SOUTH WALES CAVING CLUB
NEWSLETTER

NUMBER 37 SEPTEMBER 1961

CONTENTS

1. CLUB NEWS

THE ABBE HENRI BREUIL
Obituary

It is with deep regret that we learn of the death of the Abbe Henri Breuil, a member of the French Institute and the greatest authority on cave paintings, at his home near Paris. He was aged 85.

His name is associated in South Wales with Bacon Hole on Gower. At the end of the cave is a small chamber and it was here that in 1912 Professor Sollas and the Abbe Breuil came across the red bands on the rocks which the Abbe Breuil compared with similar bands to be found in Font de Gaume in the Dordogne in France. It was thought that these bands were the first evidence of cave painting in this country and a grill was erected in front of the chamber. However time has shown that they are natural in origin.

In the passing of the Abbe Breuil the world of speleology has lost one of its greatest and most revered members.

D.W. Jenkins.

NEW MEMBERS

We welcome the following new members to the Club:

Mr. & Mrs. Clive Barton, 49 Kimberly Road, Roath, Cardiff.
Colin John Baglin, 3 Archer Road, Penarth, Glamorganshire.
Terrence W. Burke, 16 Courtenay Road, Splott, Cardiff.
K.P. Harris, 31 Manor Road, Manselton, Swansea.
Dr. Oliver C. Lloyd, Withey House, Withey Close West, Bristol 9.
Royston J. Morgan, 7 De-Breos Street, Brynmill, Swansea.
Anthony R. Morris, 310 Oystermouth Road, Swansea.
John Victor Osborne, 34 Haygate Road, Wellington, Shropshire.
Marion S. Pennant, The Gables, Dinas Powis, Glamorganshire.
J. Francis Roberts, Belle Vue, Highbury Drive, Blackwood, Mons.
Dr. A.J. Sutcliffe, Dept. of Palaeontology, British Museum, London.
William D. Toye, Cherry Trees, Ingleton Road, Carshalton Beeches, Surrey.

WINTER LECTURES AND FILM SHOWS.

Lewis Railton	Caving in General - 3D Colour Slides	18th November
Tom Andrews	(Westminster Speleological Group) Tryglav Jugoslavia.	9th December
'HAZARD' A film of Climbing in the Italian Dolomites with Full Supporting Programme.		27 th January

SURVIVAL RATIONS

Horlicks Ltd. have been concerned in supplying Special Rations for various Armed Forces and Expeditions since the very early days of Polar Exploration and now have available for general sale, Survival Rations of various kinds. Amongst these are some which may be of interest to members:

Rum Flavoured Fudge No. 18.
Chocolate Flavoured Fudge No. 19.

These are 7 oz. blocks, Vacuum Sealed in Aluminium foil, about the size of a pack of cards. The value of such a lump is about 800 Calories and this alone daily would be nearly sufficient to maintain full efficiency in a man for several days, even though water was restricted to about one pint daily per head.

These fudges are also available in 1 oz. bars, wrapped in waxed paper which may be vacuum packed in multiples of 1 oz. up to 8 ozs.

There are various Special Bar Rations of meat and vegetable, vacuum packed, which provide about 1,000 Calories - sufficient for one day and the choice depends on the amount of water available to go with them. HF 5 is suitable for cold weather with shortage of water, and HF 6 & HF8 for cold where water is in good supply.

Horlicks have also put out a special cave emergency ration MRO/6C/3 and 2 man 1 day and Mountain Trekking rations (2 men 2 days) for the British Outward Bound Scheme. Other Emergency rations are used by Electricity Board maintenance gangs and are supplied to airliners and ships.

At present Thos. Block and Sons Ltd. and Benjamin Edginton are acting as marketing agents.

Prices.

Rum Fudge	No. 18	7 oz.	4/10d. each.
Chocolate dge	No. 19	"	" "
Bar Rations	HF / 5	6 oz.	5/3 "
	HF /66 (double size)		9/- "
	HF /88 "		" "
	MRO/60/3		33/- "

It is to be noted that the small bars of Fudge and HF are intended only for survival whereas the emergency rations such as the MRO are full rations with 'comforts' added. The fudge in particular is sufficiently small and useful to be carried on all expeditions in the way that spare bulbs are carried.

If members are interested in purchasing any of these rations more information is available and if the demand is sufficient then it may be possible to obtain them at reduced rates if a single order was made in the Club's name.

R.M. Williams.

ANNUAL SUBSCRIPTIONS. ********** **********

Is YOUR Annual Subscription for 1961 still outstanding?
If so, please send it to the Hon. Treasurer, L.A. Hawes, Cribarth, Court Moor Av., Fleet, Hants., as soon as possible and save him the trouble and expense of having to send you a personal reminder.

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COTTAGE FEES

If you are making an overnight stay at the H.Q. it would be appreciated if you would sign in on arrival rather than leave it until the last minute rush before leaving. You may if you wish hand your money preferably to the Cottage

Warden, or if he is not available, to any member of the Committee.

PUBLICATIONS RECEIVED OR PURCHASED UP TO 21st JUNE 1961.

Purchased for the Club:-

'The Mineral Wealth of Wales and its Exploitation'. by T.M. Thomas.
'Caving in North Wales' by F.J. Davies and B.M. Ellis.

Publications received:-

Axbridge Caving Group Newsletters, February, March, April and May.
The Belfry Bulletin of the B.E.C. Nos. 156 and 157.
Cave and Crag Club Newsletter, March to May inclusive.
'Cave Rescue' by Dr. O.C. Lloyd. Occasional Publications No.3. C.R.G.
Cave Research Group Newsletters No. 82.
Chelsea Speleological Society Vol.3. Nos.,5,6,7 and 8.
Gloucester Speleological Society Journal. Nos.1 and 2.
The Journal of the Mendip Caving Group. No.2.
National Speleological Society News. Vol.19. Nos.1,2 and 3.
Bulletin of the National Speleological Society. Vol.22 and Vol.23
Shepton Mallet Caving Club. Series 3. Journal No.1.
Wessex Cave Club. Vol.6. Nos.78 and 79.
Westminster Speleological Group Bulletin. March.
'Zoology' by J. Brough, C. Matheson and G.T. Jefferson.
'The Signpost' 15 issues giving B.N.S. caving news.
'Inra' Nos.2,3,4,5, contain articles on Cuban caves.
'Codification of Bibliographical Card-Index' published by Service d'Information Geologique du B.R.C.G.M. Paris.

NANT MADEN ROUND CAIRN, CWM CADLAN, PENDERYN, Breconshire.

I have been excavating this round cairn for two seasons and have not yet found the main burial at its centre, but only four secondary burials around the margin - cremations with Middle Bronze Age pottery. Since I want to do a cave dig and must finish the present one first, this is an APPEAL for volunteers to complete the excavation. It is a very interesting site and to date has yielded flint arrowheads, scrapers and Bronze Age pottery of at least two dates. Will anyone willing to dig at Cwm Cadlan on October 14th or 15th drop me a line to 39 Heol Isaf, Radyr, Glamorganshire. Please?

D.P. Webley.

CHANGE OF ADDRESS.

Mr. and Mrs. Roger Smith, 146 Cherry Hinton Road, Cambridge.
Mike Deurden, 44 Moreton Street, London S.W.1.
Mr. and Mrs. A Waldron, Trevayne, 66 Queens Road, Hertford.
Dick Basham, P.O.Box 3, Derna, Cyrenaica, Libya, N. Africa.
Neil Jones, 17 Sandford Road, Moseley, B'ham 13.
Seaton Phillips, Heightington House, Bewdly, Worcs.
John Alexander, Flat 2, 70 Talbot Road, Manchester 16 (temporary)
Dr. D.M.M. Thompson, c/o G.M. Thomas, 5 Whateley's Drive, Kenilworth.

2. ACCIDENT AT PENCOED, GLAMORGAN

ACCOUNT OF THE FATAL CAVING ACCIDENT AT PENCOED, GLAMORGAN, ON 11TH JUNE, 1961.

Location of Cave

After questioning local people, I located the entrance on 3rd June. It is known as OGOF PANT-Y-GOG (Cuckoo's Hollow Cave) and is in a wood called Coed-y-mwstwr, 3 miles east of Bridgend. The N.G.R. is SS.951.807.

Personnel

Tony Lewis (deceased), aged 20; speleological experience limited to a few months before the accident.

John Williams, aged 20; similar experience.

M. Davies, aged 32; Chairman or Secretary of B.N.S Speleology Section since 1954, and member of South Wales Caving Club and Agen Allwedd Cave Management Committee.

Description of Accident.

The three of us entered the cave, properly equipped, at about noon. Tony and John wore fibre-glass safety helmets, and I a miner's helmet. Lighting was by carbide lamp and, not knowing what the cave had to offer we also had 2 hammers, a 7 ft. nylon rope, a 120 ft. full-weight nylon rope, a 30 ft. wire ladder ('ele tron' type) and a 3 ft. crowbar.

A lofty passage ran for about 250 ft., decorated with stumps of vandalised stalactites and obviously well-known to local boys, ending in a boulder-choke partly cemented by calcite. John and I probed various routes into the boulders, while Tony being of heavier build, brought up the rear. It soon became clear that the way on was upwards and that no cavers had tried this before since the work involved was not difficult. John and I went through what we termed the first constriction and came up to the second constriction (the fatal one), leaving Tony temporarily chipping at the first. After clearing some small, loose stuff John was able to squeeze through and soon announced that he could see past a small boulder choke into a chamber. Urged on by this news I forced myself through the second constriction also, but found it very tight. True enough, there was a chamber, and John said that he could clear the boulders and get through. This seemed a dangerous proposition to me, but entirely justified and no worse than other chokes I had seen tackled in the past. However, it was a one-man-job, for the second man would be liable to be in the way of boulders inadvertently sent rolling down towards the second constriction. Therefore, I retreated to the first constriction and helped Tony to negotiate it by hammering away the protrusions. Within a few minutes John joined us and announced that the choke had succumbed easily, and he had been able to have a quick look into the chamber.

With John leading we again approached the fateful second constriction; he and I squeezed through and up into the high level chamber which turned out

to be about 60 ft. long, 20 ft. wide, but mostly only 4 or 5 ft. high. Hearing Tony struggling in the second constriction I shouted down and told him not to force it because it was a 'fresh' boulder choke. John and I had been about 5 minutes in the chamber when we heard Tony shout "I'm stuck". Being accustomed to such announcements from cavers who immediately afterwards announce that they are free again, we ignored the first shout. But when he shouted again we realised that he was in trouble and quickly climbed down into the funnel-shaped hole above constriction 2. We found that Tony had his head and shoulders through the narrow part but a flattish slab had fallen, apparently from the wall, onto his chest and forced him onto his back. His hips were also jammed in the constriction (I found later), but he was struggling vigorously and things did not look bad at first. John and I straddled the slab facing each other, but failed to lift it. We then passed the short length of nylon under the slab, and, after tremendous effort, managed to lift one end momentarily about 3 inches. Meanwhile, Tony tried to get out from underneath. He was unsuccessful, and although we managed to lift the boulder slightly several time, he remained stuck. To make things worse the boulder appeared to be bedding down and became progressively more difficult to move. Within 5 minutes or so of first shouting Tony became unconscious and was thus unable to help himself. Having failed to lift the boulder, or wedge it up, John and I thought we might be able to slide it over into a recess nearby We cleared out the small boulders in the recess and tried this, but failed. Further, we were unable to lift the slab at all either due to fatigue or due to its having bedded down. We realised that help was necessary, and set about trying to find a way out ourselves. It was only about 30 ft. to the lofty entrance passage, and we were fortunate to find a route quickly. By pulling out boulders we entered a cavity which had a floor of large boulders with space visible underneath. Small slabs were pulled out, thus making a hole big enough for us to squeeze through. Having made sure that we could get out, I crawled back to examine Tony. He was a bluish-white about the face and still quite unconscious. I failed to detect a pulse in either wrist (his chest was inaccessible), and I also failed to detect breathing although my own exhalation was visible in the cold air of the cave. I therefore concluded that Tony was dead. Having joined John again, we discussed briefly what the next step should be.

I knew that Torcoed Farm, 10 minutes walk away, would probably have a telephone, but I considered that John lacked sufficient knowledge of the locality to direct a rescue party straight to the cave. I also thought that he should not be left alone in the cave. The decision was entirely mine, and it was to the effect that we should both go out. We then made telephone calls from the farm at about 3.15 p.m. to

(i) Bridgend Police and hence C.R.O.
(ii) My wife.
(iii) The garage where John and Tony worked.
(iv) Ian Butterworth (the Section Vice-Chairman)

Some 20 cavers arrived in just over an hour, and the police also called in the Fire Brigade and the Mine Rescue Service: a W.V.S. van provided welcome cups of tea.

M. Davies.
B.N.S.S.S.

CAVE RESCUE REPORT

3.20 Phone call received at Penwyllt H.Q. from Police H.Q. Bridgend requesting aid for a caving accident. Reported - one person thought dead and maybe unknown number trapped through a boulder fall in a cave at Coed-y-Mwstw Wood, Pencoed. This cave was comparatively unknown to members present and no-one knew its conditions.

The ladies at the club prepared a meal whilst members caving in the area were contacted. Equipment was loaded into vehicles and transport was organised. The Police were requested to contact C.R.O. doctor and 2 wardens near the area.

4.00 A rescue party of 25 was fed and equipped. Lack of local maps caused a little difficulty in finding the route to Pencoed.

4.45 The rescue party arrived at Torcoed Farm and were informed of the position. Rescue teams standing by were the Police with radios, Mine rescue, Fire Brigade and W.V.S. with canteen. No further contact by any of these teams had been made with the victim.

5.00 A reconnaissance party of 3 and a doctor entered the cave. Entrance passage large with no problems, going into a low crawl and rubble requiring digging. Then into a right then left constriction in the roof where the victim was trapped. The first constriction had to be enlarged to allow the party through and to make contact with the trapped caver. Only his legs could be reached. By all appearances there was no life but it was assumed that he was still alive so morphia was given. A small hole led to a chamber above the victim and a request for 4 small cavers was made.

5.53 A team of 4 managed to get above the victim but all mannual attempts to raise the offending boulder failed. A request for ropes and pulleys was passed out and an attempt to rig lifting tackle was made.

7.15 After many difficulties the tackle was rigged. Second C.R.O. doctor arrived and little doubt was left that the caver was dead.

8.30 Boulder eventually lifted using 4 : 1 pulley tackle and 7 men; 4 above and 3 below.

9.00 Body recovered from constriction and prepared for stretcher party.

9.10 Second team commenced enlarging constrictions and bringing victim out.

11.10 Entrance reached.

11.15 Ambulance reached and recovery of equipment commenced.

CONCLUSION

This incident was caused through no neglect of good caving practice but

purely bad fortune. The victim sustained no injuries and the cause of death was due to restricted breathing through the compression of the boulder. Co-operation between all rescue parties was excellent and a good effort was made by one and all in very unpleasant circumstances.

G. Clissold.
Hon. C.R.O., S.W.C.C.

3. DIVER'S NEWS

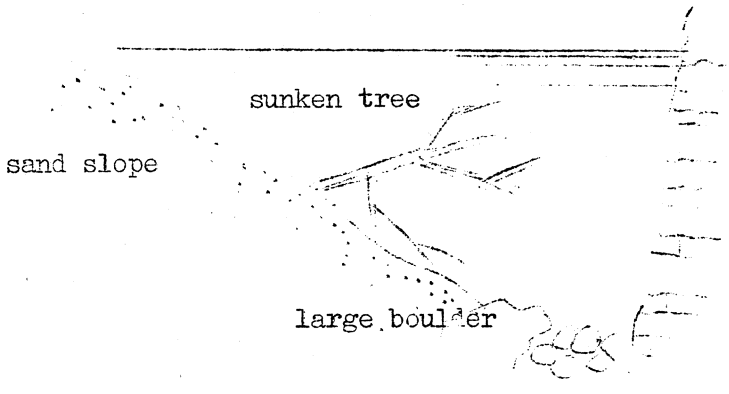
PWLL DU, YSTRADFELLTE

A large circular resurgence adjoining the River Neath. In wet weather much water rises from it, tumbling over the intervening sill into the main river, but at the time of the dive dry conditions prevailed. The pool looked green and gloomy, offering a promise of extensive caves beyond.

The operation began with a reconnaissance by one of the two divers alone on a life line from the surface. Unfortunately this was all that proved necessary as will be realised from his account of the dive.

"Entered the water very gingerly taking care not to disturb the loose mud bank. The pool looked immensly deep, doubts about the sufficiency of 70/30 crept in. (A mixture of oxygen and nitrogen permitting descent to a depth of 65') The aflo was handed in and secured ashore. On submerging the water appeared a rich green. It was so charged with algae that the bottom was invisible. I followed the rock wall down , every moment expecting to see a gaping passage leading off. The green water seemed to reach down to an immense depth. When the bottom appeared I was relieved and yet desperate to find a way on that must exist. The pool was like an inverted cone, all but one side being bounded by a sandy slope. There was no major passage. The boulders forming the bottom were very large and quite free of sand. Peering into the gaps the way on was clearly straight down. Particles of dirt were rising through the boulders; this was the only egress for the water."

A second dive established the true depth as 26 ft at the deepest part



RIVER CLYDACH, BRYNMAWR.

In the bed of the River Clydach just above the Devil's Bridge below Blackrock, between Brynmawr and Gilwern, a deep pothole gives rise to a large amount of water during wet weather. Following a drowning it is said that attempts were made to fill the hole with rocky rubble but that after a heavy flood the force of the resurgence had thrown it all out again. There is some possibility that this may be a rising from Agen Allwedd on the other side of the mountain since at a depth of 25 ft. from river level the appropriate stratum of limestone recurs. Thus by descending the pot to this depth it was hoped to get into A.A. through the 'back door'.

Unfortunately the outfall of the Brynmawr Sewage Works pours out its load not far above the pothole and in dry weather, as on the day of the dive, dilution by clean river water is almost nil. The colour of the effluent is better not described here, and the once delightful waterfalls and rapids produce a fine froth of detergent. Brushing this aside one diver plunged in on a lifeline (his noseclip more than usually useful) but at about 15 ft found progress stopped by an impenetrable mass of brushwood, (later believed to have come from tree felling for the new motor road.) Visibility was nil and feeling did not show any sign of passages leading off. The pot seemed to be roughly oval in shape, about 5 ft. by 4 ft, with an overhang on the upstream end. If we can stomach it, this hole may be worth another visit in wet weather when it has had a chance to clear, though the odds are that it may be another Pwll Du.

Our thanks to Inett Homes and David Leitch for introducing us to this novel diving site, and to the members of the Hereford Caving Club who assisted with the gear.

OGOF FFYNNON DDU

A visit with the object of using Bill Birchenough's wireless locating apparatus to try to position the passage above Shrimp Hall in the hope of being able to dig through and so make a dry land connection between Boulder Series and the passages that lie beyond Dip Sump.

It was found possible to establish telephone communication between Dip Sump and Shrimp Hall which was a great comfort to the divers and a relief to the monotony for those waiting at base, though on the return trip through the sump the various wires caused the divers some confusion. Unfortunately although radio connection was made with the "Morganator" the two operators appeared to be too far apart to make any physical connection possible.

Brian de Graaf.
Charles Owen George.

4. THE UNDERGROUND LABORATORY AT MOULIS

The 'Laboratoire Souterrain de Moulis' is situated in a small village of that name on the French side of the Pyrenees about 3 miles from St. Girons in the Ariege. It has been set up by the Centre National de la Recherche Scientifique for the express purpose of studying cave-dwelling animals in their natural habitats and has been placed under the directorship of Professor A. Vandel of the University of Toulouse. The laboratory has been well known in scientific circles for some time, but in the last year or so much wider interest has been aroused in it in this country by the showing of the very fine colour film, 'Faune Cavernicole', which was made there.

David Jenkins and I, with our respective families, were touring in the Pyrenees in August 1960 (see December '60 Newsletter) and duly arrived at Moulis one Friday morning armed with a very kind invitation from Professor Vandel to visit the laboratory. Moulis itself is a small place and, in a region where one sees little real poverty, seemed to be rather poorer than many Pyrenean villages. At St. Marcet, less than 25 miles away, very rich sources of natural gas are being exploited, but Moulis is untouched by such developments and has suffered considerably from depopulation; were it not for the presence of the laboratory it would undoubtedly have dwindled even further. The surface buildings of the laboratory contrast strikingly with the village; their fine modern construction is on a surprisingly large scale, and when we were there extensive additional building was in progress. This had resulted in a certain amount of disorganisation, with furniture stacked in corridors and with some rooms out of action for the time being, but even so it was very impressive and must be a fine place to work in. Living accommodation for staff and visiting students is provided as well as the more usual features of a research station including laboratories, library, workshops and so on.

Professor Vandel was away at the time, and we were shown around by the chief laboratory steward, Michel Bouillon, who is a great character and a mine of information on Pyrenean caves and their animals. In the surface laboratory we admired a fine collection of cave bear skulls, looked at cave plans, and met those of the resident scientific staff who were not away on holiday. My attempts to talk zoological shop with the latter soon started running into linguistic difficulties and looked like getting nowhere fast until David conjured up - I never knew from where - the most almightly French - English dictionary, which he proceeded to use with consummate skill. Presumably he keeps it up his jumper for just such an eventuality.

The barrier to scientific intercourse having been thus surmounted, we were take off to the cave laboratory by Michel Bouillon who doesn't allow language to present any barrier at all. He speaks no English, but his powers of mime are such that a conversation with him is not only intelligible, but riotously funny. The underground laboratory is some two or three hundred yards away from the surface buildings, in the Grotte des Moulis. The original entrance to the cave is rather small and a new one has been made nearby. Access is through a small entrance building which houses the compressed air plant and, as it has two sets of steel doors, also functions as an air lock. A short passage leads into the laboratory proper. This consists of a series of fair-sized interconnected chambers which have had the floors levelled and concreted, but otherwise, apart from the fittings are substantially in their natural state.

The first part of the laboratory houses the cultures of terrestrial animals - insects, spiders, millipedes and the like. These are mostly reared in wooden boxes lined with clay and covered with glass plates. The boxes stand on benches, and although the general illumination is at all times kept to a minimum, the animals can be examined when necessary by the light of a shielded inspection lamp. In the second chamber there are the cultures of aquatic invertebrates including annelids, flatworms, and of course, the cave crustacea. We were particularly impressed by the collection of Niphargus. Several different species are being reared including one enormous brute almost big enough to have culinary possibilities. It appears that the Niphargus species kept at Moulis mostly take about 3 years to become mature and then continue to live, barring accidents, for at least a further three years (that is as long as they have been rearing them).

It is undoubtedly the excellent facilities available which make possible the large-scale rearing of these rather delicate aquatic creatures. Cave water and compressed air is on tap above each bench so that all the tanks and aquarium jars can be provided with both running water and aeration. Waste water is carried away by a system of bench and floor drains.

Further on still there are large aquarium tanks provided with running water and housing cave amphibia. There are some newts which have been found in Pyrenean caves, although they normally live on the surface, but undoubtedly the most spectacular animals in the whole place are the Proteus. These long aquatic salamanders with short legs are confined to subterranean waters and have only been found in certain caves in the Balkans. The adults are blind and unpigmented. I was familiar with them as museum specimens and expected them to be white, but in fact they are a delicate shade of pink. The difficulties of transporting them from Yugoslavia were considerable and, as described by Michel Bouillon, also highly amusing, but there is now a thriving stock at Moulis and they are being bred successfully - an achievement of which the staff are justifiably proud.

At the end of that part of the cave which is used as a laboratory, a dam has been built and a large pool has been formed. Although we were invited to use it as a swimming bath (we declined), it is really the reservoir from which cave water is automatically pumped to the header tanks supplying all parts of the laboratory. After having the broad outline of the plumbing of the cave explained to us, we reluctantly retraced our steps to the surface, stopping on the way to admire a very fine stalagmite flow in a small side chamber. I don't think any of us will forget our visit to Moulis in a hurry; we were impressed with almost everything about the whole research station and not least of all by the warmth and friendliness with which we were received.

G.T. Jefferson.

5. HAZARDS OF HANDLING EXPLOSIVES

This is not an article telling people how to avoid getting themselves blown up when large rocks are being made smaller by 'chemical persuasion', but is an outline of the toxic effects of explosive mixtures and the fumes which result from their detonation.

The explosives commonly used by members of S.W.C.C. are Nobel Polar Ammon Gelignite and Plaster Gelatine. These depend on their trinitroglycerine content for their explosive powers. 'Gelignite' is approximately 60% nitroglycerine, 5% guncotton, 27% nitrate of some sort and 8% woodmeal. Trinitroglycerine is used medically to dilate narrowed blood vessels in the heart in the treatment of Angina. It causes an increase in pulse rate, dilates the blood vessels supplying the brain thus increasing the blood supply to that area and raising the intracranial pressure, giving rise to headache in many cases. All these are the symptoms of the familiar 'Banger Headache'. Medicinally it is taken by mouth, but it is also readily absorbed through intact skin. Its vapour has an equally powerful effect even when diluted by a large volume of air.

The susceptibility of individuals to the action of nitroglycerine is very variable, but in all cases the effect is greatly enhanced by heat and alcohol. In other words, copious draughts of beer taken in a warm atmosphere will make the headache and other symptoms resulting from moulding explosive by hand or exposure to the vapour, very much worse.

The headache affects those who have never been in contact with the explosive before or those whose contact with it is intermittant. People who are in constant contact with it become accustomed to it and it ceases to have a noticeable effect. It is therefore less likely to affect any member who is prepared to carry a small lump of it around with him everywhere - but such a course will probably result in nasty headaches for his friends and family! The headache begins as a severe throbbing in the frontal region and spreads until the whole head aches. Other symptoms which can arise with the headache are: flushing of the face, palpitations, feelings of weakness, passing of copious pale urine, nausea and occasionally vomiting. Little can be done to avoid 'Banger Headache' except to avoid using 'Banger'. Rubber gloves give a certain amount of protection against absorption through the skin but it is impossible to avoid inhaling some of the vapour. Once the headache is present the only drugs which are of use are the analgesics such as aspirin and caffeine. Strong coffee is said to help ease the pain. Certain drugs sugh as Ephedrine (a drug used in the treatment of allergic conditions) have been recommended for use before handling explosives but the degree of relief given by such drugs does not appear to be reliable and their experimental use has been personally disappointing.

Other explosives may contain trinitrotoluene or other aromatic compounds which can have a dangerous effect on the blood. Here again they are absorbed through the skin but in this case, large amounts are required before any symptoms develop. Continued handling for a period of time is required for the symptoms of headache, nausea and vomiting, and prostration to develop. Cyanosis appears due to the effect on the blood cells.

It is not only the handling of unexploded materials that can cause

discomfort and ill-health; equally dangerous are the products of their combustion. When a piece of Plaster Gelatine is burnt in air, dense brown fumes are seen to be given off, similar to those given off by fuming nitric acid. Explosives are designed and manufactured to be detonated under well-tamped conditions and the components are so balanced that under those conditions combustion is practically complete resulting in the release of CO_2, H_2O and free nitrogen. All these gases are harmless when breathed in. In actual practice there are always very small amounts of carbon monoxide and nitrous fumes produced as well for the ideal of complete, rapid, combustion is never attained.

Following detonation the atmosphere will also contain rock dust, which may be irritating to the lungs. The volume of such dust can be visibly assessed and thus excessive amounts avoided. There will also be small quantities of carbon monoxide and nitric oxide and nitrogen dioxide in the atmosphere and under certain conditions the concentrations of these gases can be appreciable:-

(i) If detonation is not complete
(ii) If slow combustion has taken place
(iii) If tamping has been poor
(iv) If ventilation is inadequate.

Nitrous fumes can be respired with little or no discomfort at the time, so that the effects are insidious. Since the least concentration which will produce coughing is only slightly less than the actual toxic concentration the appreciable margin of safety between realization of the risk and danger to life is very small. The initial symptoms are irritation of eyes and throat, cough and tightness of the chest. They may be so slight as to pass off unnoticed. Following the initial irritation, no further discomfort may result for some time and the person concerned may feel perfectly well and will have no inkling of what is in store for him. The action of the gas is directly on the spongy tissue in the lungs and causes an outpouring of fluid into the lung cavities. This clogs the lungs and causes asphyxia, 'Pulmonary Oedema'. The latent period between exposure and the development of major symptoms is between 2 and 20 hours during which time the person may feel only a slight weariness. The onset of the major symptoms may be sudden and may be precipitated by exertion. These symptoms vary in extent with the dose of gas taken and may include cough, tightness of the chest, difficulty in breathing, coughing of froth and blood-stained mucus, cyanosis and air hunger. Unconciousness and cardiac failure may follow. As long as the circulation remains good, the patient will tend to recover as the oedema recedes spontaneously on the second day. Thus mild cases may exhibit only a sort of bronchitis while severe cases may develop all the symptoms listed above and become unconcious.

Treatment consists of observation for 36 hours after exposure to nitrous fumes and if symptoms develop beyond a mild degree of wheeziness, medical aid should be sought. The patient should be kept still, either sitting or lying whichever is the most convenient and comfortable for him, and given oxygen. Oxygen should be given for 25 minutes at a time followed by a 5 minute observation period to see whether any improvement has occured in the patient's condition. If necessary oxygen should be administered for a further period of 25 minutes before pausing to note the patient's condition.

Carbon monoxide is also produced in explosions and this gas is poisonous even in very low concentrations. It accumulates in the bloodstream, having been absorbed from the air in the lungs, until it reaches toxic levels. The symptoms are progressively headache, giddyness, sense of oppression in the chest and loss of power in the legs and, sooner or later, unconciousness. The patient remains a good colour with pink complexion, which is classically described as "cherry pink" but this is not to be regarded as a good sign as it is due to the combination of the carbon monoxide with the haemoglobin in the blood in competition with the oxygen, thus leaving no uncombined haemoglobin in the blood to give the blue colour of cyanosis.

Treatment is to remove the patient from the source of the poisoning into fresh air, to give oxygen if very distressed and artificial respiration if necessary.

These then are the major hazards of explosives apart from their better known ones of sudden, violent disintegration.

R.M. Williams.

5. A WETTABLE CAVING SUIT

The right dress for caving is ever a problem. No one set of clothes can be comfortable when the going varies from dry and strenuous to complete immersion in cold water and then sitting waiting. Many attempts have been made at complete or partial water-proofing but these have been beneficial only for certain limited applications generally where the cold water or the wet could be made durable at the expense of having to avoid strenuous passages or of reducing speed to a slow amble.

Before the war attempts were made to endure cold water by smearing oneself all over with grease, which was messy and short lived, and later on wearing chest high waders; heavy clumsy things and nasty if you got out of your depth. After the war various patterns of exposure suits came onto the Government Surplus Market with increasing popularity with cavers. If not heavy and bulky the light rubberised material soon leaked to give very little protection. In order to wear normal boots the feet part of these suits were often cut off reducing the suit to a mere mackintosh. These were better than nothing.

The time actually spent immersed in water is usually only a small part of a trip. The shock of partial or total immersion may be great but the chilling effect of wet cloth for the rest of the day leads to tension and finally exhaustion if exposure to this condition prevails too long. (When you're too 'done' to shiver any more you're finished) Personal endurance appears to vary very much between individuals. Many people feel the cold as I do but some won't

admit they do. The ideal dress must be warm in water and cool for climbing.

Divers have been keeping themselves reasonably warm for many years by several kinds of diving suits. More recently underwater swimming has become popular and my attention was caught by the two different types of suit used. The first is the Dry Suit , rubber or rubberised cloth with light seals at wrists and neck etc designed to keep underclothing dry and thus warm. The second type is the Wet Suit a close fitting neoprene foam skin which insulates the body wet or dry without any other clothing underneath.

The dry suit is costly and with adequate clothes underneath is bulky making it easily snagged and punctured in cave conditions. A small leak quickly wets your clothes with the resulting loss of body heat. Buoyancy is very much increased but is liable to shift from body to legs making swimming hazardous and even more so when a leak causes a further reduction in buoyancy. Protection with overalls is essential. The insulation can be varied for any particular conditions by varying the under-clothing but no adjustment to meet changing conditions can be made without undressing.

The Wet Suit is cheaper and allows greater freedom of movement, bulk is less than the dry suit and even, less than conventional caving clothes. Damage to the suit is thus less likely, in any case leaks are of no consequence as the warmth is not appreciably affected by water inside. Tearing the suit results only in chilling that part of the body which is directly exposed to the external water by being uncovered. Buoyancy is slightly increased evenly and does not shift. Effects when deep diving may differ but do not concern the sump plunging caver. The degree of insulation is fixed by the material and its thickness although a suit with a 'zip' fastened jacket may be opened from neck to waist to avoid overheating. The performance of toilet functions is easier wearing this kind of suit than the dry suit. Although elastic, neoprene is unlike rubber because it is unaffected by oil or sweat and does not perish.

Often the caver is immersed for comparatively short periods and is in the cave for long periods after a wetting. Thus it is unnecessary to have as much insulation as a diver yet still be comfortable. The reduced insulation results in feeling cooler when immersed but no sudden physical shock is received getting into the water. The wet suit type of thing obviously pointed to the right solution. Underwater swimming friends eagerly helped by demonstrating their suits and discussing their warmth and pattern.

A home made suit of ¼ inch thick single skin neoprene foam finally emerged. This comprised a jacket with open ended zip fastener at the front and incorporating a wide Jock Strap; trousers reaching chest high providing with the jacket a double layer over the lower part of the trunk and the kidneys in particular. Patches of this 'cushy' material over the knees made for added comfort when crawling; a pair of bootees shaped like socks overlap the ankles of the trousers enabling ordinary caving boots to be worn. Seams were made by butt jointing with two coats of 'Evostick' Adhesive. Adjustments in size were made by cutting out 'darts' and resticking until the suit was just skin tight nearly everywhere. Talcum powder is used to help get into it.

For six months now I have worn this suit on every caving trip under

a wide variety of conditions at our prevailing cave temperatures of 48/49°F., from dry strenuous passages to wet muddy crawls and short swims in Welsh mountain rivers during February. A boiler suit was warn over the top for protection and for the pockets in it. The only parts of the Neoprene suit to show wear are the 'socks'(mended with adhesive) . The patent brass buttons securing the jock strap at the front failed and I have fallen back on strings, until I have another search for patent fasteners of the eye type. The Zip has given no trouble in use, it is a heavy duty brass one. It is more of a convenience than an essential. A jambed zip would only mean that the jacket would have to be pulled off over the head by a colleague. Several inches of seams came unstuck at first due to faulty glueing or not clean cut edges. These were given 'Evostick' first aid treatment. The 'Natural' skin edges of the pieces of the material as bought cannot be joined and must be cut away to make butted joints.

After use the outside skin of the suit dries almost immediately and you can sit in a clean car as soon as you have got your overalls off. Completely stripping off in exposed places is unnecessary. Removed and rinsed where convenient, the suit soon dries if turned inside out; no wet clothes to drag on for the second day. Exploring the wettest caves is now a sheer joy. The vilest lakes are now like tepid baths.

The suit described above cost me about £5-5-0 to make, but similar suits can be bought made to measure (£9-£12) or just patterns and materials for £5 -£8 from the several suppliers of underwater equipment. Undoubtedly this suit is a great step forward as far as I am concerned. Some people might want thicker suits for prolonged immersersion and others may find that the trousers and socks are all they want for wading. A shorts and vest pattern could be devised by those cavers only concerned about keeping their trunks warm. Originally I thought of making a one piece garment but the experience with the separate piece suit convinced me that adaptability was an advantage for quicker Talcing,easier dressing, adjustability and quicker washing, drying and repairing.

Now I can look at the formations which previously I forged past with chattering teeth. Comfort is spread over a wider range of conditions than with conventional caving clothes, enabling a better look and a longer time in a fit condition. This is another step ahead of exhaustion and consequently for safety as well.

W.H. Little.

7. CAVE DIVING WITHOUT TEARS (?) II

In Three Easy Lessons

2. EQUIPMENT

There is a great variety of apparatus available to the diver. In this

analysis all types are listed but only those suited to cave diving are at all detailed. We in fact use a 'Closed Circuit' type.

ANALYSIS OF EQUIPMENT

A. Dependent on a Surface Supply of Air.

(i) Standard gear (The familiar copper helmet and heavy boots)
(ii) 'Hookah' (A light mask with built in demand valve)
(iii) Armoured Suits and Diving Bells (Not Belles)

All the above require air supplied by pumps or banks of cylinders. They are cumbersome and expensive. There is always a danger of severing or trapping the air supply hose on an under-water projection, and with a submerged cave passage of any length it would be impossible for a diver to drag his hose around the bends. There can be no reserve supply of air, for emergencies.

Despite these disadvantages, Standard gear has been used at Wookey Hole and abroad, but all the attempts have been abandoned as impracticable.

Type (ii) has been used in short sumps for mock rescues. But we feel it is of little practical value. There is the difficulty of air supply, and in use it is considered a dangerous method by the R.N.; the diver feels insecure and uncommonly vulnerable.

B. Self Contained

All types give the wearer great manoeuvrability and a range of action free from any dependence on a surface supply. The breathing set is always independent of any protective clothing (worn if necessary)

(i) Open Circuit.

Comprises:- a high pressure cylinder filled with compressed air at 1,800 lbs. pressure (fully charged). This air is then fed to a mouth-piece, either by

a. A direct hand operated valve on the cylinder.
b. A constant flow valve and pressure reducer.
c. 'Supply on Demand' valve.

Type a., the simplest possible form, is very wasteful of air. The first self contained sets used this method.

In Type b. the pressure is lowered and flows continuously. The endurance is short.

In Type c. the high pressure air is released by a compensated lever valve. An inhalation creates a partial vacuum which depresses a diaphragm, this diaphragm acts upon the levers controlling the valve and air is allowed to the mouthpiece. The supply is cut off the moment the diver's 'demand' ceases.

This most efficient valve is embodied in various makes of apparatus, known generally as 'Aqualungs'. In all these types the air is exhaled into the water.

A diver requires approx. 1 cu.ft. of air per minute. To store enough air for a reasonable period of time under water the cylinders must be large. Two 50 cu.ft. cylinders which weigh about 60 lbs. are the largest practicable size which a diver can carry. As the volume of air consumed increases proportionately to the depth achieved, so the two 50 cu.ft. cylinders will only last 40 minutes at 33 ft. when a safety margin of 30% is allowed.

The bulk of the cylinders and their comparatively short endurance, cause us to reject the set even though it is extremely safe and easy to use.

Those interested would do well to read the British Sub Aqua Club's manual which goes into all the technicalities and safety precautions.

(ii) Closed Circuit.

Compressed Oxygen (O_2) or a mixture of Nitrogen (N_2) and O_2 are led via a reducer to a rubber breathing bag (or reservoir) It then leaves the bag by passing through a canister charged with a chemical Carbon Dioxide (CO_2) Absorbent and is inhaled by the diver. On exhaling, the exhausted gas may return to the bag either by:-

a. The 'Pendulum' Method - The exhaled gas passes back through the Canister into the bag.

b. The 'Two-Way' Method - Instead of passing through the canister, it goes directly to the bag, via a second tube.

The advantage of a. is that most of the gas passes twice through the CO_2 absorbent, greatly improving its efficiency. To its disadvantage a certain amount of gas remains in 'dead space'. This means that the gas which is in the breathing tube between the canister and the mouth-piece, at the end of an exhalation, is drawn back into the lungs on inhaling, without having been purified in the canister. To minimise this effect the diver should make a conscious effort to breathe deeply.

As the R.N. uses Type a. we do too, as commercial models are expensive and inferior.

An 'Open Circuit' uses 1 cu.ft. per minute, but the closed circuit only requires 1.5 litres per minute when 100% O_2 is breathed; or roughly $\frac{1}{8}$ of the volume of air required by the Open Circuit. The cylinders are smaller and lighter and are usually designed for a pressure of 3,000 lbs.pressure (fully charged) The effective life of the set is governed by the capacity and efficiency of the CO_2 absorbent.

(iii) The Gear We Use

An ex-naval model, the 'Universal Breathing Apparatus' Patt.No 5562

is a highly efficient,'Closed Circuit' Pendulum type set.

There is a choice of cylinders:-

a. Small double bottles carried on the stomach for O_2 lasting 80 minutes

b. Large, double bottles carried on the back for mixtures of O_2 and N_2 lasting 80 minutes and over

c. Small single bottle as a reserve cylinder - lasts 30 minutes.

The high pressure gas(3,000 lbs.) is led through a constant mass reducer. This gives a steady flow which can be regulated from .5 to 10 litres per minute. There is a by-pass valve for allowing direct high pressure gas into the breathing bag.

The flexible breathing bag of 8 litre capacity contains the CO_2 canister, holding approx. 2 lbs. of absorbent with a safe working life of 2 hours. Let into the bag is an adjustable pressure relief valve, to avoid the build up of excessive pressure in the bag, which would make breathing hard or might burst a lung.

Built into the back of the harness is a weight pouch. The weights may be jettisoned in an emergency to provide positive buoyancy.

The breathing tube is attached to the CO_2 canister and goes to a whole face mask with a gag for the mouth. The nose of the victim must be blanked off to avoid dead space in the mask. A two way cock is provided near the mask to allow air to be breathed on the surface.

iv. To Prepare for a Dive.

It is vital to check:-

a. Cylinder pressure (One Man did not: he died)
b. Set the reducer flow correctly.
c. That there is no leak. A leak will leave one short of breath!! or if it reaches the CO_2 absorbent gives the diver a 'cocktail' (Lungful of Caustic Soda - worse than Bill Birch's.)
d. Check functioning of relief valve (or pop goes a lung)
e. Have new CO_2 absorbent (or get CO_2 poisoning)
f. Check opening of emergency cylinder valve (it can stick).

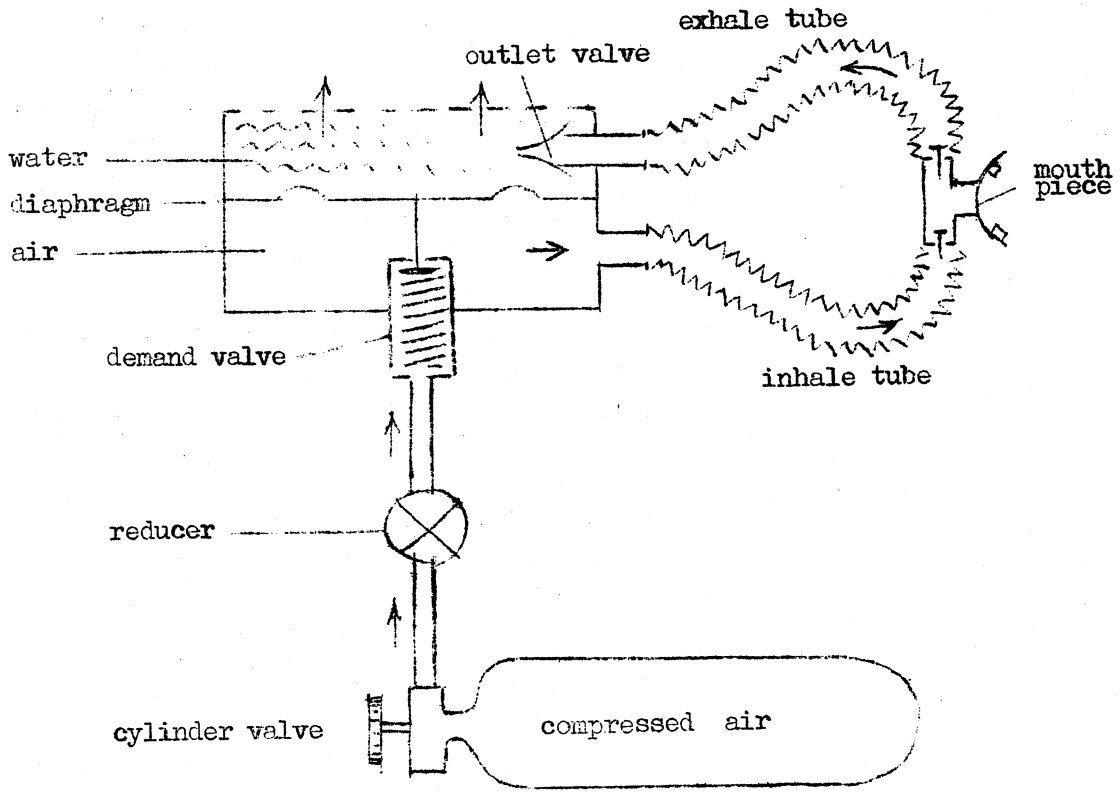
These checks keep everyone hanging about, but we hope you see why we do it.

For caving we make each set into several loads. This takes us longer to set up, but makes lighter loads. Each load is very fragile. A damaged thread is an end to the operation and is often absolutely irreplaceable. Government surplus gear does not grow on trees, whatever the tax payer may think!

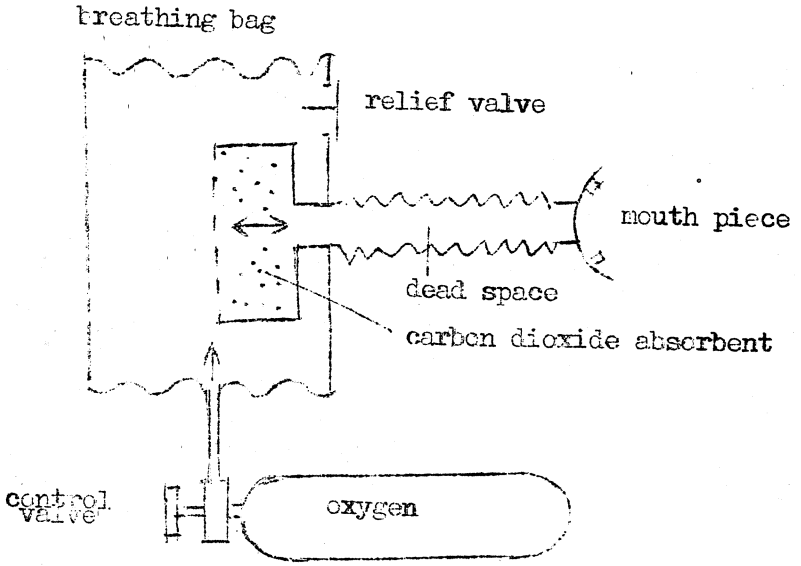
v. We welcome suggestions for sumps.

Dived so far:- O.F.D. (Not Completed)
White Lady
Cwm Pwll-y-Rhyd (Connection proved)
Porth-yr-Ogof (Nothing to see)
Pwll Du (" " ")
River Clydach (" " ")
Llygad Llychwr (Needs another dive with mixture).

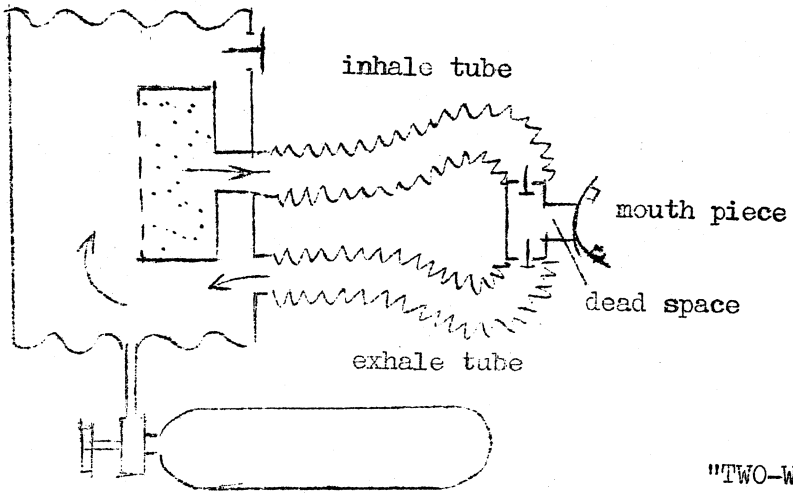
Charles Owen George.
Brian de Graaf.



OPEN CIRCUIT APPARATUS



"PENDULUM" TYPE



"TWO-WAY" TYPE

CLOSED CIRCUIT APPARATUS

SOME CAVE!

Time and place: During breakfast at the home of the Records Officer who is reading a letter from the previous Records Officer concerning the missing section of the O.F.D. survey.

Records Officer: "Ah! Good, Ann has found the Waterfall Series wrapped up in the Pant Mawr survey."

Wife of Records Officer (either not fully awake or with thoughts elsewhere) "How wonderful; so they have broken through at last!"

(Choking noises from far end of table).

8. AROUND AND ABOUT

Changes at Ogof Foel Fawr.

During a visit to Ogof Foel Fawr on April 9th.'61 an attempt was made to improve digging conditions in the loose boulders at the far end of ox-chamber.

The entrance to the downward dig in the far righthand corner was first improved by easing a large slab of rock down the slope of loose mud and boulders above the entrance, until it wedged itself on comparatively firm supports. This decreased the size of the entrance considerably, but made it a lot safer-looking.

After removing all obviously loose stuff from the 'aven' in the boulders overhead, but leaving undisturbed the gravity-defying keystones, the place was left to'settle', until a future visit.

Settlement soon became apparent. After 5 minutes of our outward journey a mighty roar was heard, sustained for several seconds, so of course, a return was made to investigate.

The chamber looked a little altered in appearance. The keystones had succumbed to the force of gravity, the aven was some 10 ft. higher, the entrance to the lower dig completely blocked and an avalanche of rocks had stopped within inches of the nearest of the precious bones.

Presumably this was the way the ox had entered originally so there is a chance of more bone discoveries being made when this new fall is cleared. An official archaeological visit should perhaps be made before any real damage is done, however. As far as can be seen, the large slab forming the entrance to the lower dig is still in position under the fall.

The chamber has now been left for further settlement!

S.C.L. Phillips.

Haffotty Mine.

During August I visited the Manganese mine marked as 'Haffotty Mine' on O.S. sheet 116 614186. It took a time to find it and when at last it was found there was little to be seen. The workings are very old and consist a very long vein of ore from which small levels were driven. The whole is in a state of decay and I do not advise anyone to waste time in visiting it. I suspect that other manganese mines in the area are also in the same state.
The references are:- 628 202
626 256
632 271
633 327

D.W. Jenkins.

Croesor Mine.

On the following day I visited the Croesor slate mine area with Bill Mills. Following the road up the mountain there is an old slate mine which has now been taken over by an Explosive Company and is used for the storage of explosive. Naturally the area is well protected (M.R. 116 / 656 455) By crossing the fence behind some old cottages and following the old miners' track a reservoir is reached and from there a short walk leads to some further disused mines (665 463). The surface workings are very extensive but give little indication of the vast labyrinth of tunnels underground. We entered the level and proceeded to walk and walk. There were one or two fair sized chambers and a very strong hurricane which blew down the main tunnel. At last we reached a big junction and took the left hand fork first. It was just one huge chamber after another and in one or two cottages had been built. In one chamber daylight was seen coming through a hole in the roof some 200 ft. above us. There were chambers leading off to lower levels but we did not attempt to explore these.

Back at the junction we followed the right fork which led us to one enormous chamber similar in a way to Starlight in O.F.D. There is a way on through this which we decided to save up for another day. Just before entering this chamber we crossed the bottom of a steep runway which had been used to haul up material (or lower it). At the bottom of this was a huge sledge some 6 ft. wide and 15 ft. long to which was attached a thick steel cable. Way up in the distance was a glimmer of daylight and so we decided to climb up. The slope was very steep indeed and levels led off at intervals. Fortunately we had the good sense not to touch the cable for it is attached to another sledge at the top and it appears that it would not take much to let the whole lot down (What a thought)! From a loading platform we followed a short passage to the open and found ourselves in the bottom of one of the biggest pits I have ever seen. Leaving Bill at the bottom as a photographer's model, I climbed out of the entrance into the base of the pit. At first it seemed that we should have to go back the way we had come for I seemed to be surrounded by smooth walls of slate. We did eventually find one and only one way out on to the top of the mountain.

Of all the mines I have ever been in this in a way was the finest. We by no means explored it all and it took us 2½ hours to do what we did. A final word of warning to any parties who may visit the place. Do not trespass on the mine used by the explosives firm and do not haul on the cable on the runway.

My thanks to Bill Birchenough for having first of all introduced me to the area.

D.W. Jenkins.

Backyard Caving.

Arriving at the H.Q. on 15th September, Bill Little Seaton Phillips, Marion and I were greeted by a letter from Laurie Galpin concerning a shake hole in someone's garden. We were also told by Bill Burton that since it was good growing weather it had grown to about 12 ft. in diameter and about the same in depth.

Next morning we visited the Evans at Pant-y-Wal. By now the hole had no bottom i.e. under a big projecting rock there was a dark hole. This was entered and we found a chamber with a sloping mud floor (i.e.the garden). At one end were obvious signs of a passage, also a strong stream could be heard. This was later shown to be equal to two W.C.'s flushed together. A few small formations could be seen in this chamber.

Since it was fairly certain that if the hole was left as it was it would continue to grow, an effort was made to wall up the stream and keep out the mud. Some fairly large boulders were placed at the bottom of the shake hole and smaller ones on top.

It seemed sad to have to fill up this promising cave but it seemed best with the closeness of the house.

W. Birchenough.