ROUGH SKETCH OF BELDI MINE

Visited 18th June 1967.

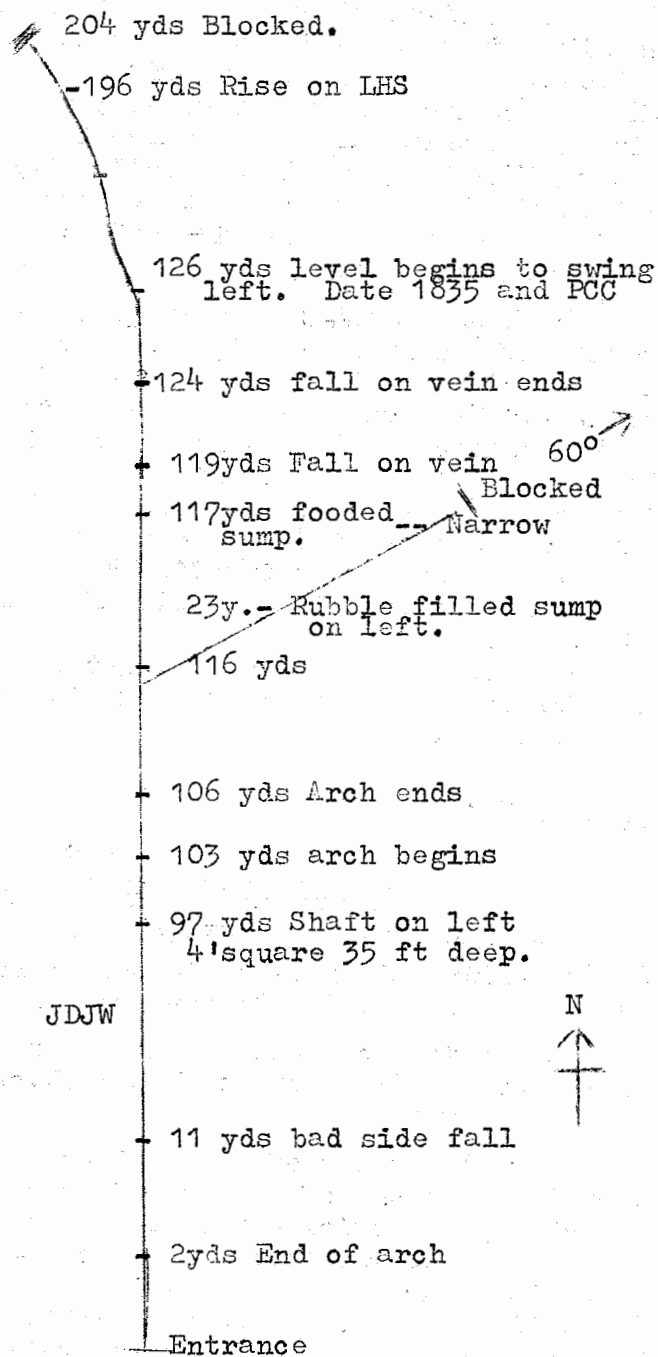


PLATE HOLE

This level was approached from river level and the first thing noticed was a ruined building. This building contains interesting relics. On the left hand side is a boat shaped pit which may have been used for settling fines. In the far wall w are two narrow slits a few inches high behind which are a further two boat shaped pits the floors of which are on the level of the floor of the main building. There is no indication as to what these might have been so it is possibly fair to conjecture that they were perhaps housings for bellows. This is substantiated to some degree by the fact that behind these pits lies the water wheel pit behind which there is a short flue and a chimney. It seems to be a rather strange set up for a smelt mill- the flue is unusually short and the chimney almost rises out of the bouse-steads. A job for research.

Further up the fell side and almost directly behind the level entrance stands a very fine set of four bouse-steads.

The level continues as an almost straight drive for about 107 yards with an average height of about 6 feet. The first 12 yards are arched and wet and at 34 yards there is a rise on the right-hand side. At 54 yards knee deep water is met and at 97 yards there is a Y junction, the left hand leg of which leads to a blocked rise. It is possible that this rise leads to Landy Level which was used for tramming out ore. The right hand leg of the Y junction leads to yet another Y junction at about 101 yards from the portal. The left hand leg leads almost immediately to a flooded sump whils the right hand leg continues in a winding fashion to a complete collapse at 113 yards.

The party returned to daylight and spent the remainder of the day following the river and admiring the view, ending up in Keld at about 6 p.m.

Workington.
18/6/67.

J.D.J.Wildridge.

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COBALT MINE, SCAR CRAGGS, CUMBERLAND

The mine which is situated between Scar Craggs and Sail, in Cumberland at an elevation of approximately 200 ft. O.D. was opened by the Keswick Mining Company sometime after 1846.

According to Postlethwaites Mines and Mining in Lakeland - 'Due to the difficult nature of the rock, only about two ounces of cobalt were ever extracted.'

Normal methods of chemical analysis of the ore have failed to show the presence of cobalt and only a minute trace has been detected by X-ray diffraction methods. The predominant constituent is arsenic.

It is thought that 'The difficult nature of the rock and the delicate nature of the cobalt' was in fact a very polite way of indicating that there was very little cobalt to be found. The mine was in fact developed on the strength of an assay report and one school of thought suggests that this was in fact a blind and was just another money making proposition arranged : to fleece share-holders.

One thing is however certain - the project lost a lot of money.

The remains are difficult to find as very little remains or is immediately evident. Perhaps the best method of locating the mine is to follow the Braithwaite to Buttermere road via Newlands House for $1\frac{1}{2}$ to $1\frac{3}{4}$ mile beyond Braithwaite to a point some 220 yards short of Stoneycroft Bridge where a road (track) to the mine leads off to the right. (NGR NY. 203214).

After travelling a short distance along this road a fenced underground reservoir is seen. This reservoir is built on the site of the Smelt Mill which is in fact built on the site of an earlier lead smelting mill. Of the Smelt Mill all that remains is a small section of one wall and the line of the flue on the hillside. The lead smelting mill is referred to in the romantic novel 'The Son of Hagar'. Furnace slag can still be found and some pieces show traces of cobalt - which occurs as pinkish streaks.

The mine road continues comfortably upwards for about two miles after which it narrows to a track by the ruins of a small building (use unknown). The track continues beneath the crags where if one looks carefully around it is possible to find the cheek of the vein running diagonally across the face of the crags in a North/South direction. If this vein is followed up the crag the only remaining open level will be reached.

The mine is reported to have had five levels - one above the other so for the sake of clarity we will refer to the open level as number 5. Judging by the extent of the remaining levels the mine could not have been very extensive - all the levels are very short. The levels are said to have been connected by short stopes.

On entering the open level (5th.) one is almost immediately confronted by a small stope - a descent of 15 ft. (ladder required) leads to level number 4 which continues for about 20 ft. to the forehead where the vein is clearly visible.

Ore was reported to have been sent down from the levels by means of a small tramway - no trace of this remains either above or below ground. This tramway went as far as the track where it is presumed pack horses were then used to convey the ore to the Smelt Mill.

Workington.
May 1967

J.D.J.Wildridge.

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CAVE RESEARCH GROUP OF GREAT BRITAIN.

SOUTHERN GENERAL MEETING 6th MAY 1967, BUCKFASTLEIGH, DEVON.

The meeting took place at the William Pengelly Cave Research Centre, Buckfastleigh and the neighbouring district during the weekend 6 - 7 th May 1967. The formal meeting was opened by Dr. Black, President and Chairman of the Association of the William Pengelly Cave Research Centre, who welcomed members and visitors to Devon and made some remarks on the essential complementarity of A.P.C.R.C. and C.R.G. and the consequent desirability of cooperation between the two bodies.

He then handed over to W.H.Little, Chairman of C.R.G.. Mr.Little first introduced Dr.A.J.Sutcliffe, Journal Editor of the A.P.C.R.C. and his subject 'The Idea behind the Pengelly Cave Research Centre'.

Dr.Sutcliffe opened by explaining the origins of the centre: Higher Kiln Quarry, containing several caves, and two farm buildings was purchased by the Society for the Promotion of Nature Reserves in 1961, a sudden action to prevent the commercialisation of the caves and the interesting ecological site. Previous to this, the Devon Speleological Society had preserved Reed's Cave, and Torquay Natural History Society had excavated Joint-Mitnor Cave between 1939 and 1941. The aim of the P.C.R.C. is to be a teaching centre.

Institutions with similar aims in various countries of the world were reviewed, being illustrated by Dr.Sutcliffe's excellent collection of teaching slides. The U.S.A. has developed the idea of the 'Visitors' Centre' in a big way: examples quoted were the Mammoth Cave National Park, Dinosaur National Monument, Badlands National Monument, sites at Los Angeles (Marineland, and the tar exudations which contain bones of the Mastodon), and the Arizona desert flora and fauna museum. At Dinosaur National Monument an observation and museum building covers a demonstration section of 60° dip deposits of Jurassic sediments containing fossilised bones of reptiles. Common features of the Visitor' Centres are a museum, visual aids, souvenir stall, restaurant, and auditorium for lectures. Park Rangers and Park Naturalists are in attendance.

In Africa Dr.Leakey has developed a number of sites, e.g. a stone tool site, Pleistocene lake deposits, and Gambols Cave in the Rift Valley. In Poland foundations of houses in a lake village, and reconstructions of the buildings may be seen. In Britain the Jarlshof site in the Shetlands, which has Neolithic, Bronze Age, Iron Age A, Viking, Medieval and 17th. century remains, is well preserved.

The Pengelly Cave Research Centre has already made some progress towards these ideal sites. Geological features in the region are Dartmoor granite, with its associated tin, copper, iron and manganese ores, Devonian and Permian rocks, and Oligocene sediments at a former lake site. The River Dart has formed terraces at various levels, on one of which Buckfastleigh church stands above the caves. Bullycleaves Quarry provides a section of limestone on impermeable tuff.

Each of the caves in Higher Kiln Quarry has been developed for a different purpose. Joint-Mitnor Cave houses a demonstration section of the talus cone containing the bones of many different types of animal, and an experimental colony of *Niphargus glenniei*. Rift cave has a bat colony. Reed's Cave contains many phreatic features and good calcite deposits. Massive flowstone has been shattered by some seismological event, and there are interesting botanical specimens in the entrance.

The area around the centre has also received much attention. The Torbryan valley contains several caves with archaeological deposits, notably the hyena den in Tornewton Cave. Kingswood Mine contains

radioactive minerals, while Brookwood Mine has a Cornish beam engine shaft. The nearby coast has platforms and raised beaches at 400, 190, 100, 40, 25 and 11 ft. intervals. There are many sea caves, notably Durl Head sea cave which exhibits rapid stalagmite formation (over recent rubbish fallen from the cliff top) and interesting liverworts and eucladiolyths in the entrance. Other sites of interest are Dartmoor, Oligocene lake deposits and kaolin workings.

The development of the buildings at the centre has mainly centred on the museum building, which has been extensively renovated, and now contains the first exhibit housed in a case constructed by Brother Joseph of Buckfast Abbey. The A.P.C.R.C. is fortunate in having the services of an honorary architect, and the projected development includes a laboratory and a common room. The 'idea' behind P.C.R.C. was most effectively projected during this lecture; it was evident to those present that much of the idea and motivation behind the project is the result of the enthusiasm and effort of Dr. A. J. Sutcliffe himself.

The second lecture was given by Mr. Bernard Woods on the Balinka Pit Expedition 1966 and its achievements, subtitled by Mr. Woods 'An Engineering Exercise'. Preliminaries were carried out in 1961, leading to the first expedition in 1964, already the subject of a lecture given to a C.R.G. General Meeting. The 1966 Expedition saw the culmination of the engineering effort, the bottoming of the pot, and the retrieval of the bones of the Yugoslav patriots executed by their enemies during the last war.

In 1964 the cage came to rest at -654 ft. and the way on was seen. In 1966 the equipment was considerably improved. A guide wire was attached to the cage. Radio transmission at a frequency of 27 MHz worked well for line of sight communication, but thickness of limestone greater than 50 ft. of rock caused attenuation. The bottom of the shaft was disappointing - there is no large system of river passages, and the pot ends at -990 ft.. Mud at the bottom gives evidence of flooding.

A small pool at the top of the boulder slope yielded a frog skeleton and some typical cave invertebrates. Bones were found of many types of animal, including humans. The theory is that the bodies of three of the patriots lodged behind large stalagmites and the bones were scattered by the falling debris. The fourth body fell the whole way down, and his almost complete skeleton was found in one place. The thigh bone was nicked, perhaps by a bullet (one man had a known wound in his thigh). The sophistication of the equipment meant that a TV man from Zagreb and two reporters could be taken down, as well as some local scientists from a speleological society. There were official burials of the remains, and medals were awarded to a number of members of the team, and to the S.W.C.C. itself.

Water tracing was unsuccessful even though 20 lb lots of fluorescein and rhodamine B were used. There is a belief that the lower levels of the pot flood occasionally.

Dr. Jefferson completed the lecture with a brief account of the biological finds. There were the usual varieties of threshold plants and algae. The fauna consisted of ten arthropod species (2 trogloneurids)

the remainder probably troglobytes.) These included 2 diptera, 2 collembola, 1 beetle (probably a new sub-species), 1 blind spider, 1 pseudo scorpion, and 1 niphargus. There was also a fish from the resurgence.

Dr. R. G. Picknett concluded the formal meeting with a vote of thanks. Members and visitors then adjourned for dinner to the Golden Lion Hotel, Ashburton.

Field visits were carried out on the Sunday to Reed's Cave, Torbryan Caves, and Durl Head sea cave, typical sites demonstrating the scope of the Pengelly Centre, which deserves to enjoy an increasing role in British Cave conservation and field studies.

Kidsgrove,
Stoke-on-Trent.
May 1967

J. D. Wilcock.

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CAVE RESEARCH GROUP OF GREAT BRITAIN

NORTHERN GENERAL MEETING 24th JUNE 1967, SETTLE, YORKSHIRE

The meeting took place at the Ashfield Hotel, Settle and the neighbouring Yorkshire Dales during the weekend 24-25th. June 1967. The formal meeting was opened by Mr. W. H. Little, Chairman of C. R. G. who introduced the first speaker, Mr. D. T. Richardson, and his subject 'Springs Wood Level.'

Mr. Richardson summarised and amplified the material contained in the recent Northern Cave and Mine Research Society Individual Survey Series Publication Number 1 on the subject of the trial lead mine level in Springs Wood, Starbottle, Wharfedale. This publication is a joint effort of Messrs Richardson (water analyses, relative humidity, air and water temperatures), Harker (geology), Dickinson (survey), and Foster-Smith (geomorphology and mining history) and Mrs Jean Dixon (biology). The former name of the level has not been ascertained, so N. C. M. R. S. has named it from the wood in which it is situated, high on the eastern slopes of Wharfedale at 975ft O.D.

Interesting fauna counts have been made along the 600 ft. threshold zone, giving distribution of various species as a function of distance from the entrance. Frogs have been found in the far reaches of the level and a solitary bat has been seen intermittently.

The questions after the lecture reflected the interest of those present particularly in the fields of water analysis and biospeleology. It was mentioned that frogs are frequently found in caves, . Frog spawn may be carried in by the water, or the frogs may walk in. The Bottomless Pit in Speedwell Mine, Castleton, Derbyshire has a large population of frogs, living on rubbish brought in by visitors to the show section of the mine.

The second speaker was Mr. R. R. Glover, on the subject 'A Study of Ingleborough Cave'.

Mr. Glover reviewed the history of exploration of the Gaping Gill-

Ingleborough Cave System, and emphasised that, although exploration had taken place for well over a hundred years, there had been no true scientific survey carried out, as has been done in many other well-known systems. The geology of the area is essentially simple, consisting of almost horizontal beds of Great Scar Limestone, Yoredale Series and Millstone Grit lying unconformably upon the contorted basement rocks of Pre-Cambrian age. There are many dry valleys on the flanks of Ingleborough, for example Crina Bottom and Clapham Bottoms. There is an anomaly in the position of the resurgence at Ingleborough Cave, since some 200 ft of Great Scar Limestone remains below this level, at least in some locations, before basement rocks are reached. Moses Well, the other main resurgence in Clapham Bottoms, is found at the expected level, where the basement rocks contain Ingleborough Lake. The other main resurgence in the district is at Austwick Beck Head, and despite frequent water tracing experiments, the course of the underground watershed is not entirely clear. It is probable that the undulations of the eroded surface of the Pre-Cambrian rocks before the deposition of the limestone in Carboniferous times are a great influence in the hydrology of the area.

Ingleborough Cave itself is a mixture of large joint-developed stream passages and bedding planes. There is a consolidated fill of gravel at the end of the visitor's section. Mr. Glover has carried out extensive water tracing tests with other members of CRG. He has reached the conclusion that the cotton hanks used in Rhodamine B water tracing disintegrate before the dye washed out. Mr. Glover concluded his talk, which was illustrated by slides as well as an overhead projector for diagrams, with acknowledgements to Dr. Farrer, Alf Hurworth and the Ingleborough Cave Company for the unlimited access and facilities which they have granted him.

Dr. T. D. Ford concluded the formal meeting with a vote of thanks to the host Club - N.C. & M.R.S., and the speakers. He said that the study of Springs Wood Level was an example of what could be done with what at first sight was an unpromising hole. Mr. Glover's account of the evolution of the Gaping Gill System in relation to the geology of the area was an example of the work which was necessary for all well known systems. This was the first attempt to give a coherent description of one of the first-explored systems. Dr. Ford stated that it was possible that a 'tongue' of basement conglomerate separated the drainage systems of Austwick Beck and Clapham Beck.

The meeting was then adjourned for dinner and more convivial surroundings. Members were able to meet delegates of both the Cave Rescue Organisations and the Regional Councils for Caving, who had arranged meetings on the same day.

On the following day members were able to visit Springs Wood Level and Alum Pot area, where a tour was made of the smaller caves in the Alum Pot drainage system. Heavy rain during Saturday evening and night had given rise to high water levels, and the presence of Cave Rescue personnel in the area was opportune as six men were trapped and drowned in the Mossdale Cavern tragedy. Many journeyed up to the caverns, three miles up a rough track from Conistone village, to

assist in the rescue, alack in vain. Many laboured, stripped to the waist, to dig a channel through the peat to divert the swollen stream from its death-dealing course through the constricted cave. The effort was reinforced by three mechanical excavators to build a dam, and auxiliary fire pumps to divert the flow down Bycliffe valley. During the Sunday afternoon Conistone village was jammed with sightseers as well as rescuers, and many visitors, reminiscent of the Floyd Collins disaster in U.S.A., even thoughtlessly ventured up to the scene of the tragedy, where the sad-eyed rescuers, exhausted by their arduous trip into the cave in hazardous circumstances, gathered in forlorn groups, at a loss to determine the best course now the worst was known. It was an unequal struggle against nature - this is perhaps all that should be said in retrospect. The loss of good-will from landowners, police and public in the area may well, however, be irreparable.

Despite representations by CRG, Mossdale Caverns have now been sealed, after it was found impracticable to bring out the bodies. Well-known potholers had offered to decently bury the bodies in some remote part of the system where further exploration would not be prejudiced. Mr. David Adamson, a member of CRG, was among the victims, and the party was undertaking an exploration in the remote areas of the cave, in an attempt to find the break from the Yoredale Series into the Main Scar Limestone, presumably by a fault in the mining area of Grassington Moor - such is the price of discovery.

Kids Grove,
Stoke-on-Trent.
July 1967

J.D. Wilcock.

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NORTHERN BIOSPELEOLOGICAL RESEARCH STATION

The North of England, despite its large numbers of caves and potholes, has been devoid of an establishment where serious biospeleological research could be undertaken. This may, to a large extent, be due to the fact that caves and potholes for exclusive use are hard to come by, let alone purchase or lease. In any case few of the Yorkshire caves would make ideal underground laboratories, most are difficult of access, the majority are subject to severe flooding, and one would dread the magnitude of the outcry if one permanently gated a cave entrance.

Fortunately perhaps, the limestone areas of Yorkshire have more than their share of metalliferous mines, again most are unsuitable being either too dry or in too unstable a condition or both. Nevertheless systematic examination of old mine levels has produced one which has definite prospects.

It is easy of access; is of suitable dimensions; is safe; is a simple system; can be readily secured; is in solid limestone; contains a stream and auxiliary water inlets; the waters having chemical compositions similar to those flowing in natural limestone caves in the vicinity, and is not subject to severe flooding. The level

contains several small alcoves and offshoots which make ideal sites for instruments and experimental tanks; it has a long twilight zone (600 ft.) and a correspondingly lengthy dark zone, and above all a large and varied natural flora and fauna.

It was perhaps the natural flora and fauna which first attracted attention and after visiting the site a number of times it was realised that it had a great potential both as a study centre for naturally occurring flora and fauna and as an underground laboratory where controlled experiments and detailed studies could be carried out.

With these ideas in mind an approach was made to the owners of the property. At first it was thought it would be a good idea if control of the level were to be placed in the hands of a local research organisation - the Northern Cavern and Mine Research Society. The owners raised serious doubts about this suggestion pointing out that in their opinion unlimited access to the level by members of a large organisation could prove a nuisance, particularly to the tenant farmer under whose fields the level is driven, and in consequence the idea of leasing the level on behalf of the N.C.M.R.S. had to be abandoned. Negotiations were continued privately, however, with the result that the level was legally turned over for use as an underground laboratory and biospeleological research station for a period of ten years as from 1st June 1967.

There are three terms of the lease which should perhaps be mentioned -

- (1) 'Not to use nor permit the demised premises to be used for pot-holing nor underground exploration which is not connected with true biological and associated research.
- (2) 'Not more than ten persons are permitted to visit the level at any one time.
- (3) 'Not to publicise the work carried out in the level nor do anything likely to attract public attention or trespassers over the surface of the land without prior consent in writing of the Landlord'

These appear to rather exacting terms. It should be pointed out however, that once the station is established not more than 2 or three persons are likely to visit the station at any one time as their presence will only be needed to collect data, read instruments, etc. As long as the exact location of the station is not quoted in literature there will be no restriction on publication of findings, and in cases where it is necessary to give more precise details it is understood that permission will be given.

Since the 1st June a great deal of preparatory work has been carried out at the station. A steel grille has been fixed in position and the station is now permanently locked. Markers, bearing the distance in feet from the portal, have been placed at 25 foot intervals along the level; hooks inserted for hanging up instruments; sandbanks levelled and experimental tanks placed in position. Running water has to be conveyed to these tanks and this will be done by means of plastic piping from roof inlets; some 1,000 ft of piping being

involved in this operation. At the time of writing this work is well under way. Grateful thanks go to the volunteer workers who have helped with these various tasks.

Initial efforts will be directed towards making detailed records of air and water temperatures and relative humidity along the level by means of maximum-minimum thermometers, hair hygrometers and a recording thermohygrograph. The numbers, varieties and distribution of naturally occurring flora and fauna and their relationship to temperature, humidity, light intensity, etc. will be recorded. Special attention is to be directed to the hibernation habits of the Tissue moth (*Triphosa dubitata*) - large numbers of which occupy the level during the winter months.

A study of the naturally occurring fauna in the stream, pools and inlets and the chemical compositions of the various waters which enter the level, will be undertaken. Photographs and mounted specimens of the flora and fauna will be prepared for exhibition and lecture purposes.

In the case of introduced experiments it is hoped, at least for a start, to be able to carry out work on the life history of the freshwater shrimp (*Gammarus pulex*) so as to establish whether or not this crustacean can complete its life cycle in complete darkness.

It is envisaged that other experiments along these lines can be introduced. The type and nature of research will, to a great extent, depend upon the type of professional assistance and advice available.

There is no intention of running the station as a show place for visitors - anyone having a serious interest in the work being carried out and who would like to visit the station will be granted permission to do so. Keys will not be supplied on loan and visitors will normally be invited to join research workers on a routine data collecting visit to the station. The lessees reserve the right of access at all times. In order to maintain the natural conditions as much as possible, carbide lamps will not be permitted. Needless to say no litter of any kind must be deposited in the station. Removal of geological specimens and biological material will not be allowed except where this is necessary for the purpose of establishing identity.

It is not envisaged that the station will publish its own findings. Reports, etc., will be offered to learned societies having kindred interests. In this way it is hoped results will reach a wider range of readers in a shorter space of time and will promote interest and perhaps an exchange of ideas.

The basic cost of the project (legal fees, rent, insurance, provision of grille, etc.) is being met by the lessees. A research fund has been set up to provide for the purchase of additional equipment and instruments (thermometers, hygrometers, barometer, etc) for until the station is adequately equipped the work planned cannot proceed effectively. Donations to the fund would be most acceptable.

The lease is held jointly by (Mrs) Jean M. Dixon, A.I.S.T.,

Douglas T. Richardson, A.R.I.C., and Charles A. Willoughby, B.Sc..

Correspondence should be addressed to the Northern Biospeleological Research Station

c/o Mrs. J.M. Dixon, 102, Leeds Road, Eccleshill, Bradford, 2, Yorkshire.

or

c/o Mr. D.T. Richardson, 5, Calton Terrace, Carleton Road, Skipton, Yorkshire.

Donations to the research fund should be made out to D.T. Richardson who is acting as Treasurer.

The lessees gratefully acknowledge the unsolicited help which has been given by members of the Northern Cavern and Mine Research Society - in particular to Mr. L.F. Miller without whose help work connected with laying on water to the experimental tanks could never have been completed - to Mr. P.D. Lodge for supplying the grille and to the various 'pack horses' who transported sand, cement, gravel and steelwork up the hillside to the station.

SKIPTON
14-8-1967

D.T. Richardson.

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BRIEF NOTES ON MINING IN IRELAND

Anyone with an interest in mining will be well satisfied by a visit to Ireland, where there is an abundance of mines, past, present and future. Visitors to Eire intending to look into mining history, would be well advised to provide themselves with a copy of the Memoir and Map of Localities of Minerals of Economic Importance and Metalliferous Mines of Ireland obtainable from the Government Publications Sale Office, G.P.O. Arcade, Dublin, Irish Republic. - price 12/6d.

Areas worthy of a visit are many, but old workings are concentrated in Co. Wicklow, Co. Clare, Co. Cork, Co. Galway, and Co. Tipperary. Minerals mined include, barytes, calcite and the ores of copper, lead, zinc, silver and iron.

To those with a knowledge of the use and working of peat or turf as it is usually called in Ireland, the activities of the Bord na Mona, or Peat Board, will be of particular interest. Although winning of the peat is not usually classed as mining, it is of course a specialised branch of the mining industry, supplying domestic fuel, in Eire, electricity generating stations, specially built to utilise peat, so abundant in the vast Irish peat bogs.

Machines, weighing as much as 45 tons, work across the bogs excavating the peat and spreading it on the bog surface for drying. Since the bearing pressure of a bog is usually around one and a half pounds per square inch the problems involved in the mechanical extraction of 40 million tons per annum of raw bog can be imagined. The above figure is misleading, as the actual peat digging lasts for

only eighteen weeks, mainly because of drying problems. Ten tons of raw bog are needed to produce one ton of saleable peat, the raw bog containing over 90% water.

Recently closed mines include the Benbulbin barytes mines in Co. Sligo, Abbeytown lead and zinc mine in Co. Sligo, and the Avoca pyritic copper mine in Co. Wicklow.

A vein of white barytes was worked near the top of Benbulbin mountain, the barytes being transported down the mountain by an aerial ropeway to the dressing mill on the shore of Lough Glencar, where it was washed, screened, crushed, jigged and tabled. Production was 8000 tons per annum, exported via Sligo port. The mine was last worked in 1961, but a great deal of the mine equipment is still in place.

The Abbeytown mine, situated a few miles South of Sligo at Ballysadare, worked a low grade lead zinc deposit of 1 million tons, on the site of the old Abbeytown mine where the vein outcropped in a sea cliff. Many buildings on the site of the mill are intact. A ready made slimes pond was available on the site i.e. the Atlantic Ocean. A few hundred yards along the shore from the mill is a quarry from which the ore was opencasted. Drives from the quarry floor, now blocked with concrete, are large enough for dump trucks, the mines being worked by a pillar and room method. The quarry face is highly stained by mineral, and large blocks of iron pyrites litter the floor of the opencast. Production from Abbeytown was mainly from 1952 to 1962.

Avoca copper mine in Co. Wicklow has been closed since 1962, but is kept on a care and maintenance basis by the Irish government who guaranteed loans made to St. Patrick's Copper Mines, the mine operators, and who hope to reopen the mine in the future. The mine is equipped with a 3,600 ton per day flotation mill to deal with an ore consisting of chalcopyrite, pyrites, quartz and some zinc and lead.

Present mining activity in Ireland is intense, due mainly to Irish mining legislation. All profits are exempt from tax for four years from commencement of production and half profits exempt for the following four years. State mineral leases are available for those prepared to spend £2000 per annum on investigating and developing leases. Privately owned mineral rights can be aquisitioned by the government if the mineral developer cannot reach agreement with the mineral owner. Available leases are rapidly diminishing, geophysical and geo-chemical prospecting increasing accordingly. Mineral exports from Eire approaching £12,000,000 are likely to go much higher as new mines go into production. Perhaps if a similar system of mining taxation was adopted in Britain, some of the areas frequented by members would once more become active. If so, Society records could play an important part in the reopening of the Northern Pennine orefields. This possibility in itself should be an incentive for increased vigour in the interest taken by Society members in the collection of available information.

Several metal mines are now in or nearing production in Eire. Tynagh mine, operated by Irish Base Metals, Ltd, is working a lead, zinc, silver, copper, barytes orebody by opencast methods. The primary ore contains 4.8% lead; 4.3% zinc and 2.2 ounces of silver per ton.

These figures show that there must be many mines in the Northern Pennines containing workable ore, although, of course, large amounts of low grade ore are required for payable results. The open pit of Tynagh Co. Galway is 2,400 ft long, and 700ft wide, and will reach a depth of 340 ft., allowing the mining of $4\frac{1}{2}$ million tons of ore. Equipment used in the open pit includes two 54RB face shovels, Euclid L30 articulated wheeled loading shovel, Caterpillar D8 bulldozer and Aveling Barford 99HG Grader. Concentrates are transported from the mill to a storage and loading installation at Galway harbour.

Consolidated Mogul Mines Ltd Silvermines operation, in Co. Tipperary, will be worked by an 18ft x 16'6" compartment shaft to a depth of 1100ft. The orebody being developed contains over 10 million tons of ore containing 2.8 % lead, 8.2% zinc and 0.9% silver.

Ballnoe opencast barytes mine at Silvermines Co. Tipperary operated by Magcobar (Ireland) Ltd. produces 125,000 tons a year. Ore reserves are said to be enough for 20 years working.

Near Tipperary town the Gortdrum mine is nearing production from a 4 million ton orebody containing 1.22 % copper and 0.83 ozs silver per ton.

Rio Tinto's Keel mine near Longford has now reached the stage of underground exploration after a comprehensive drilling programme. A 16 ft diameter shaft to a depth of 600 ft. has been sunk, from which cross-cuts will be driven to explore the lead-zinc orebody.

Most of the above mentioned mines are situated in areas worked for centuries, the low grade orebodies now being profitable with modern mining and processing methods. Let us hope that a similar renewed life might be taken by the Northern Pennine Orefields.

Longford.
Irish Republic.
September 1967

A.R. Nichols.

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