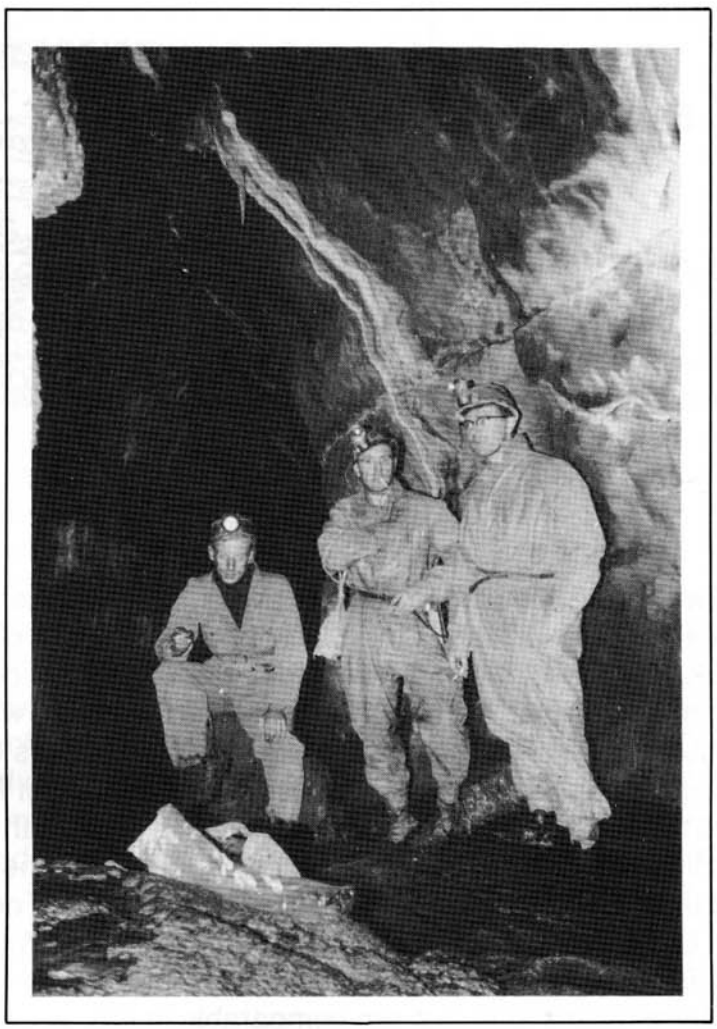
SOUTH WALES CAVING CLUB

clwb ogofeydd deheudir cymru

NEWSLETTER

No. 105

1989



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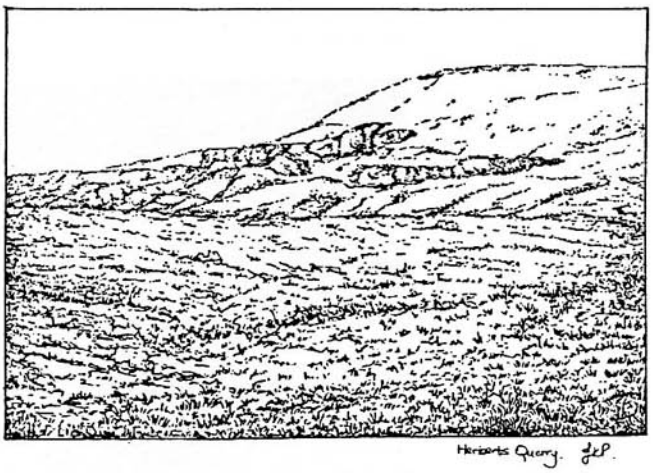
COVER PHOTOGRAPH; Cwm Dwr, May 1960 — with thanks to J. C. Saxton

OGOF FOEL FAWR

by

Bob Peat and Jenny Peat



INTRODUCTION.

Ogof Foel Fawr [SN 73501875] is a small cave situated on the North-Western slopes of the Foel Fawr upland in the Black Mountain region of the Brecon Beacons National Park. The limestone in the immediate vicinity of the cave has been much worked forming the extensive 'Herbert's Quarry'. The limestone was used not only for lime burning but also as a flux in the smelting of iron. Herbert's Quarry contains a number of speleological sites and another small cave, Ogof Pasg or Easter Cave [SN 73651883]. Ogof Pasg has been known for years with records dating back to 1850 [Hill,1946] but the cave was lost by quarrying in the 1950's and was not rediscovered until 1977 [Machin, 1977]. The history of Ogof Foel Fawr is less well documented but it was discovered in 1958 by Bill Birch and further extended in 1959 [Guest,1959]. Both caves are about 400-500 metres in length and contain some large phreatic passages that are comparable in size with the major cave systems presently known in the limestone outcrops of the Swansea valley to the East. The similarity between Ogof Foel Fawr and Ogof Pasg suggests that they are remnants of an old mature system whose catchment has long since been removed leaving fossil passages which have been infilled with glacial debris, moonmilk and calcite. Indeed, a rumour implies that these two sites have recently been connected [Farr,1989].

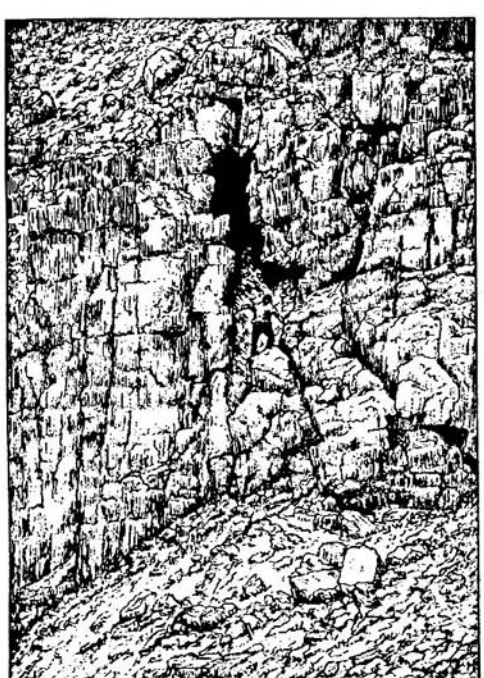
Although there is a survey for Ogof Pasg [Machin,1977], we were unable to find an accurate one for Ogof Foel Fawr despite it's long history, [Mills,1971; Oldham,1975] so in May 1985 the cave was surveyed. This cave is particularly simple in plan and for this reason was chosen to test the application of a conventional three dimensional molecular modelling routine for representing cave surveying data. The surveys are presented followed by a short description to familiarise the reader with the general layout of the cave, as the 3-D plots, even for such a simple system, are not easy to interpret.

SURVEY AND DESCRIPTION OF OGOF FOEL FAWR.

SURVEY.

The conventional cave survey is shown in figure 1. The measurements were obtained using a Suunto handheld compass and clinometer and a Fibron tape. The compass and clinometer were read to the nearest 0.5° and the tape to the nearest 0.1m. A total length of 490m was surveyed. The survey is complete except for a high level passage above Aven Series. The diagrams obtained from the molecular modelling program are shown in figure 2-8 for successive rotations around the vertical axis starting with a view from the North. The key for the labelling in all the diagrams is the same as in figure 2. The rectangle has the dimensions 160mx90mx40m with the longest side parallel to the N-S axis and the shortest side aligned with the vertical co-ordinate in the cave. To obtain a smooth rotation of the figure in real time, all the calculations and the new plot must be achieved faster than 60 milliseconds. This corresponds roughly to the 16 frames/second used in cine projection. This fast processor speed can only be achieved for a suitable number of survey stations on the more advanced PCs otherwise flexing of the backbone of the survey can be seen as it rotates. We used a Research Machines VX40/XL to do the calculations. The program was written in Turbo Pascal and run directly using the 80386 processor. It has been successfully run for a 1200 co-ordinate molecule which has a rotation speed of the order of 2 frames/ second. Although this sounds a large data set, even a small cave like Ogof Foel Fawr required 72 co-ordinates (survey stations) to be measured and this only defines the line plan. Including cross section co-ordinates, to add passage shape to the line plan, is an easy addition if the measurements are available but the data set then rapidly becomes large even for a small cave system.

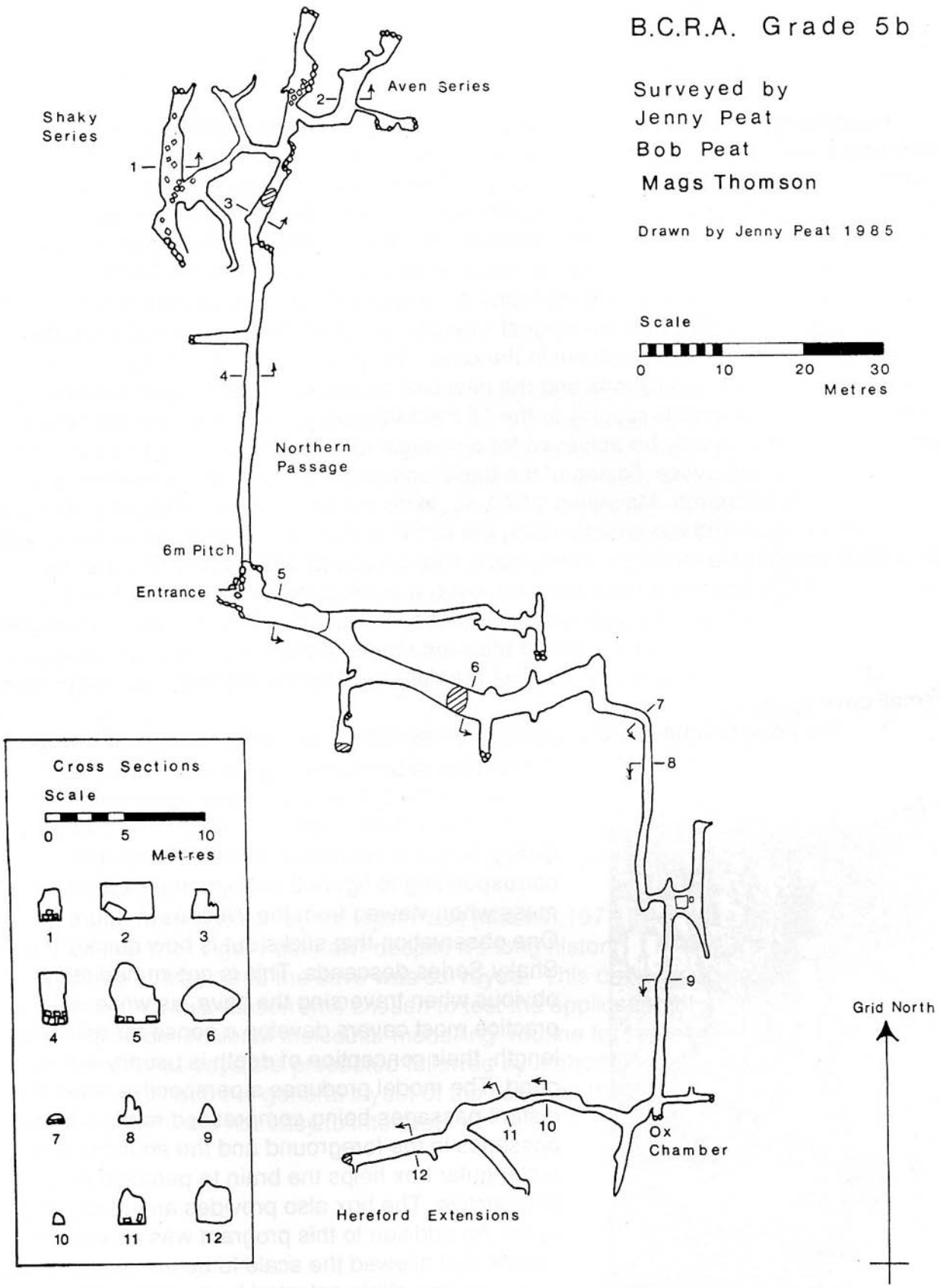
The first point to note is the complexity of the plots. The ability to rotate the diagram is essential in unscrambling the information as different viewing angles are more appropriate for certain parts of the cave than others. For example, Shaky Series is well defined in the orientation corresponding to figure 3 but becomes a jumbled mess when viewed from the West as in figure 8. One observation that sticks out is how quickly the Shaky Series descends. This is not immediately obvious when traversing the cave, as while with practice most cavers develop a sense for estimating length, their conception of depth is usually not so good. The model produces a perspective view, the distant passages being compressed relative to the passages in the foreground and the addition of a rectangular box helps the brain to perceive this perspective. The box also provides an indication of scale. An addition to this program was an expand feature that allowed the scale to be increased in real time about an origin selected by the user. This produced a zoom effect for examining a specific



Upper Herbert's Quarry Cave

Figure 1.

Ogof Foel Fawr



area in more detail. Rotation of 90°around either horizontal axis automatically produces a plan and provides the simplest check that no data errors have occured. The line plan in the key of figure 2 was produced this way and is comparable with the standard survey of figure1 but rotated anticlockwise through 90°.

Entrance Chamber.

The entrance shaft is about 2m x 1m and the descent of this soon leads to an impressive chamber littered with boulders. From the entrance chamber there are two ways on. To the left, an unobtrusive passage leads to Shaky Series, whereas the obvious main route ahead leads to Ox Chamber and the Hereford Extensions.

Main Route to Ox Chamber.

The main route is an eastward trending fossil passage about 2.5m wide by 3.5 m high containing much infill. After about 15 metres is a short climb down a calcite slope but directly opposite a rift passage can be seen which is reached by a short traverse on the left hand wall. The rift passage continues for 25m ending in calcited boulders.

At the bottom of the short climb an ascent is made to the previous level by climbing calcited boulders, passing on the right, a descending tube. This tube ends in a duck which is too tight to enter due to a calcite constriction.

The main passage is initially large but after passing through a small pool it lowers to only 1 metre. At intervals the passage is intersected by cavities formed by enlarged North-South joints.

On reaching a false gour floor the main passage changes direction heading North to South and the way on is now reduced to a flat out crawl. This was dug by S.W.C.C. members to enter Ox Chamber. This chamber is very close to the surface and voice contact has been made in the past. The name of Ox Chamber was derived from the many large bones that were found there, the horns of which belonged to a now extinct ox, Bos Priemogenius [Guest,1959].

Further digging out of Ox Chamber was continued by South Wales Caving Club members [Phillips,1961] but it was finally extended by the Hereford Caving Club in 1982 [Kealey,1982].

The Hereford Extensions.

Out of Ox Chamber the passage trends West steeply down a slope of loose boulders. To the left hand side, is a short passage which ends in mud. The way on however, is down a rift leading to a squeeze along a muddy tube. A small stream disappears on the right hand side and this has been tested to the Llygad Llwchwr resurgence [Rogers,1984].

The crawl continues steeply up a mud bank and enlarges into a phreatic passage. A climb to the left continues as a pleasant phreatic passage containing straws but this rapidly degenerates into a muddy tube that is too tight to proceed along. The main passage soon ends in a static pool from which there is no way on. There is a small draughting rift to the left which has been blasted without much success [Rogers,1985].

Shaky Series.

Leading off from the left hand corner of the Main Entrance Chamber, a tight 6m pitch can be descended that leads to a North trending joint controlled rift passage. After 40

Perspective Diagrams of Ogof Foel Fawr.

Key for figures 2-8 and line plan of Ogof Foel Fawr

A Aven series.
E Entrance.
H Hereford Extension.
O Ox Chamber.
S Shaky Series.

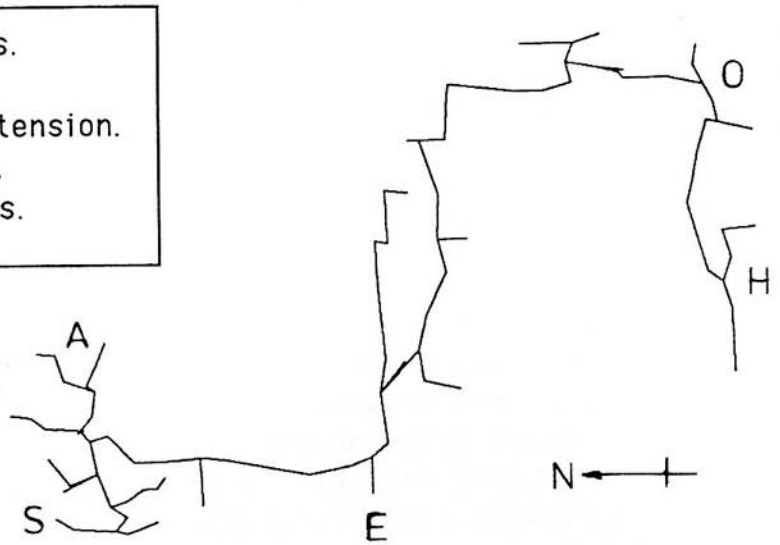
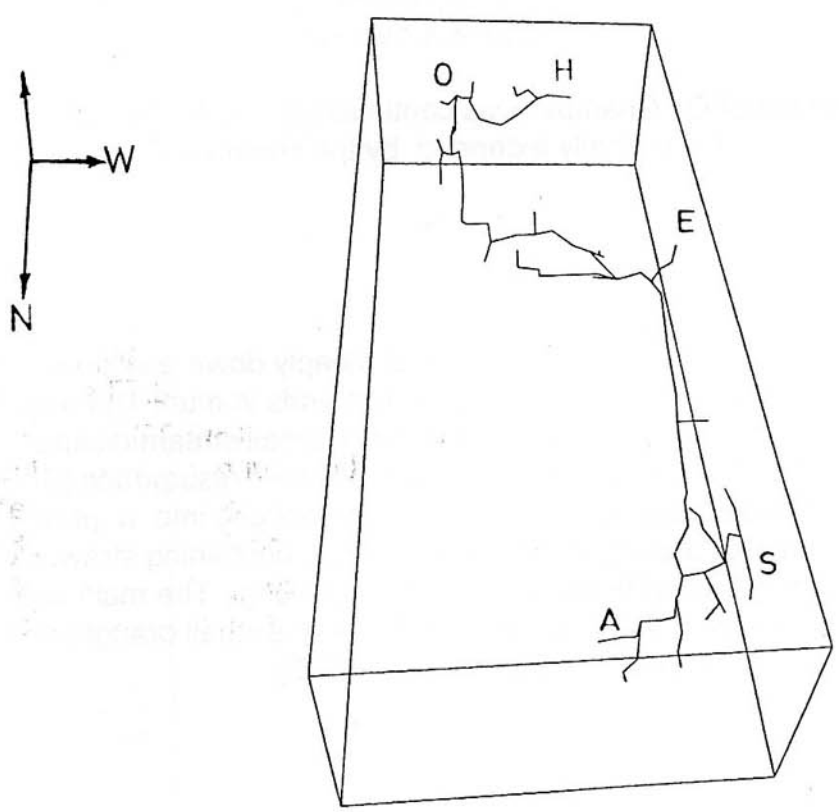


Figure 2. Aerial view from the North.



Perspective Diagrams of Ogof Foel Fawr.

Figure 3. Horizontal view from the North.

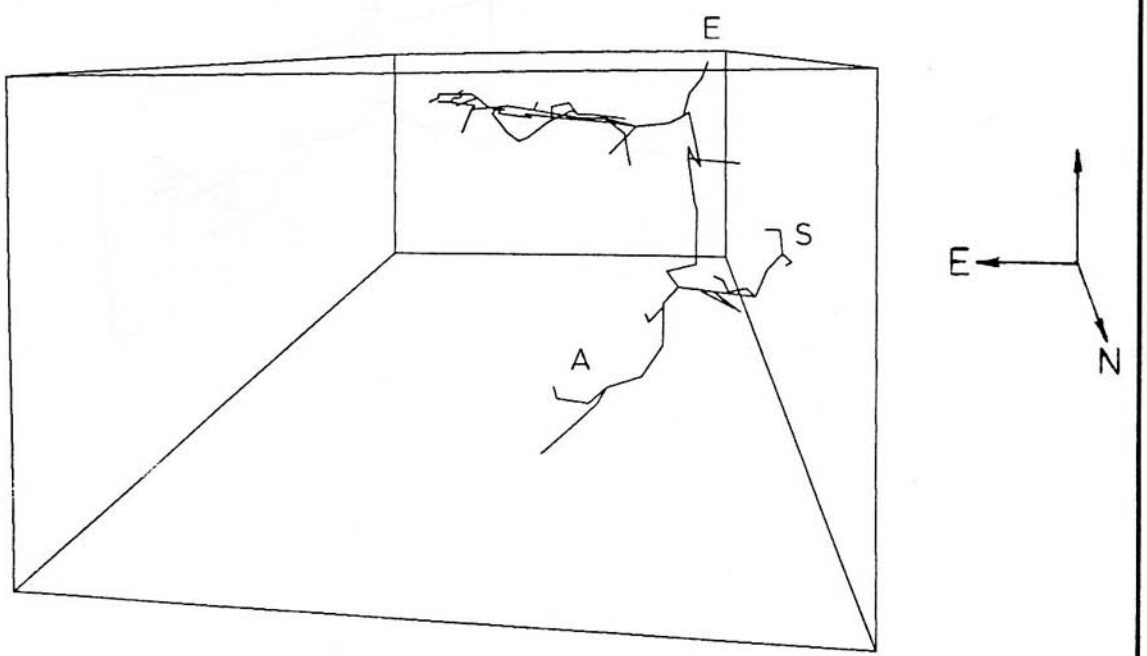
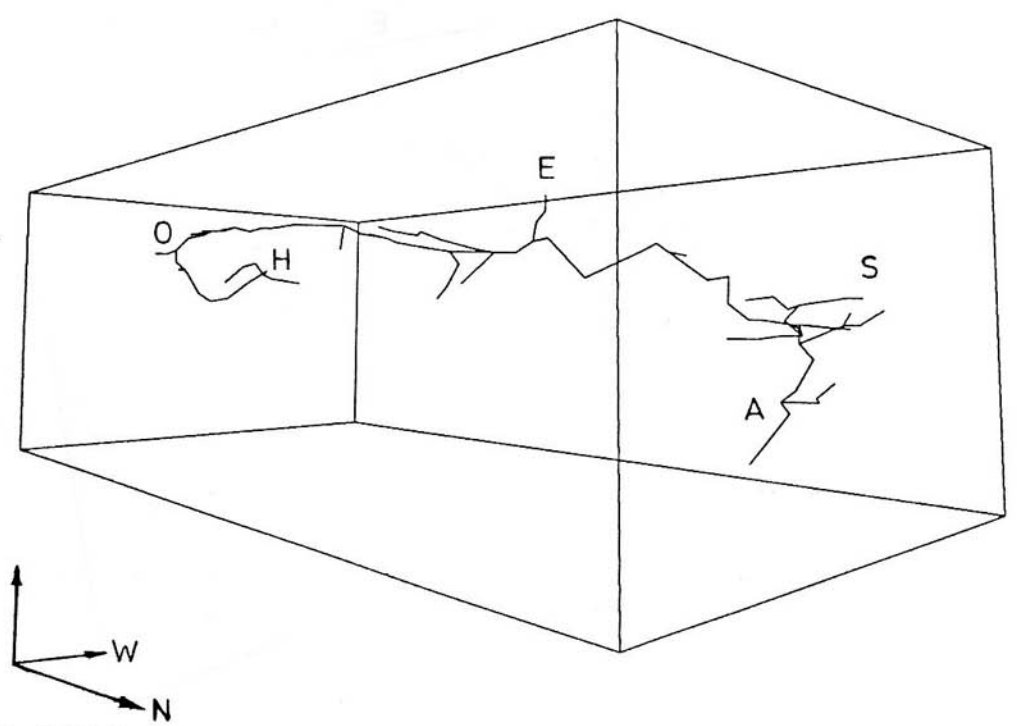


Figure 4. View from the North East.



Perspective Diagrams of Ogof Foel Fawr.

Figure 5. Tilted view from the North East.

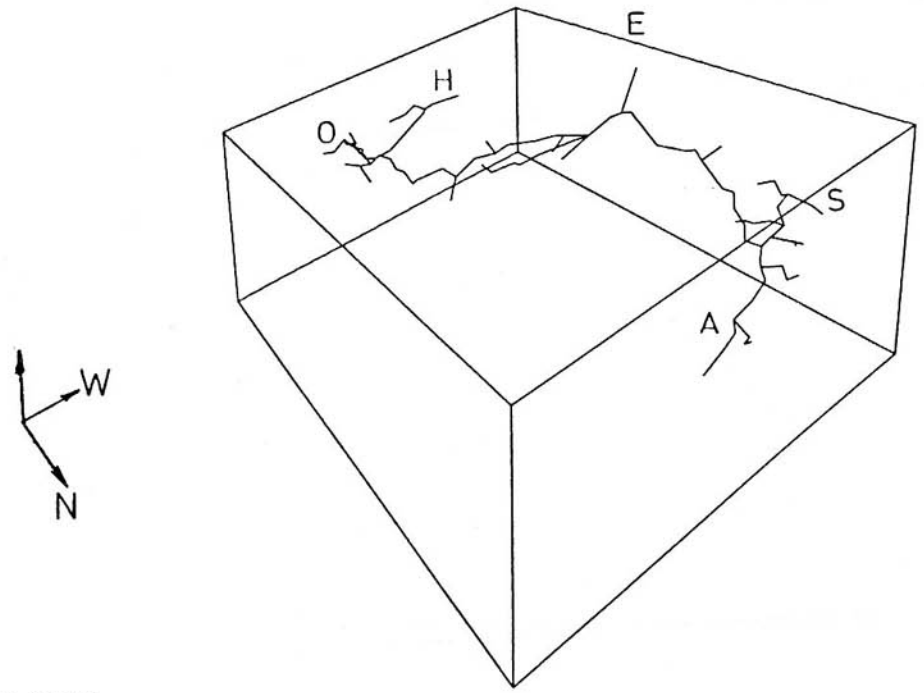
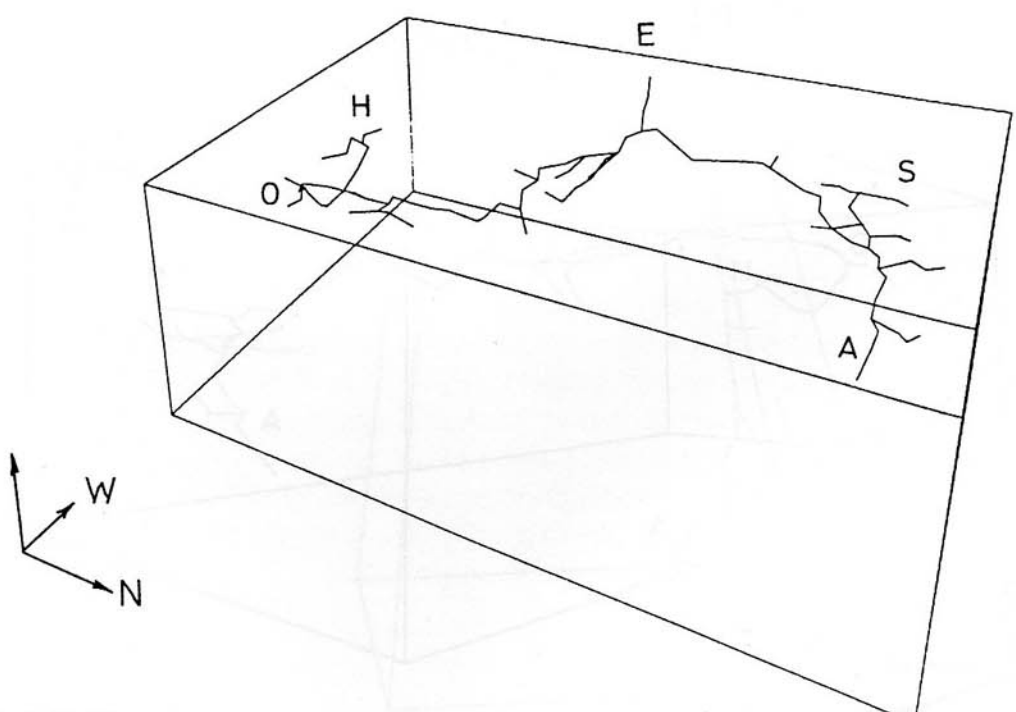


Figure 6. Aerial view from the North East.



Perspective Diagrams of Ogof Foel Fawr.

Figure 7. Horizontal view from the S. E.

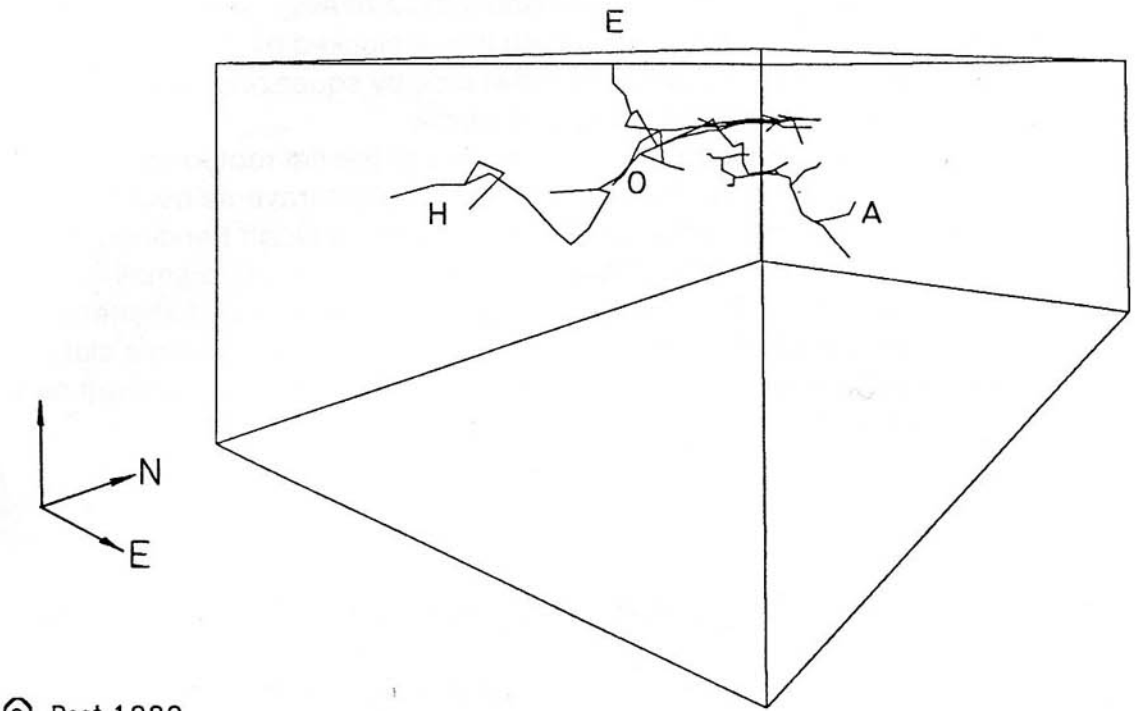
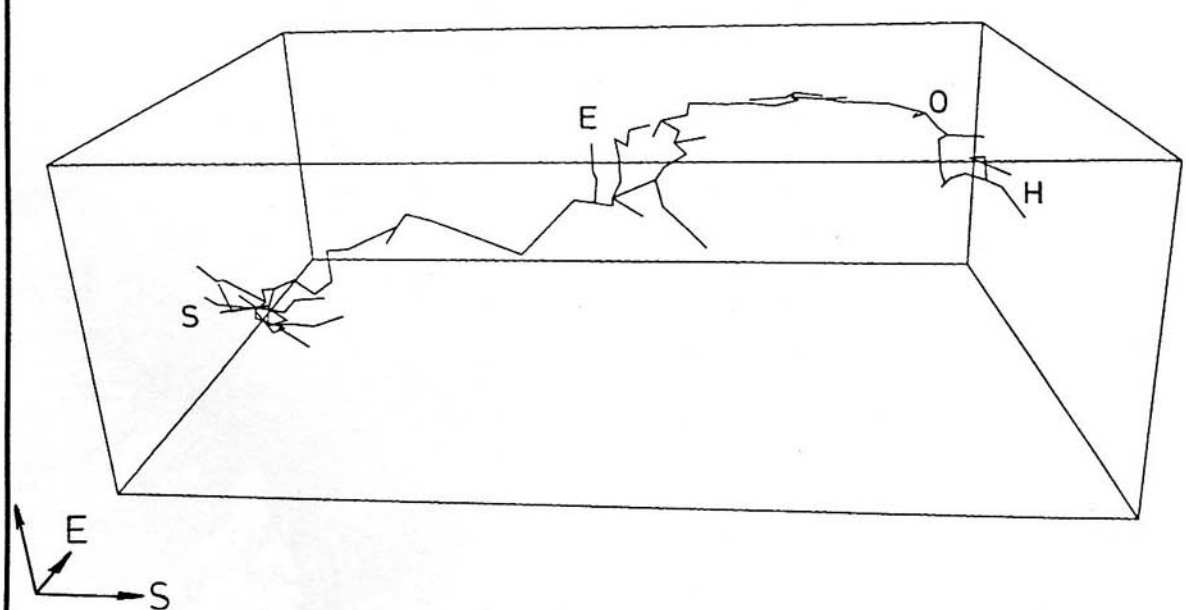


Figure 8. View from the West



metres is a short climb down that leads into a boulder chamber with a flat roof and two ways on.

The more obvious route out of the boulder chamber is to the left through a small square arch into a complex of high rift passages. On the right is a tight, muddy rift that soon closes down but straight ahead the main passage enters an unstable chamber where there are two ways off. A small hole in the floor to the left leads to some very muddy, tight tubes but by climbing up the shattered boulders on the right hand side, a heavily calcited passage can be followed which doubles back on itself. To the North this is blocked by calcited boulders but to the South the passage can be followed some distance by squeezing along the left hand wall until eventually this becomes too loose and narrow.

The less obvious slit, directly opposite the entrance to the flat roofed boulder chamber leads to a network of passages containing avens. A short traverse over a waterworn rift, followed by a crawl over boulders, enters into a very shattered North trending passage which soon becomes blocked with boulders. However, a squeeze through a small hole in the floor of the waterworn rift leads to a chamber containing several alcoves and shattered avens and a large prominent limestone block. This block marks a tight squeeze down a slot into a chamber with a strong draught. A climb of approximately 8m up a white coated aven on the left leads to further passages which remain unsurveyed [Rogers,1985].

THE RELATIONSHIP OF OGOF FOEL FAWR TO OTHER KNOWN SITES IN THE AREA.

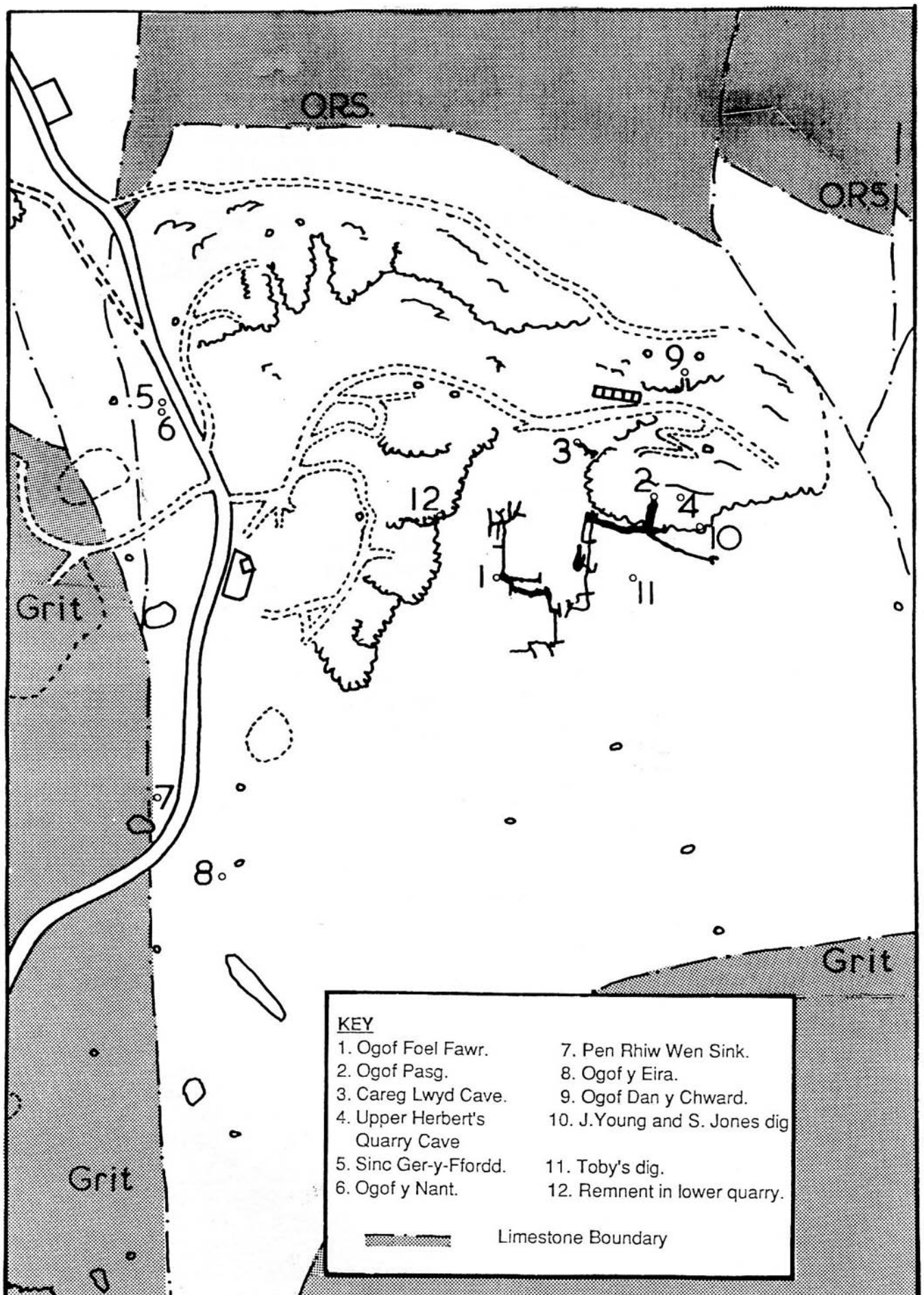
A diagram showing the relative position of Ogof Foel Fawr with respect to the other cave sites and the quarries is shown in Figure 9. The solid geology has also been superimposed in a simplified form. The sequence of the limestone beds is similar in structure to the outcrops in the Swansea valley allowing for minor regional variations. The base of the formation (the Grey Grits) can easily be distinguished as a low scarp running East from the car park[SN73061922]. However to the West, the continuation of these beds has been displaced northwards due to a fault that divides the outcrop of Foel Fawr from the limestone outcrop to the West. The throw of the fault is approximately 60 metres, the western side having dropped relative to the eastern block [Owen,1978]. The local dip in the vicinity of the quarry is 9.5° to the S.E.

The position of the three main caves, Ogof Foel Fawr, Ogof Pasg and Careg Lwyd [Oldham,1975] are superimposed in black on the plan. The relationship of the three sites is only approximate due to the difficulty in fixing the exact position of the entrances onto a map without access to a theodolite. Nevertheless, the close proximity of Ogof Pasg to Ox Chamber in Foel Fawr and to Careg Lwyd cave, which is just above the footpath at the western corner of the main quarry, suggests that they are remnants of one and the same cave. It has not been possible to compare these passages spatially as the vertical co-ordinate data was not available to us for Ogof Pasg.

Although the caves may have been part of a much larger system it is dubious as to whether the continuation of this exists today. Ogof Foel Fawr is

Careg Lwyd Cave

Figure 9. Caves and digs around the Herbert's Quarries.



high up on the hillside [approximate altitude 540 metres] and it is likely that further passages have been removed by the natural erosion of the scarp to the North, or by the valley formation to the West or to a small extent by quarring. The deepest passages in the cave are only 17 metres below the entrance and this is in Shaky series which itself must be fairly close to the surface as the hillside drops steeply at this point. Both Ox Chamber and the end of the Hereford Extensions are also close to the surface. Perhaps the best place to attempt a dig is the duck (sometimes dry) at the bottom of the descending tube on the right halfway up the calcite slope out of the main chamber. This is already at a depth comparable with the Hereford Extensions but has the advantage that it must be well into the hillside.

Despite these comments, the area around Herbert's Quarry does seem to have great potential. Interest was rejuvenated when a small stream in Ogof Foel Fawr was tested to Llygad Llwchwr [Nig Rogers, Dec 1984] thereby confirming what was already suspected in 1946! This remarkable fact was recorded in this quotation from an article by Hill [Hill,1946] in the British Caver.

Jan 4 1945

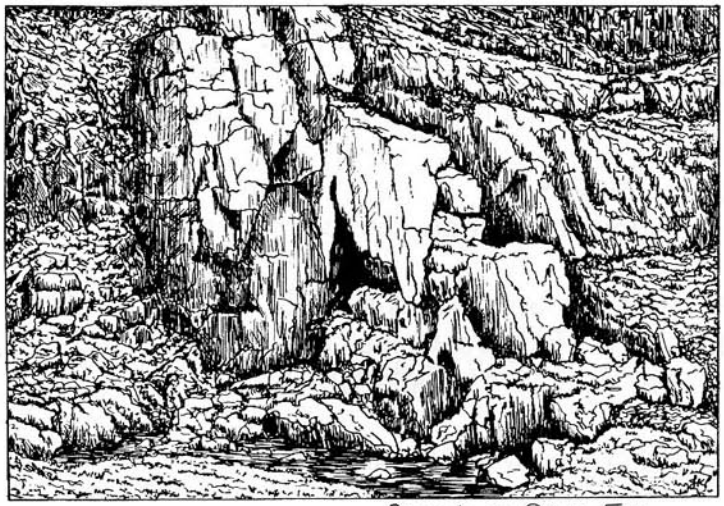
"Last saturday night with Gwyn visited the Derlwyn Arms at Brynamman, and met two people well aquainted with the Gareg Las district and who know of caves there, we are going up there on Sunday to explore. One man says it has been proved that water going underground here issues at Llygad Llwchwr. One of these men know of your "lost" cave of Palebnyna.

Jan 7 1945

"We also examined the point mentioned in my last letter said to take water to Llygad Llwchwr, this is right besides the main road on the opposite side, and yesterday after the rain, there was a good body of water going down here,"

Llygad Llwchwr is a resurgence cave comparable in outflow to Ogof Ffynnon Ddu. An average output of the order of 3000 gallons/min has been quoted in the older literature but this figure must be treated with caution. The present outflow has not been adequately monitored. However most of this water is not seen emerging from the cave as it is pumped off by the water authorities. Palebnyna is Pal-y-Cwrt. The caves referred to are Ogof Pasg and possibly the small remnant in the cliff face of the same quarry known as Upper Herbert's Quarry Cave. The sink probably refers to Sinc Ger-y-Ffordd, a small dig on the other side of the Llangadog road and 100m North of the toilet block. To the West of this road is the major Cwmllynfell Fault. Water from Ogof

Sinc Ger-y-Ffordd.



Remnant in Quarry Face.

Foel Fawr and local run off entering a number of digs along the roadside must have penetrated this major fault in order to reach Llygad Llwchwr. The Pen Rhiw Wen Sink, currently being dug by Ian Aldermann and his Southampton crew, is rumoured to have given a positive test in just 48 hours and Sinc Ger-y-Ffordd gave a similar result in 4 days[Gascoine,1983]. Considering the water had to pass the fault and that Llygad Llwchwr is over 4 miles away, the flow rate was rapid suggesting direct flow under vadose conditions. However one must bear in mind that this is the present drainage flow. The ancient waterflow that formed Ogof Foel Fawr could well have been down dip towards the Twrch.

Ogof Foel Fawr presently marks the most easterly proven limit for the Llygad Llwchwr catchment. The next important cave site over the brow of Foel Fawr to the East is Ogof Pwll Swnd but the water from this has been proved on several occasions to resurge at Ffrydiau Twrch [Machin, 1974][Gascoine,1983]. Moel Gornach, the plateau region in between the sites, also contains an active sink but attempts to establish the hydrology have so far failed[Gascoine,1983].

There are a few other sites worthy of note. In a lower quarry below the office building ruins is a resurgence called Ogof Dan y Chward[SN73681895]. This has been known for a considerable time and has been dug intermittently by the G.S.S., the R.F.D.C.C. and the H.C.C. as well as the S.W.C.C. It is a tight rift passage 8m long and contains a small stream which issues from a crack. Jon Young and Sally Jones recorded a dig at the base of the highest of the Upper Herbert's Quarry rock faces at SN737188. After removing mud and rubble a waterworn passage was revealed that issued a draught. Just over the brow of the quarry and 30m to the South of the cairn, Toby has removed the rubbish from a small depression and exposed a rift but this is too tight to descend. In the face of the small quarry at the foot of the hill below Ogof Foel Fawr is a small passage 5m in length that ends in a substantial boulder choke. It is probably a remnant of part of Ogof Foel Fawr. Finally, in a shakehole on the plateau to the East of the Pen Rhiw Wen Sink numerous digging trips, inspired by Pete Francis and Fiona Thompson, led to the discovery of Ogof y Eira [Cave of the Snow]. A passage at the foot of a rock face descends after 5m into a small chamber. A shaft in the floor of the chamber drops into a N-S passage with a draught but there is no immediately obvious place to dig. A crowbar pushed into the mud in the floor disappeared and was never recovered! The entrance is presently collapsing and the site will be lost unless some effort is made to secure it.

ACKNOWLEDGEMENTS

Thanks are due to Mags Thomson who helped with the surveying and to our colleague Anthony Kucernak at the Harwell Laboratory who takes full credit for the development of the molecular modelling routine. Finally, to Haydn Rees with whom we have spent many enjoyable weekends roaming the Black Mountain and whose knowledge of the area is, in part, responsible for this article.

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OGOF FFYNNON - A COLLECTORS PIECE.

by

Bob Peat and Jenny Peat

"How am I to get in?" Asked Alice again in a louder tone "Are you to get in at all" said the footman "thats the first question you know".

Lewis Carrol

Mainly Historical.

Ogof Ffynnon was discovered by E. A. Glennie in September 1947(Glennie(1947)). It was named after the small trickle of water issuing from a stalagmite just inside the entrance. The cave was described as dangerous. However, the original explorers descended the boulder jammed rift to the left of the entrance collapse and discovered a large chamber through a squeeze at the bottom of the rift. Several years later, the Taylors revisited the site and noted that the rift was still open but that a major collapse had occured leaving a deep pit below a false floor of boulders (Taylors(1955)). Although this looked inviting they did not descend it. In 1962 Coombes and Harris (Harris(1962)) descended the cave as far as Glennie's large chamber. They excavated the floor and discovered a lower level where the water sinks. Their small survey confirms that the limit of exploration acheived by these two was to remain unchanged until 1985 when Steve West and Toby found the upstream sump to be dry following low water conditions. This was recorded in a logbook entry.

January 1985 (no entry date).

Open passage found, streamway totally dry, no sump. 1 hours hands and knees crawling in a passage 3'x2', very muddy with a very strong draught and still open and going. Some very nice mud formations, several chambers, largest being about 40'x8'x20' (new extensions flood to the roof probably very quickly).

Steve West, Toby, Jim Nash.

The cave was probably visited many times during the interim period. In particular Burke obviously visited the site during the early 60's to compliment his study of the percolation features displayed in the Cwm Porth Woods caves nearby (Burke(1964)). However, he offers no description of the main cave below the entrance collapse except to note the absence of any vertical fluting on the walls. Oliver Lloyd was also interested in the area because of its relationship to the nearby Porth yr Ogof and Hepste river cave systems (Lloyd(1979)) and it was on one of his famous "surface working trips" in the mid 1970's that he introduced the authors to the site. Although he was aware that a lower series existed we only surveyed as far as the large chamber. It was still a dangerous unstable place and we were glad to get out. Several visits were made by SWCC following Steve and Tobys discovery but the sump could not be passed or at least if it was there are no club records of the trip.

Toby's Story (Logbook extract 23-2-86)

Another winter trip to see if the sump was open again and yes it was, with curses from Bob Hall we pushed the crawl to an approximate length of 1500' of very gooey mud and tight in places. Bob Peat pushed the last few squeezes into a chamber 20' round with a 25' pot. This is the limit at the moment but we shall be back very soon. The passage is heading South and descending whereas the streamway flows North and resurges in Porth yr Ogof. All of the extensions flood to the roof so it would not be advisable to go in mild weather or in the middle of summer. The best time of the year is in the winter after its been freezing for 2-3 weeks. At the moment there are three chambers where you would probably be able to take refuge(comment-very doubtful, Jon Young.)

Bob's Story Sunday 23rd February 1986

A considerable number of years ago I had been conned by Oliver Lloyd, an eccentric pathologist with an intimate knowledge of the caves around the Hepste area , into surveying a number of small collapse features on the eastern side of the Mellte valley near Ystradfellte. One

particular site, Ogof Ffynnon, consisted of a substantial chamber in limestone entered through a collapse in the Millstone grit that covers the area. A tortuous downward route through collapsed boulders eventually leads to a fine sream passage. This can be followed upstream for 60 metres where the roof drops rapidly to water level at a sump.

Since then many visits have been made into the cave and it was on one of these trips during extremely dry weather that the water flow decreased sufficiently to allow a series of passages to be explored.These passages had been entered during the previous year by a group from SWCC but pressing time had left a passage unexplored.

Toby, a member of that original party of explorers had found difficulty in persuading anyone to return to the site but knowing of my affinity for muddy, crawling passages he approached me on the idea. He had found a mug!

We patiently watched the weather for several weeks. It was February and a succession of severe frosts and heavy snowfalls had created an incredible beautiful wonderland of snow and ice. Local papers carried the headlines that the waterfalls in the Vale of Neath had frozen for the first time in 40 years. A slight exaggeration as they often freeze but this year the frosts had been particularly severe. The time was ripe and there were no excuses left with all the surface water locked up in snow and ice, if we were ever going to get into Ogof Ffynnon then it had to be now. On the spur of the moment Bob Hall decided he would join us.

Fortunately, the flood of tourists into the Neath valleys had compacted the snow on the mountain roads and we were able to drive with little difficulty into the area. Bob Hall, Toby and I changed hurriedly in the bitter cold and crossed the plantation to the entrance collapse. The cave entrance was impeccable, huge ice sentries guarded the interior and the frozen run off from the grit had created a treacherous slide into the system below. Greeted by the warm air inside the cave we were soon amidst the wet, dripping boulders, meltwater from the winter sun. A little concerned that our efforts were in vain we descended rapidly to the sump. It was dry!

Still apprehensive over the meltwater in the entrance we exchanged glances. A decision had to be made. It was now or never. Without further ado we slid silently into the small, muddy passage. Within minutes we were covered head to toe in brown, sticky gooe. Moving by hands and knees crawling we followed Toby along an endless series of right and left hand bends until eventually we entered a small chamber. It was a pleasure to stand up in this dismal recess that showed signs of permanent flooding probably for the majority of the year. What stalactites were present were dripping with the red glutinous ooze.

Our rest was short, apprehension forced us on, through an almost pleasurable duck. The cold, muddy water creeping around the ears was revitalising after the long, muddy crawl and the momentary pleasure of removing mud from the hands and face helped to boost the moral. It didn't last long! Almost immediately, we plunged down a muddy slide at the start

of another long hands and knees crawl. Just as the crawl began to drag and seem endless, the character of the cave changed. We stepped out into a long, high breakdown chamber and here at least the passage didn't seem to flood.The relatively clean walls showed that we were progressing through a cave passage developed along a small geological fault. The possibility of starving to death seemed a little more comforting than drowning and so we took a longer rest.

A short climb at the far end of the chamber soon brought us to a mud filled chamber with an unclimbed rift on the Western wall and a small passage continuing to the East. This was the limit of Toby and Steve's previous exploration.

The small pasage looked inviting and the excitement of new ground revived the interest. A hands and knees crawl rapidly changed to a tight vertical rift section. Struggling through this I was lying flat out on a mud floor peering down a mud tunnel with a character not unlike an overgrown rabbit burrow. Time seemed endless in this position and it is difficult to recall how long I lay there pondering the possibility of forcing my body along this tube. I could see twenty feet but no increase in size was visible. If it became too small I would have to back out, and that would be an extremely difficult manoeuvre. I decided to give it a try. Progress was slow, each bend in the tunnel drawing me forward only to be greeted by another short section with a tantalising bend at the end. A protruding rock flake forced me onto my back, with my arms trapped against my sides. Hardly able to move in the confined space I slowly wriggled forwards. My helmet scraped mud from the roof into my eyes and ears but eventually I was through.It was a dead end!

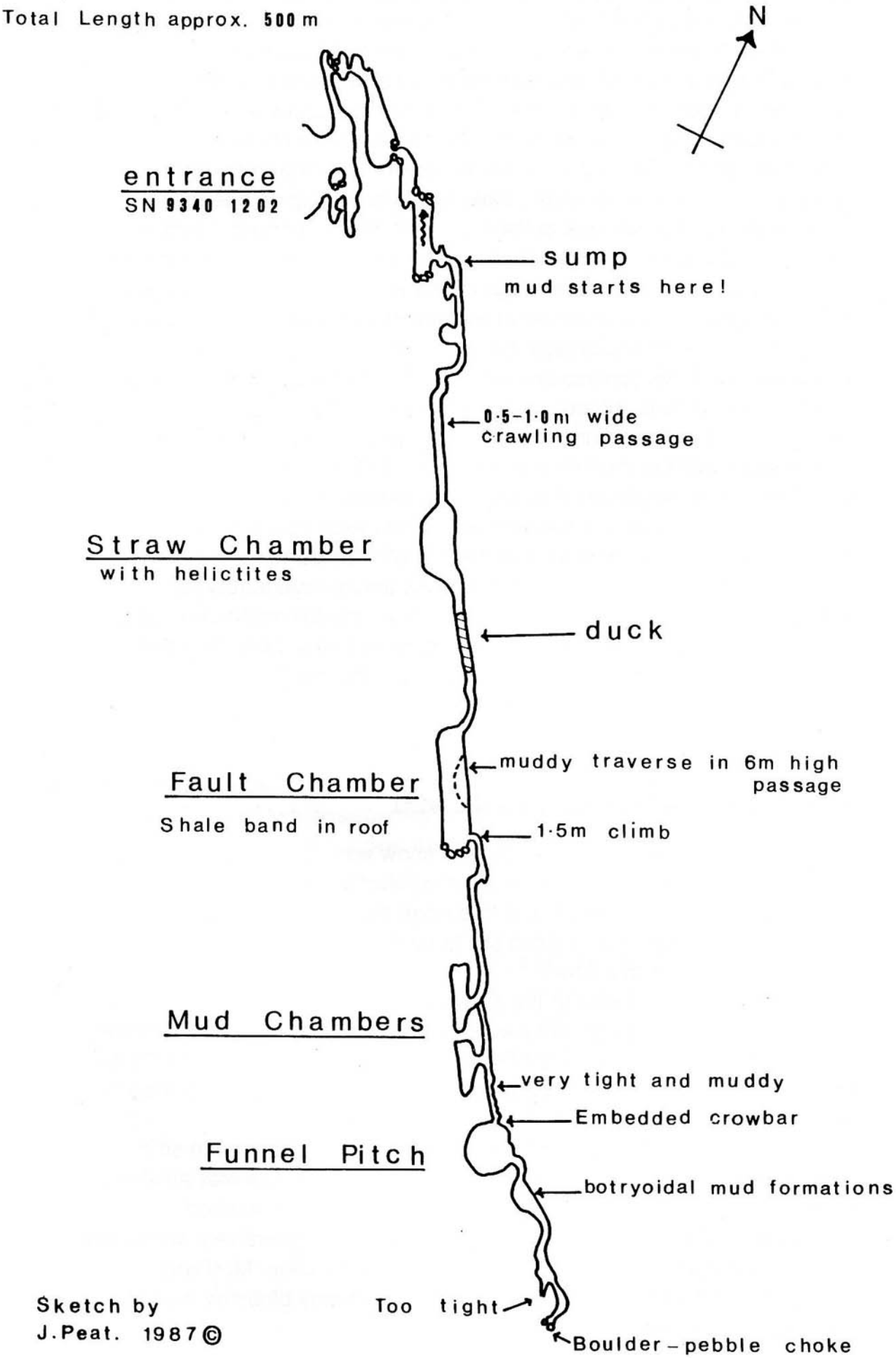
A flash of worry crossed my mind, a sudden panic, could I reverse? All I could hear was the dull thud of my heart, its beating amplified by the invisible mud diaphragm I was lying on. With difficulty I forced my arms into a position above my head and removed my helmet and lamp. The extra freedom of the head allowed me to view my surroundings, above to my right through a hole was a black space, a large black space!

Somehow, I had to get up into the space even if it didn't go anywhere it would allow me to turn around. I twisted into an uncomfortable half sitting position that allowed me to slowly open up the tunnel by pushing the mud over the lip into the black space. I held my breath to compress the rib cage, placed my boots against some unknown projection behind and pushed myself through the hole. I recovered my helmet and lamp. Now I could see where I was, perched on a muddy ledge near the top of a deep mud funnel.

It was a relief to be out of the tunnel and it somehow seemed cooler and fresher over the black void. I could hear the sound of water dripping mixed with the grunting noises of the others making there way along the tube. To the left the steep mud funnel dropped twenty or so feet to what looked like the way on. Just above my head was a flat stalactite decorated roof with an abrupt step to the right where the mud funnel rose to some undefined roof. The opposite wall was not far away perhaps 5-6

Figure 1. Ogof Ffynnon

Total Length approx. 500 m



Sketch by
J.Peat. 1987©

metres or so and for some minutes I contemplated the problem of crossing the funnel. I gave it a try but once I had left the security of the ledge I quickly realised the futility of the move and returned rapidly to the ledge. One slip and I would fall twenty feet and it was quite possible that although the mud looked harmless enough some sharp rock flake could easily be concealed under the mud. What was needed was a ladder and that meant another trip. At that moment a light flickered and I realised that Toby had reached the foot of the small hole into the chamber. Ignoring the abuse at my choice of passage , I told him I was sitting on a ledge in a small chamber. A quick look at the muddy slope was enough to convince him that we couldn't safely descend and without hesitation we set off out.

The return journey through the tube seemed easy by comparison without the psychological barrier of the unknown ahead. About halfway along I noticed a small passage to the left which after a tight squeeze over a flat slab emerged into another chamber. I was at the bottom of an amphitheatre of mud. All around mud banks rose to a flat rock roof liberally dotted with mud drip formations. I climbed a bank and followed the passage until the mud filled it to the roof. In the corner I wrote "Bob Peat 1986". This single act of vandalism was to perform an experiment. If the whole of this system floods with water then redistribution of the silt will erase the writing. I wonder if its still there? The journey out was uneventful, moving slowly through tiredness and an overburden of mud, we emerged to greet the great ice statuettes under the full moon of a frosty February evening. We returned to the cottage with our story. An open passage waiting to be explored. We lied about the mud!

Jenny's story (Saturday 1st March 1986)

It was quiet at the club and the snow was still falling The ground had remained frozen since the previous weekend. We had heard the story of Ogof Ffynnon many times . There had been the mention of "some mud" along with the glorification of a 20' pitch still to be descended. Who was going down Ogof Ffynnon this time?

Why didn't I listen to the excuses? "my wetsuit needs mending", "my lamp needs charging". Why was it that Steve West was hiding in the corner with a smirk on his face? Did he know something I didn't? Toby said that he'd been down there twice before and thought he'd give it a miss this week. Bob nobly told me it was my turn to go caving.

Sam, Jon Young and I set off enthusiastically, so much so that we took the surveying gear with us. If the initial sump passage was anything to go by it was very pleasant, a fine phreatic tube in well washed limestone. However, from here on things became progressively worse. We knew the rumours were true. There was no exaggeration. Mud was **Everywhere!** Even we, ourselves, resembled muddy blobs by the time we'd reached Funnel Pitch.

Our next task was to find a belay but everything was coated in a slimy ooze. In desperation we stuck the crowbar in the mud which proved excellent as it became so firmly embedded that we couldn't remove it again. We were hopeful as we descended the 20' ladder and squeezed through a crawl at the bottom. We stood up in a walking sized passage and looked at each other with glum expressions. "More mud! For how long can this dismal place continue?" We were relieved to find that after about 30 metres the passage closed down with 2 possible ways on.

On the right was a small 'U' shaped squeeze which became too tight to get through without removing some of the mud. It looked quite an easy dig and a small passage could be seen to continue but still mud ridden.

To the left, a squeeze and then a short crawl led to a small boulder choke. This was filled with relatively clean pebbles and boulders and could easily be dug, although there was little room to put the spoil.

Our enthusiasm for digging had dwindled and as far as surveying was concerned it would be a nightmare in such conditions. The whole cave was unnerving and we recalled that conditions were not static. Last week's duck was a mere drop of water this week. We bid a hasty retreat.

We emerged from the cave plastered in mud only to remember that there were no showers as the water at the club had frozen. However, the thaw had started, whilst we were underground. We were thankful that the showers were on and Ogof Ffynnon was off, for at least another year !

Sam's Story (Extract from the logbook 1-3-86)

Descended pitch at previous limit to enter rather large passage (walking/stooping size) but for only about 100', when passage almost closed down, leaving two possible ways on. One with the most draught went after 10' into a boulder choke, easily diggable, with a draught going up to the top left of the choke where a small space could be seen. 30 minutes digging would determine whether this would go. The second possible way on was through a small hole which would be passable apart from the impossibility of getting at it as a mud bank prevents access. Again 30 minutes with an entrenching tool would allow this to be pushed. Passage can be seen to continue beyond.

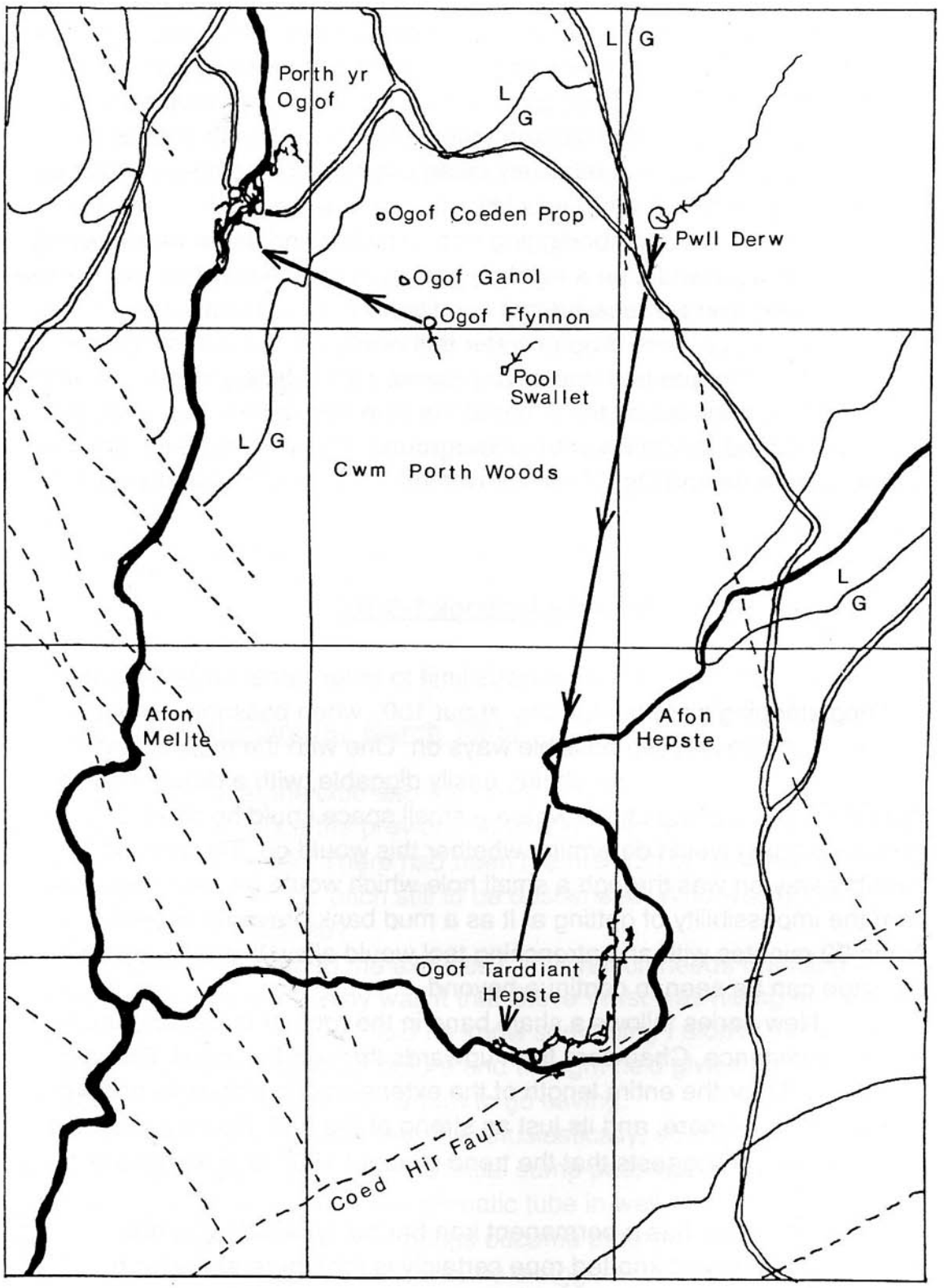
New series follows a shale band in the roof, or is just under it for the entire distance. Chambers form upwards through this band. Draught goes inwards for the entire length of the extensions, in places its of Cwm Dwr strength or more, and its just as strong at the end. Bearing taken on the previous trip suggests that the trend is about 150^{o} ie. towards the Hepste.

Pitch now has a permanent iron bar belay, a ladder is not necessary but a fixed knotted rope certainly is (not there at present), leave it there, because its not a pleasant cave to carry tackle through.

SAM, Jenny Peat and Jon Young.

Figure 2.

Ogof Ffynnon In Relation To The Surface



SUMMARY.

The extensions to Ogof Ffynnon are shown in the sketch of figure 1. The length has been estimated at around 1000'. Surveying the cave would be extremely difficult due to the mud but a single radiolocation at the end of the extensions would fix the position. The passage, in the main, follows a single joint or fault, orientated at 150^{o} to the magnetic North. Comparison with a diagram of the area (figure 2) puts the end of the extension close to a mud filled depression known as Pool Swallet. A dye test under high water conditions might prove the hydrological connection with the lower levels in Ogof Ffynnon but attempts to relocate the swallet have been thwarted by the recent afforestation. Lloyd (1979) dye tested the spring in the entrance to the Cwm Porth Inlet in Porth yr Ogof and it is likely but not conclusive that the stream in the lower levels takes a similar course. Lloyd has also tested Pwll Derw a large swallet to the East and proved the connection with the resurgence of the Hepste river cave. Although the prospect of a cross valley system seems a little over optimistic the situation at Ogof Ffynnon sitting as it does, midway between the two catchments still offers possibilities for further extensions

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A Preliminary Investigation into Radio-caesium Contamination in Dan-yr-Ogof

Bob Hall March 1988

Introduction

The work to be described does not comprise a systematic programme of study. Samples were collected in and around the Dan-yr-Ogof system and were studied in the Physics department at York University as part of a wider programme of research with which I was associated. The results presented here are limited to estimations of radio-caesium activity simply because no other artificial radio-nuclides were detectable in the samples.

Sources of Radio-caesium

There are two radio-isotopes of caesium that are of interest. Caesium-137 has a half-life of 30 years and emits gamma-rays of 661 keV energy. Cs-137 is a major component of most types of reactor waste and is also produced in nuclear weapons explosions. Cs-137 detected in the UK at the present time is mostly attributable to fallout from Chernobyl. However, because Cs-137 has a fairly long half-life, significant contamination dating back to the atmospheric testing of nuclear weapons in the 'fifties and early 'sixties may also be encountered. Caesium-134 has a half-life of only 2 years and emits gamma-rays of various energies, the most important being at 605 keV and at 796 keV. Cs-134 is produced in nuclear reactors but unlike Cs-137 is not a significant product of nuclear explosions. This fact can be used to distinguish between sources of radio-caesium contamination. Furthermore the likely ratio of Cs-137 to Cs-134 in nuclear reactor material may be predicted from knowledge of reactor behaviour. Using such information, together with the known half-lives, allows the age of contamination to be estimated if the current ratio of activities is measured. For example, the Cs-137: Cs-134 ratio in many samples collected in Britain today is consistant with the 2:1 ratio that existed in May 1986 in the Chernobyl fallout.

Method of Investigation

Samples were collected from a number of sites in Dan-yr-Ogof 1 and 2 and from the surface at Waun Fignen Felyn. These samples were used to fill 150ml plastic counting containers and these were then counted for 62.5ks (about 18 hours) each. The counting was done using a well shielded Germanium detector having an absolute detection efficiency of about 1% at 661keV. This detector was coupled to a spectometer system that sorts the counts detected and produces a spectrum of counts recorded versus gamma-ray energy. The counting was carried out during October 1987, ie about 18 months after Chernobyl. Typical spectra collected are illustrated in Figure 1. By careful analysis of the spectrum it was then possible to compute the activity of radio-caesium present in each sample. These results are presented in Figure 2.

Discussion of Results

The radio-caesium activities detected have all been small and in some cases have been close to the limits of reliable measurement by the apparatus. An important point to note is that the counting apparatus is itself slightly contaminated with Cs-137. The small peak seen in the 'Bat Chamber' spectrum is due to this contamination as may be crudely verified by comparison with the background spectrum in the inset. (The background spectrum having been collected with no sample present). Since Bat Chamber is high and dry in a fossil part of the cave it is not suprising to find it uncontaminated. Such freedom from contamination is now rarely encountered – fallout from whatever source having found its way into most places, radiometric laboratories included.

As far as the other samples are concerned the presence of contamination along the course of an active streamway was to be expected. The variation in the activities measured follows no obvious relationship with mass of sample, nature of sample or sampling site. Many more samples would be needed to build up a coherent picture. The main feature of interest is the absence of measureable amounts of Cs-134 in all but one sample. To be consistant with Chernobyl as a source of the contamination Cs-134 activities roughly one third the size of the Cs-137 activities would have been expected last October. Had such activities been present they would have been detectable in samples DYO2, DYO3 and DYO7 but perhaps not in samples DYO4 or DYO5 which have much lower Cs-137 levels than the other samples. A tentative conclusion must be that the contamination observed predates Chernobyl and is a consequence of weapons testing. More extensive sampling both on the surface and underground might make the picture clearer. A longer term programme of sampling might also be of interest to investigate the possibility that there is some time-lag in the build up of contamination underground.

Two further, more general, observations might be made. Firstly the measurement of radio-caesium in cave sediments may be of value in various branches of cave science as they give an absolute indication of recent exposure to surface water : Cs-137 was unknown until the nuclear era. Secondly anyone who has harboured secret designs on Dan-yr-Ogof and the food dump as their private fallout shelter should think again!

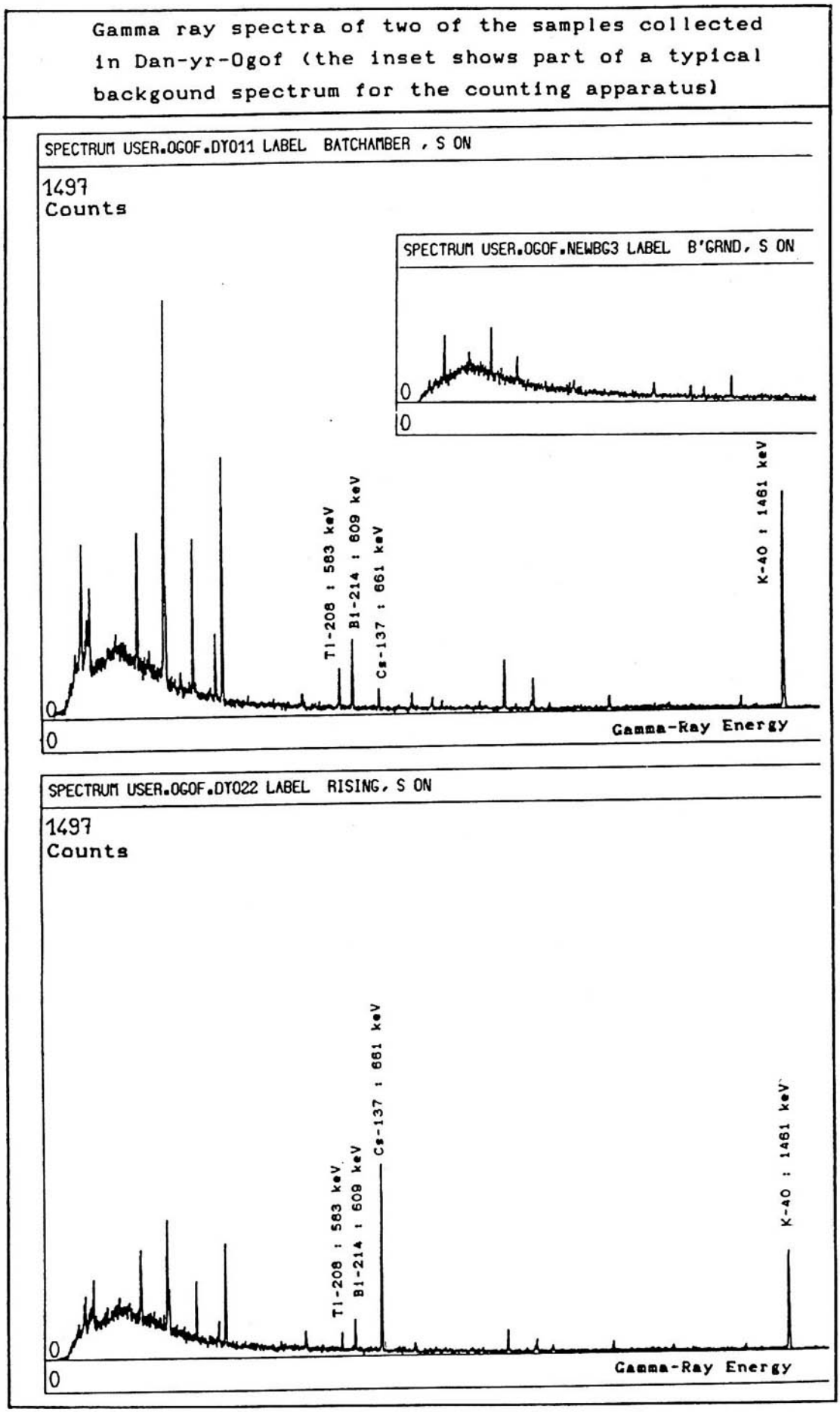


Figure 1

Gamma ray spectra of two of the samples collected in Dan-yr-Ogof (the inset shows part of a typical background spectrum for the counting apparatus)

Activities of samples collected in Dan-yr-Ogof (in Bq)

Sample	Collecting site	Characteristics of sample	Mass of 150 ml	Nuclides	
				Cs-137	Cs-134
DYO1	Bat Chamber alcove	Sandy clay	220.1	-	-
DYO2	The Rising	Fine gravel and sand	310.8	4.28 (0.43)	-
DYO3	Bakerloo straight	Peaty sand	266.1	2.01 (0.20)	-
DYO4	Thixotropic pass.	Sandy peat	213.5	0.53 (0.05)	-
DYO5	Lake 2	Fine gravel and sand	314.7	0.89 (0.09)	-
DYO6	Waun Fignen Felin	Peat	138.3	2.90 (0.29)	0.29 (0.04)
DYO7	Waun Fignen Felin	Peat	154.1	5.14 (0.51)	-

Figure 2

Activities of radio-caesium in samples collected in Dan-yr-Ogof (Bq)

Ireland 1988

Our trip to Ireland visited the North and the South; 3 people (Tony Baker, Malcolm Herbert and Ian Anderson) first went to North West County Clare, and then onto Fermanagh where they were joined by Paul Taylor and members of G.S.S. from Reading.

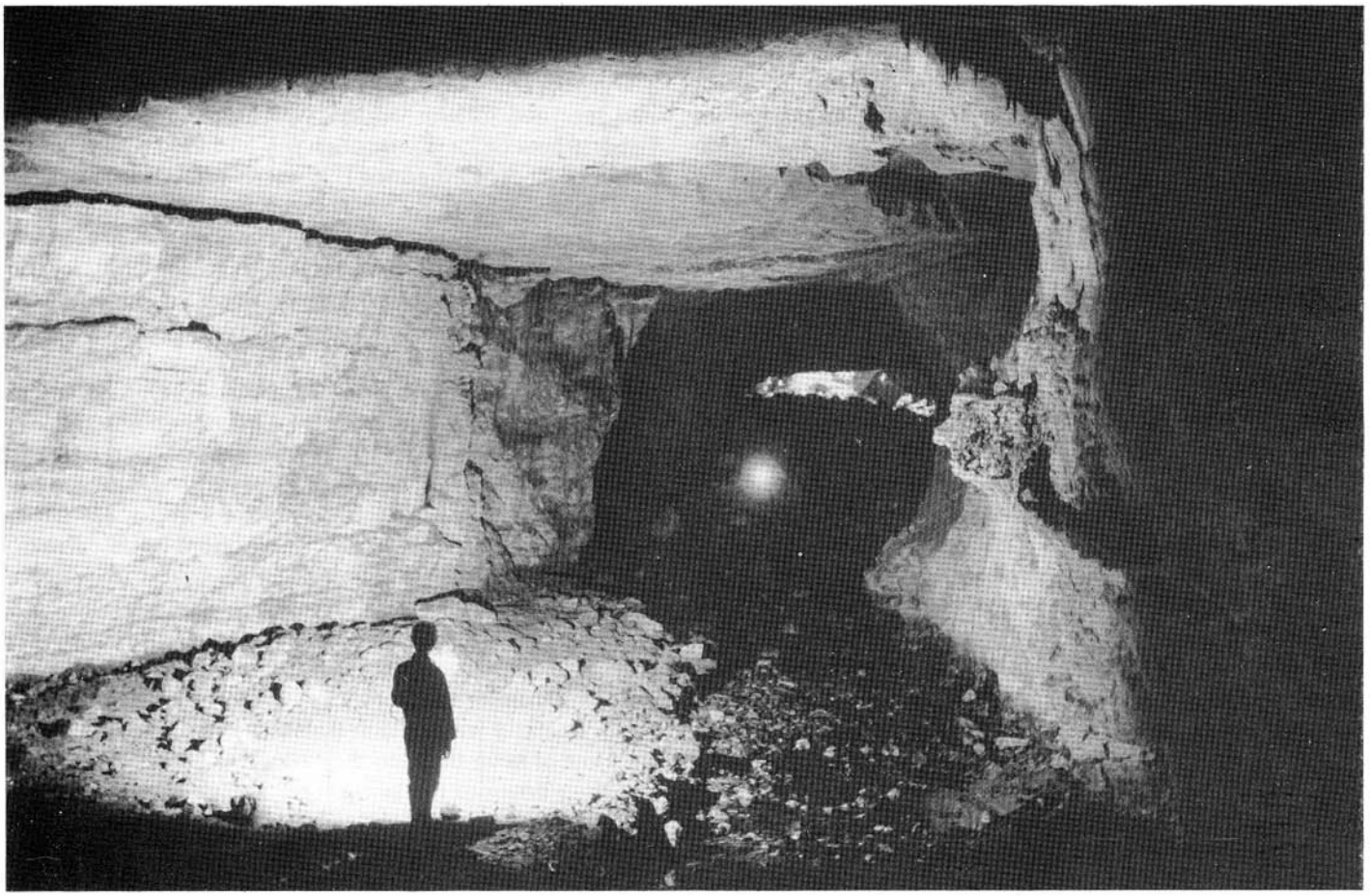
A few problems arose whilst packing the car and the caving gear finished up on the roof rack to make way for one person's camera gear. (5 or 6 cameras, 3 tins, 2 holdalls, film stocks and a very large tripod) but we eventually set off. We arrived in Pembroke Dock at 1am only to find that the ferry was 2½ hours late, so we didn't reach Rosslare until 8am the following morning. We were rather tired after a non too smooth crossing. After breakfast Ian drove straight across to Kilshanny in Co. Clare and became so exhausted that he drove the last seventy miles without using fourth gear. Our accommodation was at Kilshanny Outdoor Centre where on arrival we found the key in the alloted place and let ourselves into very roomy and comfortable lodgings. In the afternoon we visited the Cliffs of Moher and came across an Irishman trying to sell mouldy branches as walking sticks to American tourists. We went to O'Connor's Bar at Doolin where there were no Americans but plenty of lively entertainment from musicians.

Our first caving trip was to Doolin River Cave. After we had returned for the ladders which Ian forgot we rigged Fisherstreet Pot for our through trip and then walked to the entrance at St. Catherines I. It was a sunny but inevitably windy day. A leisurely three and a half hour trip followed with Tony taking photographs of the classic streamway. This trip was a superb introduction to caving on Clare, but we would like to contest the guide book's comment about driving motor coaches in some part of the cave!

Our second trip was in the Pollnagollum/Poulelva system. After we rigged (sorry – Tony rigged) the 35 metre pitch of Poulelva we walked to Pollnagollum entrance (en route we met Alan Richardson who happened to be in the area at the same time). The through trip was negotiated successfully using a sketch survey on some toilet paper. Again Tony took photographs. The bottom of Poulelva Pot was more impressive than the top, with the waterfall cascading down one wall. Whilst Ian made a balls-up of the re-belay on the pitch, Malcolm nearly lost his due to a borrowed sit-harness. Meanwhile Tony got cold whilst watching from the bottom.

Our final trip was Callaun II. This was a photographic trip with lots of large bulbs to the "Bloody Guts" (a formation) and then down to the sump.

Paul Taylor in Entrance Chamber, Pollaraftara, Co. Fermanagh



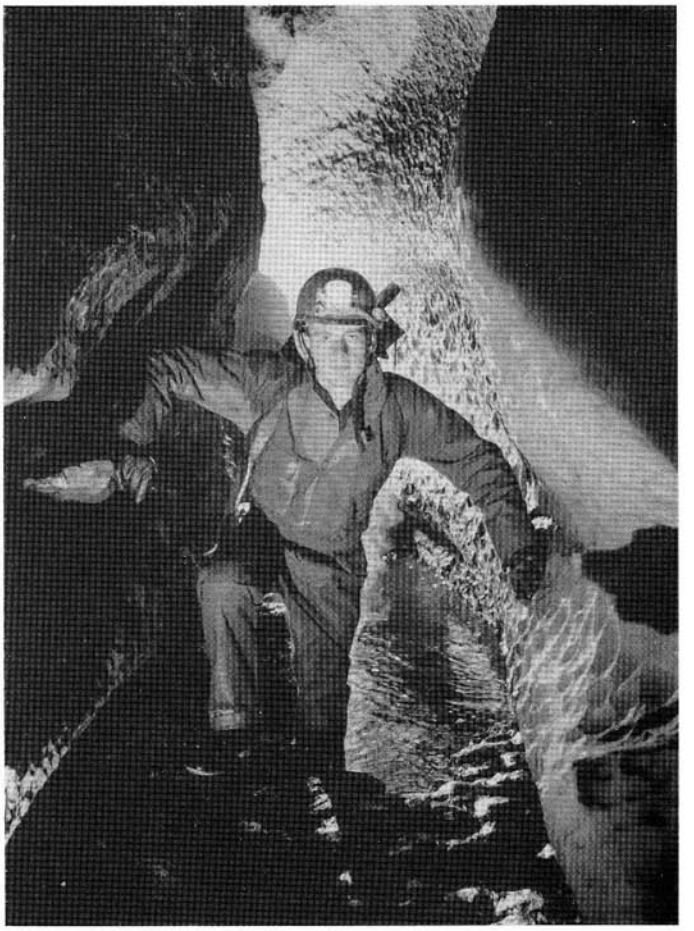
Coolarken, Co. Fermanagh

Ian Anderson at The Chickens, Pollaraftara, Co. Fermanagh

The weather was fairly good for the days we were in Clare, especially as it was an early Easter. However the water levels were not low enough to make a trip to Coolagh River Cave. We met two Chinese scientists who were with Tim Fogg; they had already visited S.W.C.C. Whilst in O'Connor's Bar we saw an American playing the bagpipes quite well. Tony had plenty of opportunity to take pictures of peat bogs, telegraph poles and rocks; he also nearly succeeded in getting washed off the rocks at Fanore.

We left Clare to meet Paul and the others in Fermanagh; in the Bush Bar to be precise. On our way we called at Knock Airport out of curiosity. It is now called Connaught International Airport to stop some of the jokes. If Ystradgynlais had an airport it would be busier than Knock!

We rendezvoused with the others who had travelled five up plus caving gear and two canoes from Belfast. Our accommodation was an improvement on the traditional caver's residence in Fermanagh. A caving era had passed when Upper Thornhill house changed ownership. There would be no more tales of the Super Rat, who could eat half a frying pan or resist Hywel Davies' violent efforts to catch him, leaving only clumps of hair in the trap, having fought his way out. For the first time we stayed in a cottage where not only was there no positive dye trace from the toilet to the drinking tap, but also central heating, a bath and a shower, lake views and even a television! It was so good we are keeping the location a closely guarded secret.



Ian Anderson in Callaun Two, Co. Clare

Our caving trips were as follows:

Prods Pot

With Paul Taylor's arrival the team was fired with fresh enthusiasm so we didn't start caving until 3pm – well it was raining! We laddered down five wet pitches into the streamway. Malcolm went up a wrong inlet to avoid a deep bit as he wasn't wearing his wetsuit having lent it to one of the lads from Reading. Even though he'd made this magnanimous gesture he'd not been let off the trip. Paul needed heavy persuasion to get him underground but the situation was reversed on the way out; he ascended the five pitches hastily due to a stomach problem!

Polltullyard

A practise trip for the two S.R.T. juniors. It is supposedly a single pitch, but dissention has it there is a tricky continuation climb!

Pollaraftara

An early start at 5pm after a lot of heavy t.v. watching, including the boat race and a 'phone-in to Kylie Minogue. It's as well the cottage had no 'phone . . .! An enjoyable trip to this interesting and muddy cave, but we didn't swim the canals.

Noons/Arch II

There had been a lot of dissention about this trip; Ian disappeared with some of the lads on a sedate drive around Connemara, whilst Paul & Tony physically dragged Malcolm to the top of the pitch of Noon's Hole. Whilst sitting in the sun waiting for Tony to rig the 270ft pitch, Malcolm considered the twelve mile walk back to the cottage as a way out. At the end of the first drop, whilst Paul was on rebelay, someone above threw down a rock to check the depth and just missed him. Paul, shouting loudly as he does, was not very impressed. Neither was Malcolm when he found the knot he had to pass.

From the bottom of the pitch we set off to the end of Noons and into the connection with Arch. It took thirty minutes of searching to find it and then we wished we hadn't as it was rather tight, mostly filled with water and awkward. We all got through, emerging into an Oxbow of the mainstream which we soon joined. We went down a rather impressive passage, all of us feeling that this was a really remote location. We went downstream for quite a way, through some of the roof collapses before turning back.

We were all pleased with the trip; Tony because he had derigged and Malcolm because, although a little slow, it was only his third S.R.T. trip. It was finally 10.30pm when we left the cave, having been underground for eleven hours. We got to the Linnet Arms at 11.15pm and still managed to get in three pints, leaving because we were knackered not because the pub closed.

Tallyhona

Four of us had a quick trip to the end and back, although we had a few route finding problems at the beginning. Passing through the rather sharp Fenian Terror By-Pass we

entered a very nice section of streamway, with excellent formations. It is called the something Country after a well known cave diver whose name slips my memory at present. We found lots of flies and worms at the end meaning it must be very close to the surface, but local Irish logic is right in thinking that making a through trip would ruin the end of the cave.

Pollnagollum of the Boats

Yet another Pollnagollum (I think there are only two Irish counties without a cave of this name). We visited it with the G.S.S. lads in order to work up an appetite for the evening's feed-up in Killyhelvin Hotel in Enniskillen. Unfortunately one member of the team weighed in at twenty stone and couldn't get through the entrance boulder choke! However if he had, he might have found any unstable boulders! A good trip with lots of photographs taken.

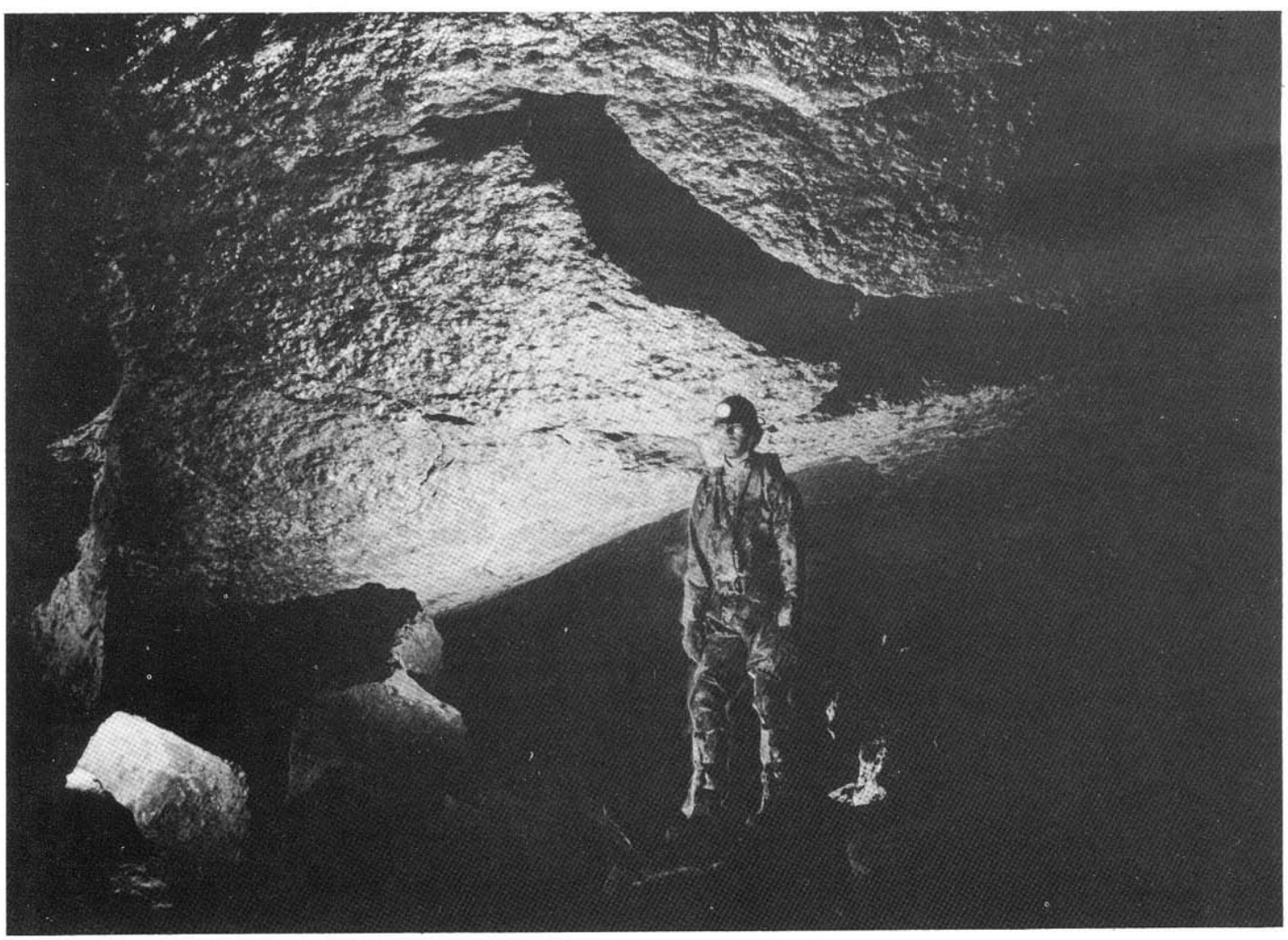
Coolasken

A photographic trip into this impressive onetime resurgance. We had a look at the choke which needs a JCB to tackle it.

As well as caving we did some surface walking on

Left: **Malcolm Herbert at Aille Cascade, Doolin Cave, Co. Clare**

Bottom: **Paul Taylor in Boulder Chamber, Pollaraftara, Co. Fermanagh**



Cuilcagh Mountain which has more holes than a Swiss cheese. There was a trip to Lough Navar viewpoint and Malcolm and Tony took the canoes out on Upper Lough Macnean amongst the islands. On one of these we discovered an Escort van in fairly good condition and wondered how it had got there.

We spent some time in the Bush Bar where we were well looked after by Seamus et al, and also next door in Maguires where Gerry also served a very good pint of the black stuff. As the weather was so good it had enabled us to go caving on ten days out of twelve. We had all been on at least four trips to Ireland and this was one of the better ones. Staying somewhere comfortable means it may be a little harder to get going in the morning but at least it's easy to relax after a trip. Somehow I think we will all be going back again as Ireland provides some good and varied caving as well as that feeling of being away from it all.

Rescue Training Week 26-30th October 1987

With 1–10 Powell Street vacated by weekenders, Sunday evening saw the gathering of the few. The majority of the group, whilst having assisted here and there on rescues, were largely beginners in terms of the mechanics behind organising and running a large rescue. It was soon apparent that the Copper Beech was a better place to gather, ostensibly to obtain supplies of anaesthetic in view of the evenings which were to be occupied by Ieuan Jones' first aid course. Nobody at that stage realised just how hard a taskmaster R. Radcliffe (Esq.) was to be. The course turned out to be extremely intensive with very little time for the evening anaesthetic dose.

The course, which comprised theory sessions followed by practical application in the cave, began with an introduction as to what equipment is kept in the Aladdin's cave called "Rescue". It was an interesting prospect that we would become familiar with most of the equipment in the store (including how to start the Landrover). Whilst everything that could immediately be required is there, some listing would be helpful to allow rank beginners to know exactly what is available in the event of a real call-out. In practice, it will probably (hopefully) be somebody who has some knowledge of the stores, but in a real situation it is important that people know what is held.

The river entrance to DYO was used for the floating stretcher practical, which provided the first opportunity to practice as a team (attempting to drown some victims) and to learn who your friends were. This was a deceptively easy piece of equipment to operate and needs special care. It could be very unnerving for an injured person and constant care is needed. However, provided that there was one person who had used it before to act as leader, the stretcher can be used by a group of inexperienced carriers.

Pitch-rigging in a rescue situation, where the safety of two or more persons can be involved, was new to most people. This portion of the course was perhaps the most difficult to organise since only a limited number of the participants had had experience at the sharp end. The pitch chosen was certainly difficult, the 90ft chimney down into Chasm Passage from the high-level route on the way to OFD3. This involved a restricted pitch head and an awkward hauling position. Whilst useful lessons were learnt it was possibly too difficult given the number of people available and their experience. In the subsequent discussion we all felt that it would have been useful to have had a practice run in one of the open chimneys in one of the old quarries first so that everybody could see exactly what is involved in such a haul. Whilst the haul was completed satisfactorily, it is very obvious that rigging any pitch must be carried out by experienced personnel. It may be that restrictions on who can use the pitch-hauling kit should be seriously thought about.

One topic which did raise heated discussion was how to deal with the press. Whilst accepting that they have a job to do it was generally agreed that they are unreasonable people (immaterial of what they drink). For a variety of reasons it seems best to keep them as far away as possible, but they must be given regular releases to keep them out of the way. The communications and crawls practical was carried out in the entrance to Cwm Dwr and for most was the first introduction to the Stuart France single wire phones. These were found to be excellent and, because of the simple handset, extremely easy to use. Wrestling with simulated poor communication over the radio was very illuminating and demonstrated exactly how precise one must be. The geometrical problems, with added snags, really emphasised how accurate one must be in relaying information and carrying out instructions. Everybody already knew how bad crawls are and this was reflected in the number of volunteers for the practical sessions. The added problems of coping with the number of people there must be distributed in front of the casualty and trying to manipulate them through various contorted passages (thanks Bruce, but we are not all that small!) must not be underestimated.

The First Aid part of the programme ran every evening and most people found the pictures of the injuries numbing enough without having to imagine what they would be like to suffer. It may be a good thing that a new syllabus is being established. Our thanks to Alison, Bob and Jess for giving up their evenings off to talk us through the course and i the supervision of the exam.

The culmination of the training week was the practice rescue on the Friday. This began at 9.30 when a distraught caver (simulated by R. Radcliffe) stumbled back into the cottages with the story that a trip into OFD2 to visit the Labyrinth had gone wrong when a boulder had fallen on his companion. Brian Bowell (by popular consent) assumed command and sorted out the troops (simulating tired Sunday evening cavers) to begin the rescue. On the basis of the information obtained a search was initiated in the back of the Labyrinth whilst arrangements for equipment went on simultaneously. By 10.55 the victim had been located, his condition correctly diagnised (compound fracture of tibia and a hip injury) and this

reported to the surface via a single line phone laid to within 30m of the casaulty. The logistics of evacuating the casualty from this position had partly been realised as soon as the location of the casualty was reported. Apart from extricating him through a squeeze at the site of the accident, two major problems presented themselves. First, the pitch out of Cairn Chamber involving a slope and a near vertical haul and second, probably the more difficult, the pitch involving a sloping rift descent, 90-degree lefthand bend over a large hole with a tight rift passage into the slightly larger rift exit passage. By 12.30 the pitches were being rigged and a Clarke stretcher and drag sheet had arrived at the casualty. By 13.50 he had been extracted through the squeeze and loaded onto the stretcher in preparation for evacuation. The carry to the bottom of the Cairn Chamber pitch was accomplished by 14.45. This pitch had been virtually rigged by then and the haul was completed by 15.30. Refreshments were taken with the casualty 'comfortable' between pitches. The second pitch provided the most problems. It was impossible with the manpower available to do a straight carry down the sloping rift so a pendulum rig was set. Anchorages for this were difficult to obtain and a clear pulling direction was also impossible because of the 90-degree bend. However, by 16.20 the pitch was commenced and rather clumsily negotiated by 17.15. The first part of the exit rift was negotiated before the practice was terminated, with all the major problems tackled. The equipment was packed up and the cave vacated by 1810.

At the debriefing held afterwards (in the Copper Beech) there were several points of self criticism, though there was a general satisfaction with the exercise. First-time controller Brian Bowell coped well though he expressed doubts as to the wisdom of some of the decisions, for example the use of a Clarke stretcher (for the diagnosed hip injury) rather than a Neil Robinson. It was generally concluded that the Neil Robinson was a far more convenient shape for carrying through a cave system, and that the Clarke should only be used if it was absolutely neccessary. A major criticism was the slowness of getting the stretcher and drag sheet to the casualty. We also considered the slowness of the carry out and the time that the stretcher actually spent on the pitches, particularly the last haul where the casualty was vertical for some time. There was, however, a good reason for both of these problems, which (hopefully) would not normally be encountered on a real callout. The problems of getting the kit to the casualty was partly due to personnel doubling jobs and going backwards and forwards to the cave entrance, leaving too few at base. The slowness of the evacuation was a direct function of the lack of manpower, the whole exercise being accomplished with only 14 people. For example, the stretcher carrying party, which did not change for the total exercise, also doubled as the pitch-hauling crew at both pitches except for the addition of Ashley Houlton as main gorilla in charge of the haul. In a real situation this would not have happened and both pitches would have been separately crewed. Several points did emerge, possibly only pertaining to our course, but worth mentioning.

1) It cannot be emphasised how important it is to interrogate thoroughly the person reporting the incident. He is the only link with the casualty and must be kept on hand until the casualty is located.
2) It was also agreed that information must go back regularly to the Controller so that he has the ability to constantly reassess the decisions he has to make. If he does not get the information he must insist on being given regular reports. In our case it probably did not happen for two reasons, it being Brian's first attempt at controller and because of the manpower shortage the phone end, whilst being kept near the casualty, was not permanently manned.
3) Since time may be vital to the casualty it may be important to get items of kit to the cave entrance in preparation for use, even if in the event they are not used. The trailer contains most of the equipment needed in any case and it is clearly better to have it as near to the site of the incident as possible. This means that the person designated as being in charge of kit issue must be meticulous in recording where it has been sent. The situation may change very rapidly and it is probably better to have the kit at the entrance than to have to send back for it adding to the delay. The only thing mitigating against this is a double callout, but in those circumstances it may be that resources are so stretched that other help would be needed.
4) It was generally agreed that the single wire phone was excellent. this being the first time they had been used in a rescue situation. We all felt that they represent good value. Additionally, it was very useful for the telephone operator to be able to listen to Radio 4 when there was no traffic on the line (a new dimension in monitoring the press!).

The organisation of the theory and practical sessions seemed to work well, though there could have been a little more time for debriefing. This was very much a practice and feedback is a substantial part of the learning process. It was also felt that after a very strenuous day it was a bit much to then have to sit through the first aid course, which does require some mental alertness. A gentle debrief in the Copper would have been kinder.

All the participants thoroughly enjoyed the week and would like to thank those who give up their time to help with the instruction. Particularly thanks go to Bob Radcliffe for committing so much time to the organisation and to Neil (the casualty) for putting up with the rather lengthy time he suffered in the stretcher and for any poor handling he was given (our apologies).

Whilst all found the course to be very stimulating, discovering many new things (including what to do with the Marmite jar) probably the Club gained most. The results of the week demonstrated that with very few people, possibly the typical remnants on a Sunday night, a lot can be accomplished relatively quickly that would contribute substantially to the evacuation of a casualty.

Why are caves formed only in specific beds of the limestone when they have numerous, apparently similar, beds in which to develop? Like cavers who prefer the brew and environment of one pub to another, in a region abounding with boozers, caves follow and remain loyal to their chosen bands of limestone.

What is it in these parts of the limestone that allows caves to form, whilst other beds nearby are neglected? If caves are formed by carbonated water dissolving calcium carbonate, as we have all been taught, then there is no reason why one piece of this rock should be so more easily dissolved than are other pieces.

What if another mechanism is the main agent of cave making? And what if this other agent could only perform in certain beds containing magic ingredient X? Hang on in, all will be revealed, like Alderman at a party, in the gripping story which is about to be told.

Bugs, or micro-organisms, are the main agents of cave formation and one type in particular, known as Thiobacillus, is responsible for initiating and progressing a series of simple reactions which ultimately result in removal of calcium carbonate and in the creation of caves. These organisms can oxidise iron and sulphide minerals, just as you and I oxidise carbon in our food and beer to give us energy. Certain beds of limestone contain minute particles of iron sulphide (fools gold) and are therefore a suitable habitat for Thiobacillus. These beds are, as you have already guessed, the beds that favour cave formation. It could be that the sulphur is not contained in the cave bearing beds, but in beds close to them, such as shale.

When our rock devouring bug bites its way through a piece of this sulphide it produces ferrous sulphate and sulphuric acid. It does this with the help of water and oxygen. (route 1 on diagram) — See page 34.

Other Thibacillui now take these chemicals and oxygen and convert them to ferric sulphate and water. (route 2) This is where the very clever bit comes in. These two new chemicals are able to react with more of the original iron sulphide to produce more ferrous sulphate and sulphuric acid. (route 3) The process is a chain reaction fuelled by fools gold.

Not all of the sulphuric acid produced is consumed in the chain reaction. Some of it attackes the calcium carbonate to produce calcium sulphate (gypsum) and carbon dioxide. (route 4) The gypsum dissolves in water and is carried away. The carbon dioxide also dissolves to form carbonic acid which attacks calcium carbonate converting it to the more soluble bicarbonate which dissolves. (route 5)

So we have limestone being eaten away by the activities of Thiobacillus to produce caves.

Why do we not have much more gypsum in caves if there is so much produced in the cave forming process?

Good question.

Now for a good answer. Gypsum is relatively very soluble in water and is washed away.

O yes, if so why don't we find more sulphate in cave water?

Good question.

Help, quick fumble in bag of tricks.

Ah yes, Sulphate reducing bacteria.

They can convert gypsum into calcium hydroxide and hydrogen sulphide. They need some organic matter as an energy source but can get this from the organics dissolved in the water. (route 6)

The calcium hydroxide is dissolved or washed away and the hydrogen sulphide either disperses or is absorbed on the limestone. When this limestone is fractured some of the evil smelling sulphide is released.

So there you have it, for millions of years micro-organisms have been beavering away in the surface layers of rock in the vados and phreatic zones producing sulphuric and carbonic acids. To do this they have needed a source of sulphur which was available as iron sulphide but only in some beds of the limestone.

These words of wisdom are not written on tablets of stone, they are but a simplified approach to a complicated mechanism. The metallic sulphide could just as well be an organic sulphide and the hydrogen sulphide could be a mercapton gas.

Time, experiment and detailed discussions at the bar will no doubt complicate the mechanism proposed in this article out of the realms of every day understanding. However if this is the skeleton of the process it will assist us to understand why caves are where they are and then enable us to find the best sites for digging.

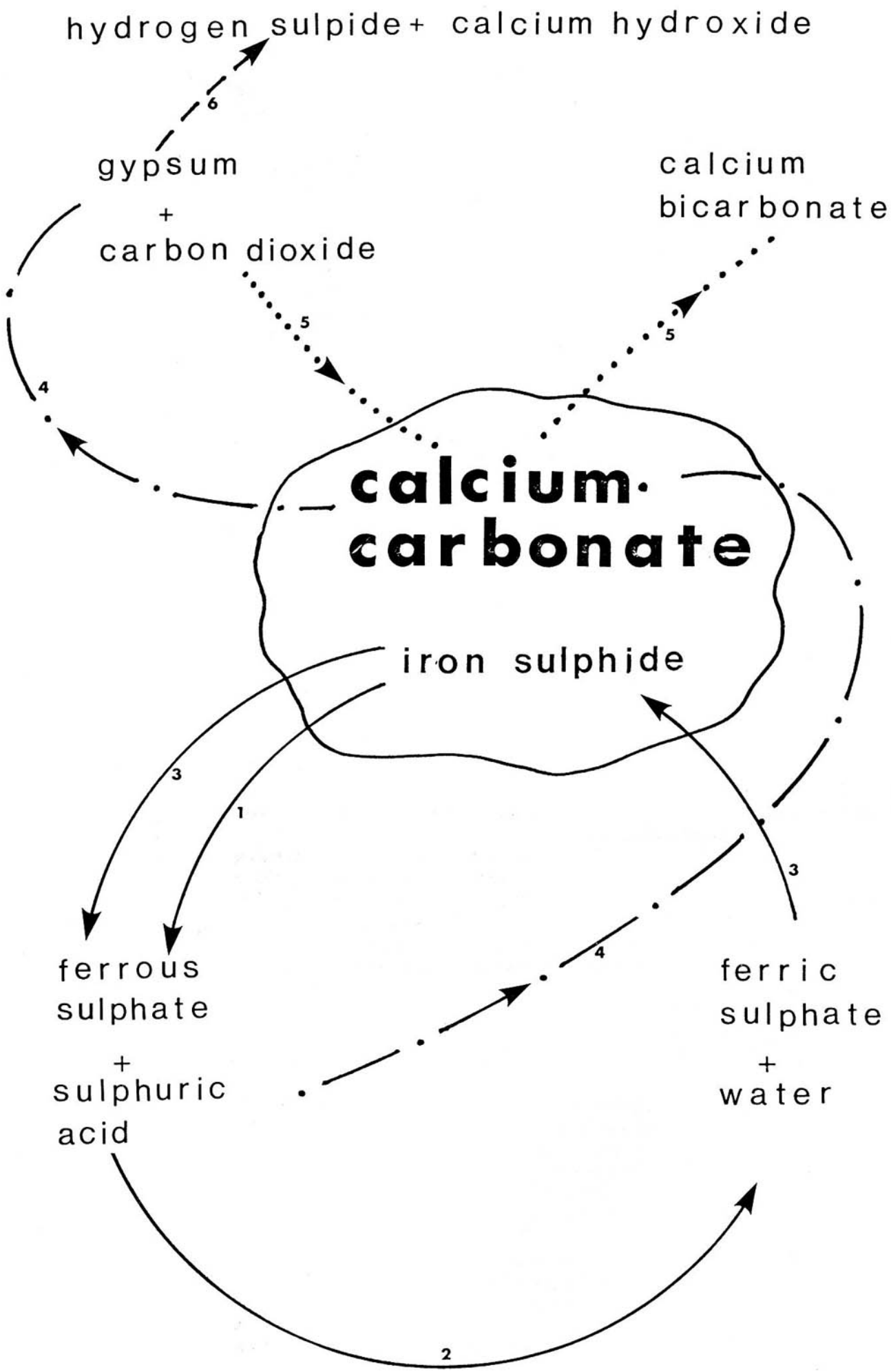
CATCH 22

Sometimes we are so close to a problem or so involved in an activity which creates a problem that we either cannot see, or do not want to see, the problem. Not wanting to see or not seeing a problem does not solve it or make it go away. The problem grows and becomes a crisis which is either solved by politicians and bureaucrats or leads to aggression.

The biggest problems are those where more than one matter of principle is involved and where the people are from differing backgrounds with a range of lifestyles and aspirations.

Take two principles – concern for the environment and personal freedom. Some of us may wish to pick wild flowers; others will want to pick their way through a cave. Both are damaging the environment. This was of no real consequence when there were only a few people involved but now the numbers are such that wild flowers are disappearing from many sites and white calcite floors have become brown muddy pathways.

Those of us who saw the ferns and orchids of the Neath valley before they were almost totally destroyed when the area became so popular, and who were lucky enough to visit Ogof Ffynnon Ddu just after it was found, can now see what has gone. Others see beauty in what is left and do not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ferric
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2

know what they have missed. But in five years or so they will experience a feeling of frustration of helplessness, as the people erosion of their special part of the environment becomes visible to them.

One solution would be to reduce access but this is encroaching on personal freedoms and is unacceptable. If I were allowed only two walks a year in the Neath valley and twenty hours in Ogof Ffynnon Ddu I would feel imprisoned.

Problems of this kind do not appear out of the blue, they are visible for years. Each year the rate of growth is greater than that of the previous year and then suddenly there is take off, as the numbers of people and damage is increasing exponentially.

If we so wish the problem will solve itself, because in not so many years there will be no environment worth protecting and then we can all wallow in each others mess as happy as pigs in you know what.

The problem with problems of this nature is that every solution poses another problem and when this is the case people bury their heads in the sand. Acid rain is a classic example where all politicians have adopted the ostrich stance. The only way to produce an acceptable solution is to first recognise that there is a problem and that it could be growing exponentially. Then to attempt to understand it from all angles before proposing solutions.

We are all in some way contributing to the degredation of our environment by our involment with it. I get angry when I see school parties touring the waterfalls and tearing branches off trees. On the same day I go digging on Pant Mawr and blast away rock and calcite. My justification is that I may find a new cave. Many of the school parties are deprived kids from the inner cities. Their teachers believe that a small, but worthwhile, percentage of children benefit from the outdoor exprience. They therefore justify bringing large numbers of their pupils into the countryside.

More and more people wish to escape the urban sprawl and the chaos of city life at the weekends. They form a club to get away to a retreat in the hills to pursue their hobby. To reduce costs, they lease accommodation and recruit new members. Often what started as a quiet country getaway, where the founders can enjoy the peace and get on with their interests, ends up bringing the urban sprawl into the open spaces. The founders loose out, the environment suffers but more people enjoy the open air.

Climbers flock to the hard rock regions to scale vertical faces and camp in the valleys. What if The Young Farmers Club decided to climb London's monuments on a weekend and to camp in Hyde Park bringing their sheep with them. Their justification could be that they needed a challenging change of environment at weekends. They could argue that the damage they do to Saint Pauls or to Buck House was of the same significance as the damage done to Tryfan on weekends by the exodus from the city; but that London's monuments can be repaired. What a welcome they would get from landowners, local residents and the police.

The point I am trying to make is that we have a classic catch 22 situation. What is more we all believe that the other person is the culprit and that what we do is legitimate.

The more mobile people from the cities can move on to fresh fields when one place gets too popular or too polluted, but those of us who were born in the country or who have chosen to live there are left with the wreckage. The countryside is not like a golf course where groundsmen appear to repair the greens when the players retreat to the bar.

Some people may ridicule what I've said, a few may stop and think. Unless we, who love and use the great outdoors, can come up with a considered plan to reconcile protection of the environment whilst retaining personal liberties, an unacceptable solution may be imposed on us by real and other kinds of politicians.

WHERE ELSE CAN WE GO WHEN WE'VE DESTROYED THIS PLACE?

DAN YR OGOF, AN UPPER SERIES?

W. H. Little, Sutton Coldfield, April 1988

A perusal of the survey of Dan yr Ogof reveals gaps that should be filled, chokes that have not been dug through and explanations that require to be made. What is more, these all occur in the nearer part of the cave, that is from Boulder Chamber out to the oldest places still left intact for the previous resurgences of the River Llynfell. These risings would have been at a higher altitude than the present one and a little to the East.

If the upper passages in the main synchlinally affected part of the cave are looked at there is something suspicious. Look at this list:

Hangar South	270 M. alt.
Hangar North	265 M. alt.
Hangar Passage	260 M. alt.
Green Canal (rock floor)	260 M. alt.
Monk Hall	255 M. alt.
Grand Canyon	247 M. alt.
Shower Aven (on boulders)	255 M. alt.
Boulder Ch. Upper Series	257 M. alt.
Boulder Ch. (on boulders)	247 M. alt.
Wigmore Hall	247 M. alt.
Cauldron (Lawrence's Shore)	240 M. alt.
Ogof yr Esgryn (Bone Cave)	265 M. alt.
Tunnel Cave (D. P. Hall)	257 M. alt.
Llynfell Rising (actual)	220 M. alt.
Llynfell Rising (past)	245 M. alt.

These are all at present floor level. The real solid rock floor may have been as much as 20 or 30 metres lower, where not on solid rock. There will be seen to be a fairly steady gradiant downwards towards Tunnel Cave and the past rising.

If the main stream flowed through Wigmore Hall then the precise place where it left it is obscured by stal flows and boulders and mud. Only the general trend is suggested. These larger passages all occur in the upper beds of the S2 series and follow these beds dramatically according to Coase. (B.C.R.A. Trans. vol. 4 nos. 1&2. Mar. 1977.) This is particularly shown in the 'Longitudinal

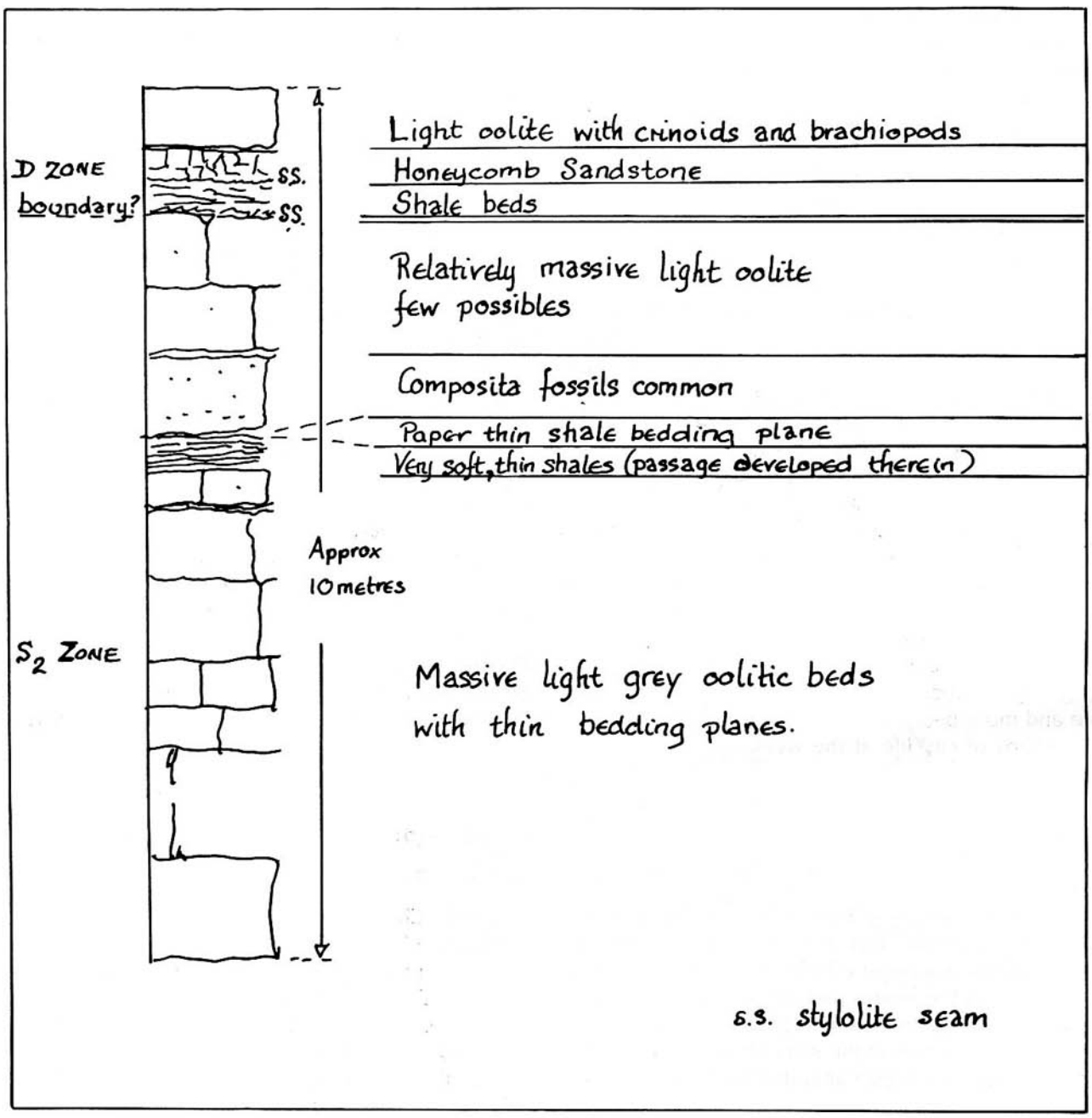

Fig.1 Section at top of Dali's Delight. (after Conse)
showing thin exposure of Honeycomb Sandstone and presumed junction of S and D Zones.

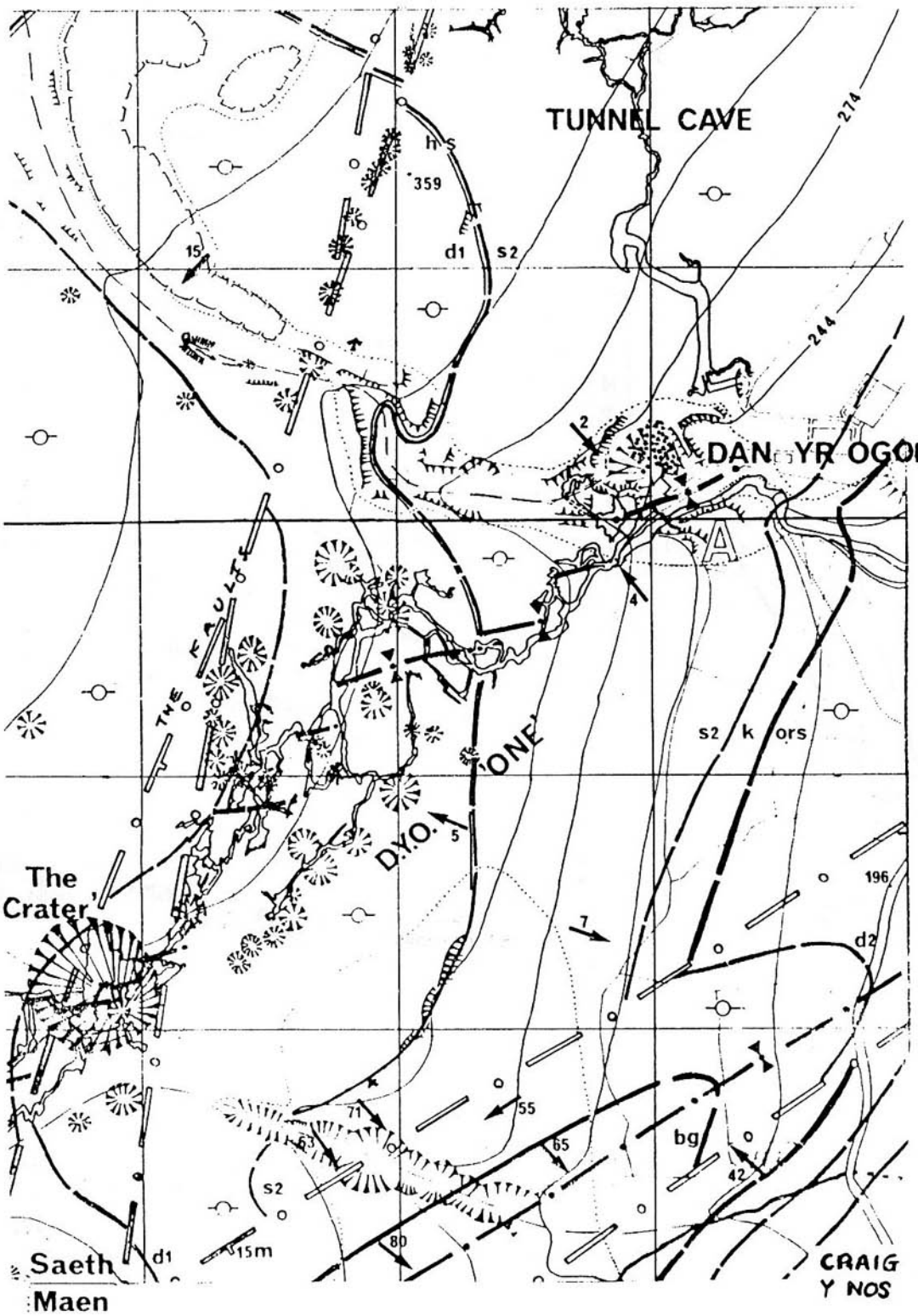

Fig. 2. THE FAULTS (after COASE)

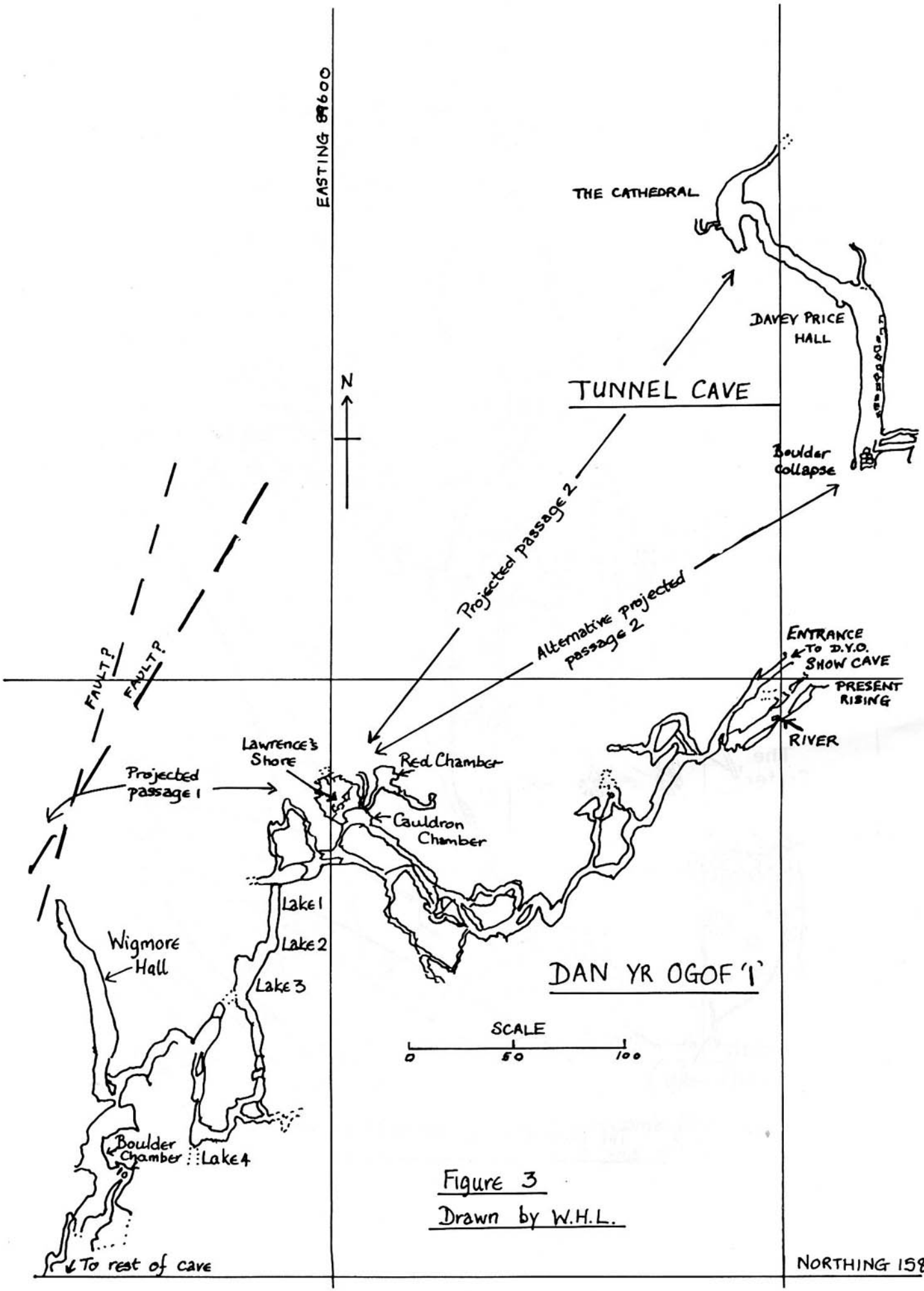

Figure 3

Drawn by W.H.L.

Sections Related to Lithology 2. B-A. Here the known cave quite slavishly follows Coase's projection of the S2 Upper beds. This tendency may be exaggerated by the collapse of the passages in places, in areas of the main passage. Fig. 1 shows the stratigraphy at the top of Dalis Delight with reference to the S2 upper boundary.

In Tunnel Cave this state of roof collapse applies and the real floor, solid rock, is nowhere to be seen in Davey Price Hall. It must be somewhere perhaps 10 or 20 m. deeper than where we now walk through to the Cathedral. This is apparently due to roof collapse and damming and filling behind.

A complicating feature is also the two faults shown by Coase which cross one another to the north of Wigmore Hall and to the west of Lawrence's Shore, see fig. 2. This fact undoubtedly has influenced the blockage of Wigmore Hall's northern end. It is also noted that the north end of Wigmore Hall, Lawrence's Shore, Red Chamber, and the south end of Davey Price's Hall all lie on a straight line: being all collapses this might indicate yet another fault line. This should be investigated further, although this is not obvious on the surface: (Fig. 2).

Fig. 3 shows the course of the Connecting Passages may thus extend from Wigmore Hall, (North End) Eastwards to Lawrence's Shore, then Eastwards and Northwards to the Cathedral. The stream would then have flowed along D. P. Hall, through the boulders, to the scree slope, rising as the Llynfell, as now, but at higher altitude, say 245 m.

Looking at the possible points of access, the bottom end of the Cathedral is filled with water and mud. This is not a practical dig. At the Wigmore Hall end, the problem is where to start without destroying stalagmite. It seems that both ends are blocked but will the middle point give access?

Lawrence's Shore is a good possibility. It was first dug in the wrong places by a number of people including Ashford Price in the tube, at the right back by me, and at the top left by John Bowden. All failed after comparitively short distances. The common knowledge from all these attempts was 'there were Boulders to the West'. The two higher dug passages exist underneath overhanging beds which continue in both directions, North and South, across the end of Lawrence's Shore. That is consistent with a large boulder filled passage. The dig now current is in the centre and is going upwards where the roof is marked with a conspicuous joint. Here two short crawls meet and lead to a choke. This was blocked with boulders which were lightly stalled. Dripping water also washed the blocks clean. The main drawback to this digging position was not being able to use any explosives. The reason for this ban was the Shawl, the most spectacular formation in the show cave, with it's root in the same beds. To date progress has been very slow. Mostly the blocks are not of limestone but of Honeycombe Sandstone. Demolition of large boulders at first began with heat, only removed a stal crust, so revealing the nature of the problem. Eventually a hired electric hammer and a turfor eased out one offending boulder. Then with subsequent rockfalls the throat of the dig became blocked, time and time again. With the falling rocks came thyxotropic mud and gravel and more Honeycombe Sandstone. This is from the very beds we are aiming for; the bottom of the D2. These beds are exposed in Dali's Delight at the other end of the syncline, and it is worth looking at Coase's section again.

The S2 beds may be 100/120 m. thick but Coase again suggests that these may only be 95 m. thick at this end of the sync line. That means that the origin of the Honeycombe Sandstone blocks is near to Lawrence's Shore. It is interesting that in Coase's thesis (not the D.Y.O. publication) under 'Anomolies' he says that Railton predicted a high level route to The Rising, via Bone Cave (Ogof yr Esgryn). But he, Coase, dismisses this link as tenuous.

Now he, Coase, explains the Cathedral by 'increased aggressiveness' of the waters that produced the passage. This was a popular explanation at the time but unproven here. Neither of these two workers proposed another passage coming under the arch at the lower end of the Cathedral. Nor do either 'see' this as a way over the lakes, which would be free from flooding, and, would result in a connection from Wigmore Hall.

If the Lawrence's Shore Dig reveals an upper series then it will prove to be the key to one of D.Y.O.'s mysteries. It deserves a thorough investigation and, while the repeated falls of blocks are disheartening, progress is being made.

CONTENTS

COVER PHOTOGRAPH; Cwm Dwr, May 1960 — with thanks to J. C. Saxton

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