

SOUTH WALES CAVING CLUB



40TH

ANNIVERSARY

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Editorial

The 40th Anniversary of the South Wales Caving Club is without doubt a milestone in British Caving!

This Anniversary issue of the Newsletter celebrates these 40 years, not by looking back at a Golden Age but by recording the clubs contribution to caving today and for the future. The fact is, SWCC is very much alive and actively engaged in the best of caving, both in this country and abroad.

Certainly over the years things have changed, just take a look at some of the old photographs! but SWCC has been able to change with the times while retaining its own integrity and unique character. Nothing can give greater confidence for the clubs future than the Newsletter articles themselves.

Two major trips abroad this year were immensely successful both in technical achievement (see Agua '86) and sheer exuberance of caving with good friends (Dachstein Trip). Articles on the West Indies and caving in New Zealand, like the information on China in the last issue just go to show that SWCC is making a real contribution to the international scene, even if it is at the expense of exporting some of our best cavers! The write-up on the Ogofone, in conjunction with the ogofbeacon in edition 101, shows the spirit of "the clock-work cavers" is still wound up and going strong. The "toys" in this instance are, however, examples of technical excellence which would not have been thought possible just a few years back. Conservation-wise the article on bats is a timely reminder of the drastic decrease in the bat population recently and the role-cavers can play to protect our cave ecosystems. Perhaps the single most important article in this issue is on Llangattock and the truly enormous cave system which is slowly revealing itself. If that article means anything it illustrates that there is still an awful lot more cave passage to be discovered in South Wales. A lesson, perhaps, in systematic exploration which might profitably be applied to the west end of the limestone!

The loss of Jeff Jefferson earlier this year is reflected in the brief account of his life and work for the University of Wales and for the Club. I am sure we will all miss Jeff as indeed we recall all the other faces of the past 40 years who have made the club what it is today.

Lastly, may I just add my own note of thanks. When I took the photograph on the front cover of this edition both Bob and I were young teenagers and used to arrive at the club by bike and went caving on sufferance of the older members. After nearly twenty years of "growing up" with the club and now, like Bob, bringing my own children up to Penwyllt, I feel an enormous debt of gratitude to those people who, 40 years ago came together to found the South Wales Caving Club.

*Gary Jones.
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Agua '86

A Cave Diving Expedition to the Picos de Europa

Extract from the prospectus

"High in the Eastern Massif of the Picos de Europa in Northern Spain, many small streams disappear into deep cave systems, and resurge over 1500m below, from 'La Cueva del Agua'. If a traverse were to be made from sink to resurgence, many miles of previously unexplored passage would be discovered, and the world cave depth record could be broken. The key to the whole system is the resurgence cave itself, this being the focal point of a huge underground network of cave passage. Although over 10 kms of passage has already been found here, further exploration of La Cueva del Agua has been stopped by sections of flooded passage (sumps) which early explorers lacked the ability to tackle..."

Cueva del Agua was first explored by a group of cavers from the University of Lancaster (LUSS) in 1975, and during that and subsequent summers up to 1979 was extended to a total of 10 kms of passage. The exploration was never easy, with difficult route finding and constant climbing slowing progress. Eventually, failure to find a major way on led LUSS to turn their attention to the several promising leads high up on the massif in the feeder caves for Agua.

Cueva del Agua was to remain comparatively undisturbed until 1984, when Colin Boothroyd turned his attention to one lead which had never been pushed, the Road to Certain Death sump. This sump is formed by a huge wall damming the upstream end of the Road to Certain Death passage. Colin dived down the wall to a depth of -25m, but when he still couldn't see the bottom decided to ascend. The following year, Rob Parker dived the sump but stayed near the ceiling, laying out 120m of line to a maximum depth of only -18m. The sump was big and crystal clear, Rob's lights not reaching the bottom of what was obviously a deep

rift. However, encouragingly, at the 120m point, the ceiling was starting to rise. Although continued exploration was out of the question, as Rob was reaching the safe limit of his air, what he had seen was sufficiently exciting to fire enthusiasm for a full expedition to this one site. Agua '86 was born.

Extracts from the log of Agua '86.

A year later, on the 25th July 1986, with most of the preparation completed, the team gathered in Bristol. However, we weren't to leave Britain without a reminder that even experienced divers can sometimes push their limits that little bit too far.

25th July 1986. Steve Jones.

And it came to pass, that due to poor organisation, and Ian's wife's baby being late, a last minute, rushed trip had to be made to the end of Wookey to retrieve a sleeping bag needed in Agua. Things started badly and became progressively worse. Two 80's (80 cu.ft. diving cylinders) and a valve were collected from Julian's flat on the way. We assumed the 80's were full, but they were later found to be just over half full. Only the start of a minor epic to follow. Ian operating on almost totally borrowed gear, had not only a 'bum' fill on his 30, but also a highly sensitive, blowing-off valve.

Nevertheless, the dive through to Wookey 24 went very well, in a time of just over 35 minutes. Here the first mistake was made when we expressed our thoughts that we "didn't know what all the fuss was about getting here, it's easy". The sleeping bag was collected and we started out, all going well until leaving chamber 22, when my fin strap broke. Whilst retrieving it I lost the line. After a quick panicked search, I found it buried in the mud. Progress was now slow, scooping along the bottom. Passing a belay point, the line suddenly went slack. I pulled in some 4 metres before following it up into a tight ascending rift. Fortunately, the visibility was just good enough for me to see the rift dipping away to the left, and after a shaky retreat I eventually surfaced in (chamber) 20, fin in hand and bloody glad to have arrived. I waited anxiously for the comforting arrival of Ian.

Ian Rolland

Coming to the same slack line as Steve I held it out in my left hand as I slowly made my way in the zero visibility. I came across a narrow piece of passage and pushed through. As I popped out, the line came out of my hand. I dropped the bag and made a bid to get back through the narrow section. This was done with not too much effort. I then had a quick

feel around the passage for the line, but with no luck. I said to myself "You're going to die here Rolland". Low on air, I made a last effort by going to (Chamber) 20 without the line. I was very happy to surface and see Steve, and after hearing his story, realised it was time to get out. We left the sleeping bag in the sump and exited with no more problems.

We arrived in Spain on Tuesday 29th July via the Plymouth Santander ferry, caught a bus to the Urdon Gorge and walked up to Tresviso, a tiny mountain village. Tresviso is only accessible by a mule track from the east and a landrover track from the west but it makes an ideal base camp, situated 600m directly above the entrance to Agua. We anxiously awaited the arrival of the Range Rover, which carried the majority of our equipment and by early evening it had appeared and camp was set. Later on we retired to the tiny village bar where the members of the team who had not been to Spain before were introduced to Spanish beer.

Our plan of action was discussed and we decided on three areas of effort. First, and most important was the dive in the Road to Certain Death sump. Second, was to rig towards the furthest extreme of Agua where there was another important diving site (Upstream Terminal Sump) and the possibility of a dry lead. Third, was to rig another cave called Marniosa, in the Sobra Valley, which also contained an undived sump.

30th July 1986 - Julian Walker

Agua revisited, as Jim, Ian, H and Julian rigged Road to Certain Death (now Road to a Minor Injury) and repeated the bolt climb to Certain Death Sump.

31st July 1986 - Rob Parker

A late start saw Howard, Julian, Jim, Gavin, Ian 'I don't need any air' Rolland, and myself heading down the gorge for Agua. The first job was to rig a short length of bluewater across the entrance pool, instead of its old 6 mm diving line. Howard was the first to try the new line, and unfortunately it wasn't tight enough.....

We arrived at the sump at around 3.30pm. Julian climbed the pitch and hauled the tanks up, whilst Ian and Jim helped me kit up with gauges, knives etc.

Diving on two 72's and one 50, I followed the line I had laid the previous year. Reaching the limit of exploration I tied on the new reel and set off into virgin passage, thinking that I should surface within

a few metres. To my dismay the roof of the sump levelled off at -6m then dipped again leading into a wall going down. The roof was found again at -18m, 20m further on the passage dipped again to -25m. A further 20m and it was down to -30m. The floor could be seen some 12m deeper at this point. I would have had to go below -36m to make any forward progress so the dive was called off. I reached base after a 23 minute dive.

This was a major setback, and at the start of the expedition. Our prime lead was going to be difficult to crack and require a lot more effort than originally thought. However, in Marniosa on the same day, things were going rather better:-

31st July 1986 - Colin Boothroyd

Downstream Marniosa Sump - Two Acurex (light-weight diving cylinder that can be pumped to high pressure), two valves and a connecting hose, plus all the danglies needed for a long dive. The sump pool was 10m deep and line was laid into a blind alcove, only to be wound back onto the reel again (with difficulty as the line was overly full). The way on was found at -7m and followed for a further 20m to where, surprisingly it surfaced. A short deliberation over whether to go back for Steve, and then decided to check the passage out first. It continued in a similar fashion to that immediately prior to the sump, rifts with chert nodules and numerous small cascades. Approximately 200m in, a large dripping oven was reached, thought to be about 80m in height. The rifts continued beyond the aven to another chamber where the water was lost under the boulders. Clambering over to the far side the passage continuation was a dry, flat-floored canyon. It passed an 18m deep pot in the left hand wall to a large boulder-floored passage. An abrupt end came after 50m at the lip of a 17m pitch, with a pool at the bottom. The return trip to the sump was paced out to 920m (later to prove to be considerably exaggerated). The dive back through the sump was surveyed and found to be 35m. Returned to a very cold and relieved Steve, Debbie, Nick and Rod.

1st August 1986 - Steve Jones

Downstream Marniosa Sump - All to Downstream sump in 2hrs. Donned the gear. Colin dived first with fins and tackle bags (50' ladder and survey gear). On reaching the far side he re-belayed the line, and started screaming. No voice connection was made. The rest of us dived through uneventfully by pulling on the line. Ian and Colin started surveying towards the pitch while Gavin and myself set off to rig it and explore the "miles of passage" at the bottom. An inlet was noted on the right as we

moved downstream. The route is very impressive, passing through some massive canyons and very high avens. Reached the pitch and rigged it on decidedly dodgy belays. I descended first to find the ladder about 3' short. In the excitement I dived straight into a 4m wide resurging sump pool, and swam across waiting for Gavin. (Wished I had done my jacket up). 15m of impressive canyon passage, estimated to be 45m high led straight into a series of tight jagged rifts. Various routes were forced through and eventually after about 1½ hrs and shredded wetsuits we dropped about 12m into a pool. I swam around for about 5 minutes praying this couldn't be the end of exploration. After a few laps and sticking my feet under the edge, it was quite definitely the end. On retreat a few more desperate avens were climbed. All closed down. We slumped down into a heap on the gravel, head in hands.... Set off home, uneventful exit, reached surface about 11.15pm after a 9½hr trip.

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Some possible climbs were noticed in the new extension and on the 5th August, Steve Jones and Colin Boothroyd returned to tackle them.

* * *

5th August 1986 - Steve Jones

Marniosa - Following a very efficient entry, we got to the climb at the end of Colin's extension in under 3hrs. Colin climbed a muddy rift using friends and slings to a false floor..... The way on was to the left, which felt like we were doubling back on ourselves. Nevertheless, an overflow stream passage was met and followed for a few hundred metres. At one point I managed to fall about 4m into a pot and was lucky to escape with a bruised bum. Colin found a way over the top. This passage continued and entered an extremely tight rift, which was impossible to traverse at any one level. On squeezing out of the far end after about 200m, we entered a chamber and from there we were in huge stream passage. We had remet the Marniosa water! Many huge avens and amazing formations were passed. The passage terminated after an estimated 750m at a beautiful, calcite-rimmed, crystal-clear sump pool.....Two weary, but very happy cavers eventually emerged after 12hrs, getting back to camp at 2am.

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On subsequent trips many of the climbs were checked out but none of them "went". However, Colin did another trip into the new terminal sump and free-dived with a mask and a bag of rocks on a base fed line. He went down to -3.5m and could see

the passage continuing, large and with good visibility just waiting for a dive.

Apart from the divers activities, over the course of several trips, Roddy with Howard and Fran concentrated on climbing the avens between the entrance and sump one in the hope of finding a by-pass. None was found but the climbs led to several hundred metres of old, high level passage.

Meanwhile, exploration continued in Cueva del Agua and dramatically in another resurgence cave, further down the Urdon Gorge, the Cueva del Rio Chico.

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3rd August 1986 - Steve Jones

Chico - Aimed to dive terminal sump. Using one Acurex and one 30 cu.ft. bottle. Passed the first sump. Colin's line still in place from two years ago. Crossed the chamber without problem, belayed the line and set off into the unknown. Descended down a huge canyon, following the roof. Put out 66m of line to -37m, on a bearing of 90°. The line was belayed to a large nodule and cut to bring out the line reel. Uneventful exit, thanks to Colin for support.

4th August 1986 - Steve Jones

Chico - Kitting up took a while - 2x80 cu.ft. and 1x30 cu.ft. decompression bottle, ABLJ etc. I spent a few minutes playing/learning how to use the ABLJ (air inflated life jacket) in the first sump. Struggled over the lip into the second sump. Time was noted and a quick descent to -9m where the decomp. tables plus 30 cu.ft. bottle were tied to the line. Then a rapid descent to previous day's limit, tied the line and away I went. I stopped at -55m, (my tables only calculated -57m). While looking for belays and checking my gauges I unknowingly dropped to -62m. A probably too rapid ascent was made to -9m and first decompression stop. And then the absolute horror show. NO DECOM. TABLES. I bloody crapped myself. I calmed myself down and started computing on the slate. Decided to do 20 minutes at -9m, 15 minutes at -6m and 10 minutes at -3m. I had no idea whether they were correct. In fact, the times transpired to be about right, just in the wrong order. After about 20 minutes the cold was getting a bit serious. I suffered and stayed the time. Spent a couple of minutes watching some bugs crawl around on the wall, but then back to the worrying reality. I eventually surfaced shaking quite violently and spent the next four hours worrying about getting decompression sickness. A true epic I don't wish to

repeat. A great carry with heavy loads by John & Debbie - thanks.

* * *

Steve was very lucky - the fact that he only "bounce-dived" to -62m and then had the sense on discovering the loss of his decompression tables to spend estimated times decompressing, saved him from serious injury. As well equipped and experienced an expedition as we were, we still would not have been able to help Steve if he had got the bends. The best we could have done would have been to try and find someplace in Northern Spain with a decompression chamber, with very little guarantee of success.

With the sump going deep, Chico still remains open.

In Agua, although Road to Certain Death sump was going deep the expedition was still capable of putting a diver through to the other side. Rob would dive in a dry suit, enabling him to spend greater time at depth and consequently at decompressing. If we were lucky and the sump didn't keep descending and wasn't too long we would be able to get a second diver through with Rob. The problem with Rob surfacing on the other side of the sump on his own would be his inability to get out of his dry suit, and more critically, if he did succeed, the impossibility of him getting back into it. The dry suit would be too delicate and constricting to spend any reasonable time exploring.

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3rd August 1986 - Rob Parker.

Ian, Gavin and myself managed to make an early start (well, early for this place). The first job to be done on reaching the sump was to put a brew on. Ian climbed to the sump pool and hauled the full cylinders up, then rigged them, ready for the dive. Gavin helped me to get into the dry suit. A quite nervous pee before zipping the suit right up and I was ready to climb the ladder. Kitting up was once again performed on the little perch between sump and pitch.

Using two 72's and an Acurex as main gas supply vessels, plus a 47 as back up decompression gas, I set off into the water. A small amount of cramp was experienced as I sank deeper into the sump, this being caused by 'drysuit squeeze'. The Acurex was staged at -30m and the line reel picked up. The passage continued to descend and after 40m of line had been laid, a depth of -54m was reached. At this point I decided to call off the dive due to lack of decompression information. No real delayed psycho-motor response was encountered (the

'Narcs' or nitrogen narcosis which can cause a diver to feel either extreme euphoria or fear). A total of 47 minutes decompression was required. This passed quickly as Gavin was taking pictures. Thanks to Debbie, Jim, Ian, Gavin and of course, as seen on TV - me!

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For all practical purposes on our expedition, the sump had now gone too deep. However, Rob decided to have one more dive.

* * *

11th August 1986 - Rob Parker

Final Push - A wet day ensured a late start, we left camp at 2pm just as the rain stopped. A large team of porters comprising Ian, Jo, Rich, John, Chris, Dick and Clive made the journey to the sump effortless. The standard thrutch saw me clad in the dry suit at the top of the ladder with 2 x 72's strapped to my side. With an Acurex as a stage cylinder and a 47 as a spare decompression cylinder I set off. Stopping at the -36m belay I dropped all the stages and prepared the line reel ready to clip on. The 'narcs' could be felt as I neared the limit of exploration at -54m. Line attached, I quickly followed the passage gradually gaining depth. At -62m the roof gave way to a shaft heading vertically upwards. Bubbles could be seen 20m above reflecting light back down. Near the safe air limit I looked for a belay, finding an eyehole at -64m (sorry Steve). Feeling quite high I set off out. Had trouble dumping air out of my suit. Decom. passed quickly with the aid of a 'Penthouse' (thanks Ju).

* * *

So there we have it, the sump is ascending. Unfortunately, it was beyond the logistics of the expedition to continue its exploration as decompression will now be required going in as well as returning. Practicality dictates that a minimum of two divers with drysuits are necessary with all the requisite support - another time, another expedition.

Concurrent with the diving of Road to Certain Death Sump and the pushing of Marniosa and Chico, an underground camp was set up in Consort Hall. This was the best way to explore the least accessible areas of Agua without having a long and tiring trip just to get there, let alone get back.

From the camp the downstream passage from Colin's Climax was pushed through several hundred metres of very active streamway to a sump. This sump has yet to be dived.

The camp was again used when the Upstream Terminal sump was dived after the cessation of activity in Road to Certain Death sump.

* * *

14th August 1986 - Ian Rolland

Agua, pushing Terminal Sump - A late start to the trip, but we soon got to the sump after a stop at the camp for a hot drink. In no time at all the diving gear was up the climb and we were ready. I dived off. With 15m visibility I came across an airbell after only 30m. The passage in one place was a good 20m x 20m, but never smaller than 10m x 10m. As I came to the end of my line I found a nice place to tie off, and I had not even hit 'thirds' on my 47. A slow exit was made looking again for any sign of passages. After a 17 minute dive I was back with Colin. Back to camp then Rob and Steve went to dive and we turned in for a sleep. Up at 6am as Rob and Steve returned but we did not leave camp until 9.30am. trip 23hrs, a good one. Dive just over 120m to -24m. What a buzz!!

14th/15th August 1986 - Rob Parker

Agua, pushing Terminal Sump - Followed Colin and Ian into cave. About 4hrs behind them. Quick, hot trip to camp where we found a note from the others saying that they had left for the sump at 4pm. As it was only 6.30pm Steve and I decided to eat and sleep rather than follow on to the back end. CB and IMR strolled into camp at 11pm with the news that the sump had gone to -24m, 120m from base. After much thought it was decided that I should try to go further and make a good search for side passages. Arrived at Colin's climax at 2.15am and promptly dropped my generator hose into a 1m deep pot. Dived 3.15am, reached the limit and laid a further 42m to a maximum depth of -27m.

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The sump wasn't dived again because of the shortage of time. Road to Certain Death and Upstream Terminal sumps were the main diving objectives in Agua, but with plenty of man power and limitless supplies of air they were by no means the only ones.

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2nd August 1986 - Jim Thomson

Agua, Road to Wigan Pier - Myself and Colin entered cave at approx. 4pm. Eventually located sump and kitted up by 6.30pm. Sump pool turned out to be a pain in the arse. Kitting up needed to be done while bobbing around in the water. Problem:

1. Could not get valve to seal on Acurex
2. Dropped two lumps of lead to about 6m depth.

Made quick dive to recover lead, followed by a dive on one tank, one valve, 15m into passage 3m x 2m. Tied off line and surfaced.

Enter Colin "I've touched Anneka Rice's bottom" Boothroyd. "I'll have a go with the Acurex" (unknown quantity of air), "and one mini". After kitting up, hanging on the end of some dive line, Colin also managed to drop some lead. Colin dived to recover the lead, surfaced. No lead, no light, no helmet. Colin dived again to recover helmet - surfaced with helmet on head. "Where's my f--ing helmet?". "On your head". "Oh, yes", said Colin, as helmet fell back into sump pool. Finally Colin made dive, laying 50m of line at -16m. CB surfaced with no problems and an exit made from the cave at 10pm.

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On the next dive at this site Jim managed to scare himself pretty thoroughly by getting tangled up in a lot of loose line. Luckily, Jim hadn't lost his knife and was able to cut himself free.

The sump eventually surfaced after 180m on a push made by Steve and Colin. Approximately 300m of passage were surveyed on that trip finishing at a 4m waterfall. A number of side passages were also followed and one particularly grovelly one dropped back into a streamway. This turned out to be the stream they had just dived from - a sump bypass had been found.

The waterfall was climbed on the next trip by Colin.

* * *

16th August 1986 - Steve Jones

Road to Wigan Pier -The climb was attacked by Colin by traversing in from the right in the hope that the pitch lip could be reached. A friend and a sling were placed for protection, and then, whilst swinging from one dubious friend, attempts were made to lasso a spike. The dubious friend "popped" and Colin fell, just being held by Steve before he decked out

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In the fall Colin had badly cut his little finger necessitating a rapid exit from the cave, and a frantic night time drive to a hospital in Oviedo (about 100kms away) where it was sewn up.

The climb was finished by Steve producing a short length of streamway going to yet another sump.

In contrast to the diving conditions in Agua and Chico there was one place where the sumps turned

out to be easy and shallow. This was in a new cave system discovered during the second week of the expedition. It was situated on the north side of the Sobra Valley about 1 mile closer to the Urdon Gorge than Marniosa. Exactly why the cave hadn't been explored on previous expeditions to the area, is a mystery, as the entrance is a very obvious hole in a cliff face with a resurging stream. It is also only 10 metres from, and in plain view of a landrover track. This cave came to be known by several names - Cheese Cave (because most accessible cave entrances are used by the Tresvisans to store cheese); Cows Head Cave (after the fossilised remains of a cows head calcited to the floor in one of the main chambers); and finally the local name Cueva del Agua (simply because any cave with water is a cueva del agua).

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7th August 1986 - Rich Barker

Cheese Cave I - The Cheese cave was visited, and a crawl pushed to a small chamber and a smaller crawl. Two minutes knocking the shit out of some stals. opened it up for another small section ending in a calcite choke.

Cheese Cave II - Two minutes further up the road, a stream was noted coming out of a 6m high rock face. Following the stream up the lefthand passage we passed a low section of streamway, through an oxbow and then hit a boulder choke - a potential dig/push. To the right we followed a smaller streamway, approximately 30m to a boulder choke. Pushed a crawl to another calcite choke approximately 15m.

The next day John Wallwork and Dick visited the cave and pushed a crawl through boulders in the lefthand streamway of Cheese Cave II. The cave 'went' for ¼km to a sump, passing on the way a chamber with the calcited cows head (Ogof Pen y Buwch).

13th August 1986 - Julian Walker

Cows Head Cavern (Ogof Pen y Buwch) - To dive the sump. Fran had a quick look at the blue pool, but handed over to Ju. Laid 100m of line to -9m maximum. Passed one air bell to surface in an open streamway. This was followed for about 100m to a further clear sump. Total about 150m of passage and 100m of sump.

14th August 1986 - Rich Barker

Cows Head Cavern (Ogof Pen y Buwch) - Aim: to survey passage found by Ju on previous day, and explore new sump pool.

After problems of various kinds, original three person team beyond Sump 1 became one man with no intention of surveying. Ju's 100m sump passed easily. Abandoned spare 13 cu.ft. at end of sump and continued on to Sump 2 with 200m of line and an Acurex with two valves. Expecting a similar length to Sump 1.

Arrived at Sump 2 cursing Acurex, belayed line observing passage spiralling down in very similar manner to Sump 1. Sump passed after 12m of line laid, descending to -2m.

Surfaced in large deep sump pool with stream entering down a 1m high oval tube. Part de-kitted and set off to explore. Got carried away exploring and arrived at large chamber 70m+ high, 50m wide and 25m long.

Grade 2 survey done on return journey. Passage estimated at 500m, proved a little inaccurate later. Arrived back at home side of Sump 1 after 3½hrs, to find willing team to help remove kit back to vehicle. Thanks to Gav. and Fran.

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The cave was properly surveyed to a large chamber on the 15.8.86 and the following day, Rob and Ian went in to attempt a climb in the terminal chamber.

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16th August 1986 - Ian Rolland

Cows Head Cavern (Ogof Pen y Buwch) - After a late start got to the chamber with a tackle bag of climbing/rigging gear each.

We were over the moon to get to the top of the waterfall coming in to the chamber, without even taking the bags off our backs. Continued, only to find a sump after a short distance. Rob put on a mask and had a go at free-diving, but with no luck. I climbed a rift to the sound of water finding an upstream and downstream sump. Rob had another go at free-diving, but again no go.

A 22m aven next to the sump was climbed and two ways on were found at the top. One way came to an 8m pitch.

.....We rigged the rope and I set off down to find a small ramp, at the bottom of which was another climb. By now it was 3am. Rob and I had a go at soloing the pitch but gave up. Got the rope and Rob started climbing, with only a bolting kit (with no hangers), and one tape sling. He used the tape for his highest possible point of protection then for

the last bit put in a bolt and clipped into the bolt driver before making the final moves.

There was passage at the top.

.....After only a short distance a 3m climb was scaled with the aid of our last piece of gear - a chest harness! We were only to get about 100m further before the passage became full of mud. On the way out we went back down the other passage (at the top of the 22m aven) to find a drop of 40m+ back into the big chamber. Out of the cave at 6.30am. Trip 15½hrs.

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Cows Head Cavern was left at this stage with a sump still to be dived, and every possibility that it will go as easily as the previous two. The cave is an important one because it is the only known development of cave passage on the north side of both the Sobra Valley and the Urdon Gorge. This is because most of the limestone of the northern side belongs to the formation resting above that of the southern side. The junction between the two formations is characterised by the presence of a thin (1-6m) calcareous sandstone unit, seen by Rob and Ian at the highest point in the Cheese Cave and seen by the landrover track in the Sobra Valley. A good find.

With the chronicling of the discovery and exploration of Cows Head Cavern, we have almost reached the end of the expedition's log, but there was one more find that could prove to be of major significance. The aim of the last underground camp in Agua was to follow, as far as possible the draught in the area around Colin's Climax, and to look at one or two climbs that had been noticed on earlier camps.

* * *

15th August 1986 - Julian Walker

Final camp, Consort Hall, Cueva del Agua - Day 1: The earliest start of the expedition! Underground by 11.30am and through Consort Hall (stopping for a quick brew) and on to Hall of the Green Domino by 4pm. Clive and Nick started hunting for the draught whilst Ju and Rod looked at two climbs in Green Domino. The first came to nothing - going to a balcony leading around into the big rift.

The second climb took Roddy into a passage seen above the Bloody Lake, via an aid climb (total climb 11m). The passage went up at 45° for about 50m to another 3m climb on loose mud and fragile

calcite with a strong draught. Ju followed up, surmounted the climb and the two went on. The only easy way ahead was down a short pitch and then a tube, to who knows where? The draught obviously went over the top of a calcite ramp/wall which we decided to leave until the following day. The two climbs were left rigged.

Meanwhile Clive and Nick had had little success draught hunting.

16th August 1986 - Roddy McLauchlan

Teeth of Satan - Day 2: Awoke at 9am and away from camp by 11.30am. Ju and I to continue exploration of the new passage - Clive and Nick to Dan's Room and associated area.

Swiftly up fixed lines into the passage above Bloody Lake. Intimidating passage - having to traverse up the walls on brittle calcite cauliflowers, as the central area is slippery mud at an angle of 45°. It plunges into the lake 20-25m below.

I tackled the climb over the calcite ramp with a total lack of subtlety - knocking footholds in the hollow calcite with a bolt driver and belly flopping over the top. Once up the draught was quite noticeable. Ju followed up and after sorting out gear set off into caverns new. The next three hours encompassed some of the most intimidating caving Ju and I have ever done. The passage angle was rarely less than 45°, frequently closer to 90°. The passage length gained was probably not more than 200m for a height gain of approximately 190m. Mostly large passage - 3m high by 6m wide, with an exciting 25m+ aven entering about halfway up, (an active inlet with an obvious lip at the top). Ju and I finally reached a very large rift, the edge of which was free-climbed on mud and loose calcite to a calcite platform. Lying there, recovering our nerves (we were both by now quite frightened, having come up some nasty climbs with big drops beneath) Ju noticed that it looked like we were lying in a mouth with calcite fangs pointing down at us - "The Teeth of Satan".

We explored one more small passage left still going, then surveyed out. Four or five leads still untouched - draught still present! Looks like this could be the way on up the mountain. A truly amazing day.

Back to camp by 10pm.

The next day, the 17th, detackling was begun and Julian, Nick, Clive and Roddy removed all the tackle

from the cave in one mammoth effort. A total of nine tackle bags and two coiled ropes were taken from Consort Hall to the entrance in 6½hrs.

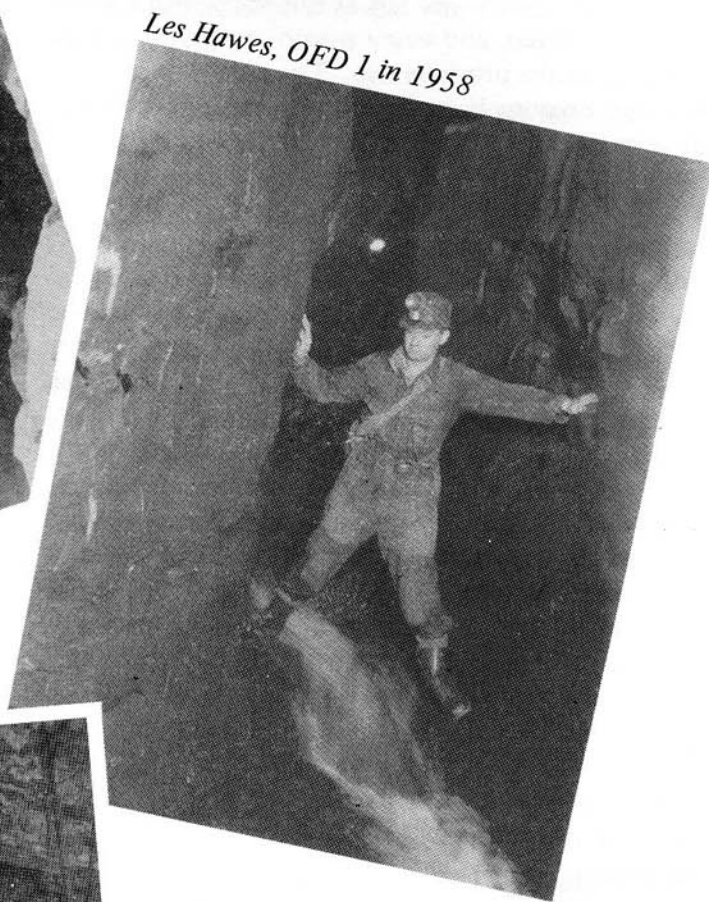
Conclusion

Some truly remarkable finds at the limit of expedi-

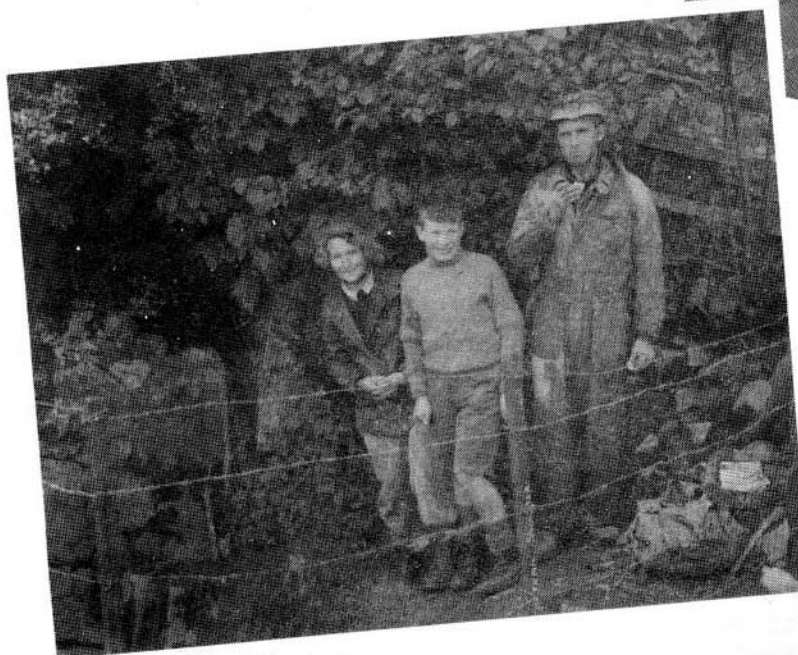
tion technology. The hoped-for traverse from sink to resurgence was not made but the resurgence caves themselves provided a unique opportunity for exploration that was never easy and often hazardous. There are sufficient new leads to merit a return to the area.



*Gordon Clissold
November 1954*



Les Hawes, OFD 1 in 1958



*OFD 1 entrance 1952
Mrs Wild, David Wild
& Alan Ashwell*

Bats in Caves

by John Messenger

There can be few cavers who have not encountered bats at sometime during a caving trip and for many this is a fairly frequent occurrence. Bats are usually associated with caves during winter when they seek the conditions they need during hibernation. However, not all of the 11 or so species of bats found in Wales are seen in caves, and in many cases the use extends outside the winter period.

Winter

Hibernation is the bats answer to the problem of a much reduced insect food supply during the colder months. It is a complicated process which involves lowering the body temperature to nearly that of the surroundings, reducing heart beat, breathing and other body functions. The effect is to drastically reduce the animal's energy requirements so that it can survive on a small amount of brown-fat that is laid down in the late summer/autumn. Arousal is very costly in terms of brown-fat consumption, although bats "budget" to wake up every few weeks to get rid of waste products and to drink. Moisture loss by evaporation is a problem to these tiny animals because of their high surface to weight ratio. Bats may also be forced to wake and move if the temperature regime becomes unsuitable at the site they have chosen.

Clearly caves, with their fairly stable, low temperatures and high humidities, offer ideal conditions for bats to hibernate in and from October to April (sometimes longer) torpid bats can often be seen by cavers. Despite this, some species of bat such as the noctule (*Nyctalus noctula*) prefer tree holes for hibernation whilst others such as the pipistrelle (*Pipistrellus pipistrellus*) find suitable crevices in buildings.

Summer

Caves can also be of use to bats outside the normal hibernation period. One small cave I have been

monitoring has contained Lesser Horseshoe bats (*Rhinolophus hipposideros*) throughout the year albeit in much reduced numbers during summer. In the past, the two species of horseshoe bats resident in Wales would probably have bred in caves as well as hibernating in them. The conditions for rearing young are rather different, and the warmth that is necessary would have been maintained by bats forming large, tightly-packed clusters. Whilst this would have been possible years ago, when colonies were large, declines in numbers mean that modern colonies are too small to keep warm in caves and most now occupy buildings. There is now only one underground breeding colony of horseshoe bats in Britain.

The few bats that are sometimes seen in caves during summer may well be males which, having no part in rearing the young, do not normally associate with the nursery colony. For them, there may be advantages in finding cool day-roosts where they can become torpid and thereby save valuable energy. Larger numbers of bats may use caves in summer during the night. Where a nursery colony is nearby, bats may enter caves to rest and digest their food after the dusk feeding period, only to leave again before dawn. This behaviour has been noted at Agen Allwedd where over 150 bats may fly in on some nights in summer (S. Heaver - pers. comm.)

The Bats

My personal knowledge of the caves of South Wales is limited and I am quite unable to comment on usage by bats of specific sites. Instead, I include a few more generalised notes on those species of bat found in the principality.

Family Rhinolophidae (The Horseshoe Bats)

The two species that occur are both rare although their preference for cave hibernation sites and their habit of hanging freely in often exposed places make them the most frequently noticed (and most vulnerable) bats in Wales. Both species roost with their wings wrapped around them in what is often thought of as "traditional" bat style.

Lesser Horseshoe bat (Rhinolophus hipposideros) - About the size of a plum when roosting. Found throughout Wales. Sometimes found hanging in quite narrow crevices.

Greater Horseshoe bat (R. ferrumequinum) - A much larger bat - the size of a small pear when roosting. Extremely rare. Now probably confined to West Wales and Gwent.

Family Vesperitilionidae (The Ordinary Bats)

All the remaining species are members of this family. They are probably less cave-dependent than the two horseshoe bats, with some species rarely, if ever, venturing underground. Most species prefer small crevices or other confined spaces and consequently they are seldom noticed in caves.

Whiskered Bat (Myotis mystacinus) - A fairly frequent cave user. Prefers cooler entrance areas. May roost hanging freely.

Brandt's bat (M. brandti) - Almost identical to *M. mystacinus* in appearance. Prefers less cool areas of caves.

Natterer's bat (M. nattereri) - Another frequent caver user. Prefers tight crevices.

Daubenton's bat (M. daubentoni) - Often found in caves using crevices. May also roost in amongst scree slopes, rock falls etc. (Tread carefully!)

Serotine (Eptesicus serotinus) - Very rarely found in caves. Recent evidence suggests scree and rock falls may be used. A large bat.

Noctule (Nyctalus noctula) - A tree-roosting bat. Only one record of a noctule underground in Britain. A large bat.

Pipistrelle (Pipistrellus pipistrellus) - Very rarely found in caves in Britain. Please note.

Barbastelle (Barbastella barbastellus) - Uses caves only during extremely cold weather. Very rare. Only one recent cave record from Wales.

Brown long-eared bat (Plecotus auritus) - Quite often found in caves. Prefers cooler entrance areas. Can withstand moderate temperature fluctuations. Note - the long ears are tucked away and not obvious when this bat is roosting.

Conservation

For a variety of reasons, British bats have been declining in recent decades. As a result, all species are now fully protected by the Wildlife and Countryside Act 1981. Bats are extremely vulnerable during hibernation, the main threat coming from disturbance of some kind. Anything which causes a bat to make an "unscheduled" arousal may result in insufficient brown-fat reserves being left to maintain the animal through the winter. In addition, because it

can take up to 30 minutes or so for a hibernating bat to become active enough to fly, it is unable to make a rapid escape from any potentially hazardous situation.

In some circumstances bats seem able to cope with a moderate amount of disturbance, such as the regular passage of cavers through a fairly spacious chamber. However, large increases in activity in confined places, previously undisturbed, are likely to affect bats, as is the close inspection of individuals, even if they are not physically touched. It is for this reason that surveys specifically for bats are controlled by licences issued by the Nature Conservancy Council.

Most serious cavers give bats the same consideration as they do other conservation issues in caves. Agreements over activities such as blasting already exist and are of enormous value to bat conservation. Bats can also benefit from the control over access that grating provides (Heaver 1985). This not only reduces the amount of incidental disturbance in some sites, but also ensures that only bona fide cavers gain entry. In sites protected in this way, the deliberate disturbance or harming of bats by "vandals" is also prevented.

The long-term future of bats in Wales may be uncertain but, with the continued help of the caving fraternity, their future in caves at least may be more secure.

Reference: Heaver, S (1985) Bat investigations on Mynydd Llangattwg 1984-5.

'Jeff' Jefferson

A Tribute

by Dennis Bellamy

It will be 40 years this November that Jeff came to Cardiff from Edinburgh where he had been working in a Government Research Unit set up during the war to investigate the pests of stored foods.

As a student at Imperial College he had specialized in entomology and this was his chosen area of research in the Department of Zoology, which was then situated in Newport Road.

In those days, all first appointments to the University were at the grade of Assistant Lecturer but because of his research experience in the Ministry of Food, Jeff was rapidly promoted to Lecturer.

I first came to know of his work in the mid-60's, before I arrived in Cardiff. By then he was a Senior Lecturer, and one of the small group of British entomologists pioneering the relatively new field of insect-physiology. At this time he was working on locusts and blowflies, studying their physiological potential for adapting to a wide range of environments. His hope was that fundamental work on stress resistance would reveal a weakness in the insects physiology which could then be exploited as part of a pest control measure.

His discovery that flies were exceptional in their ability to survive at high temperatures was later taken up by a group of Canadian biochemists who revealed the molecular principles. His work on heat injury provided a base line for a team in the University of Sussex who used the effects of temperature to develop a theory of molecular ageing. It was characteristic that he was quite happy to provide lead and stimulus to other people in this way. The modern group approach to research was against his fundamental philosophy of self-sufficiency.

During this period Jeff carried a heavy teaching load in the undergraduate courses. An all-round zoolo-

gist, of a kind that it is rare to find today, he was able to turn his mind to most aspects of animal biology and in his career he probably lectured on most zoological topics.

When I arrived in Cardiff in the late 60's Jeff was carrying most of the departments administration as the first holder of the post of Assistant Director of Laboratories.

He readily took on administrative duties and had a flair for giving large and small tasks their due attention. This involvement in the day to day running of the zoology department, which had grown considerably since he joined it in 1946, left little time for research. However, it was about this time that his hobby of caving began to intrude into zoology. Eventually hobby and work fused around the mystery of how cave animals manage to survive and reproduce when there is very little food material entering caves from the outside world. This important question of the links in the food chain of cave animals gradually came to dominate his research. And during the last decade before his retirement, as the foremost British cave biologist he played a leading part in the international development of cave science.

A personal highlight of this time, which I know gave him a great sense of achievement, was his selection as Senior Scientist on the first expedition to explore the vast caves of Ecuador. On a more parochial, but perhaps more significant level, he was a key figure in scheduling part of the South Wales limestone cave system as Britain's first underground Nature Reserve.

This was his personal triumph as a cave biologist but was also a fight against unthinking industrial development. He was a rare generalist, able to walk the interdisciplinary tight-rope of environmental management, and as the Secretary of State's nominee, he gave freely of his time to a wide range of problems associated with running the Brecon Beacons National Park.

On retirement he was awarded an Emeritus Senior Research Fellowship of the Leverhulme Trust which was augmented by several prestigious grants from the Royal Society. This support provided funds to expand and accelerate his work on cave energetics. Here I remember our last conversation shortly after his operation, which was about the possibility of adapting one of the instruments used by my research group so that he could take it underground to measure the electrical properties of the cave

atmosphere. He saw this as part of his future programme to define the total cave environment. In this particular discussion he was animated not only by the future opportunities for furthering his biological research but also the possibilities of discovering extensions to the local cave system. On a very long list of things to do, was a trip to Steep Holm Island to explore its caves, which he felt might open up new unsullied ecosystems. He was beginning to see a previously unsuspected pattern of geographical diversity in the animal communities of caves, and the discovery of new cave systems was essential to confirm this.

Without doubt, retirement had released new energies.

He was particularly helpful to newcomers and patient with students. I remember we had a student once who was determined to take up one of Jeff's final year projects on cave animals, which would entail several trips underground. Although the student was full of determination, in terms of shape and fitness he was clearly unsuited for caving. Neither Jeff nor I could talk him out of it. I was all for putting him on someone else's project list, but Jeff's comment was, "Well, I'll just have to spend

more time looking after him". As always his concern was to draw the best out of students, and this one eventually submitted a first class project.

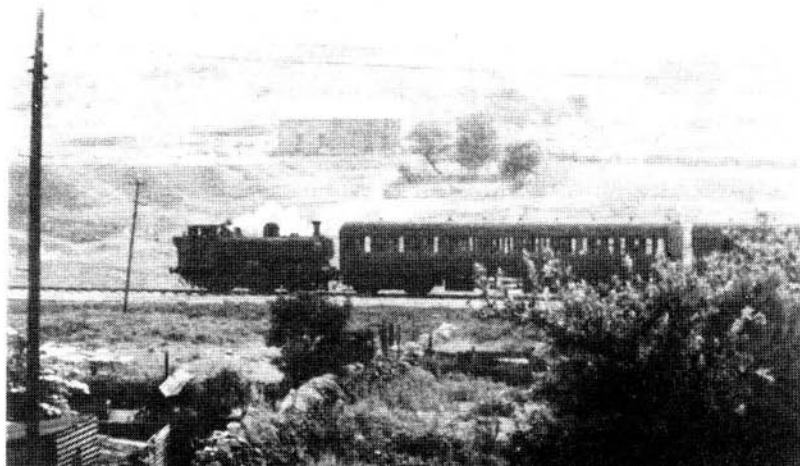
This kind of above average commitment to students was evident in his long-standing membership of the College Physical Recreation Committee, where it pleased him to have a direct, and general, impact on student welfare.

In all of these senses, when he retired from College, we lost a pillar of the department, a wise and kindly colleague, who was very jealous of its reputation, and yet had adapted to the great changes in staff, syllabus and research that had taken place since his first years in Cardiff.

When I heard how seriously ill he was, I told a selection of people in College who I knew held Jeff in high regard. This was a cross section in terms of both jobs and hierarchy. Such was his personal impact, that, from the College administration to the research staff and secretariat of the department, there was an identical first response "Oh no! That lovely man!" I am sure that's how all of his friends and colleagues will remember him.

September, 1986

Back of Gwyn Arms



A familiar daily scene until 1965, (but never on a Sunday.) View from SWCC HQ Penwyllt. The 6.20 Brecon to Neath leaving Craigynos Station, the only train of the day.

The Llangattock Mega System

The First Through Trip

by Martyn Farr

That a 50 mile/80km long system exists beneath Llangattock Mountain is today certain; over 37 miles/59km of passage exist in the three caves Agen Allwedd (18), Daren Cilau (13) and Craig ar Ffynnon (6). The final connections are now close at hand and hopefully the HTV film currently underway will do justice to some of the finer points of the area and its magnificent caves.

These discoveries have undoubtedly been some of the most spectacular ever made in the sport. In the late '50s for example the explorations at Llangattock suddenly elevated Agen Allwedd to the longest cave network in the British Isles. Those familiar with the system, its geology and hydrology, rightly presumed that much, much more remained to be discovered. However despite considerable efforts over the next few years the '60s were largely unproductive. Over half a mile/800m of passage was added at the upstream end of the cave when divers Wooding, Pearce and Sinclair passed the Turkey Sumps, but the real mystery concerned Eglwys Faen and the frustrating area at the eastern termination of the Main Passage in Agen Allwedd.

In the early '70s it appeared that only by diving would the mysteries be solved. John Parker and Jeff Phillips of Cwmbran Caving Club first took up the gauntlet at the terminal sump of Agen Allwedd. (There had been an earlier attempt on this site using oxygen rebreathing equipment but no significant progress was made.) Two well prepared operations extended the cave 750 feet/225m into Sump 3, over 1300 feet/390m of passage having been explored from diving base. Then in May '74 just 100 feet/30m beyond John's limit, an extremely lucky break came my way - I surfaced, to discover nearly 2000 feet/600m of dry stuff 'Maytime'. The sequel is well known. In June the follow up trip to tackle Sump 4 ended in tragedy. Roger Solari my friend and diving partner was

lost. It was 7 years before Sump 4 witnessed any further activity, and just as many before any dry discoveries were made.

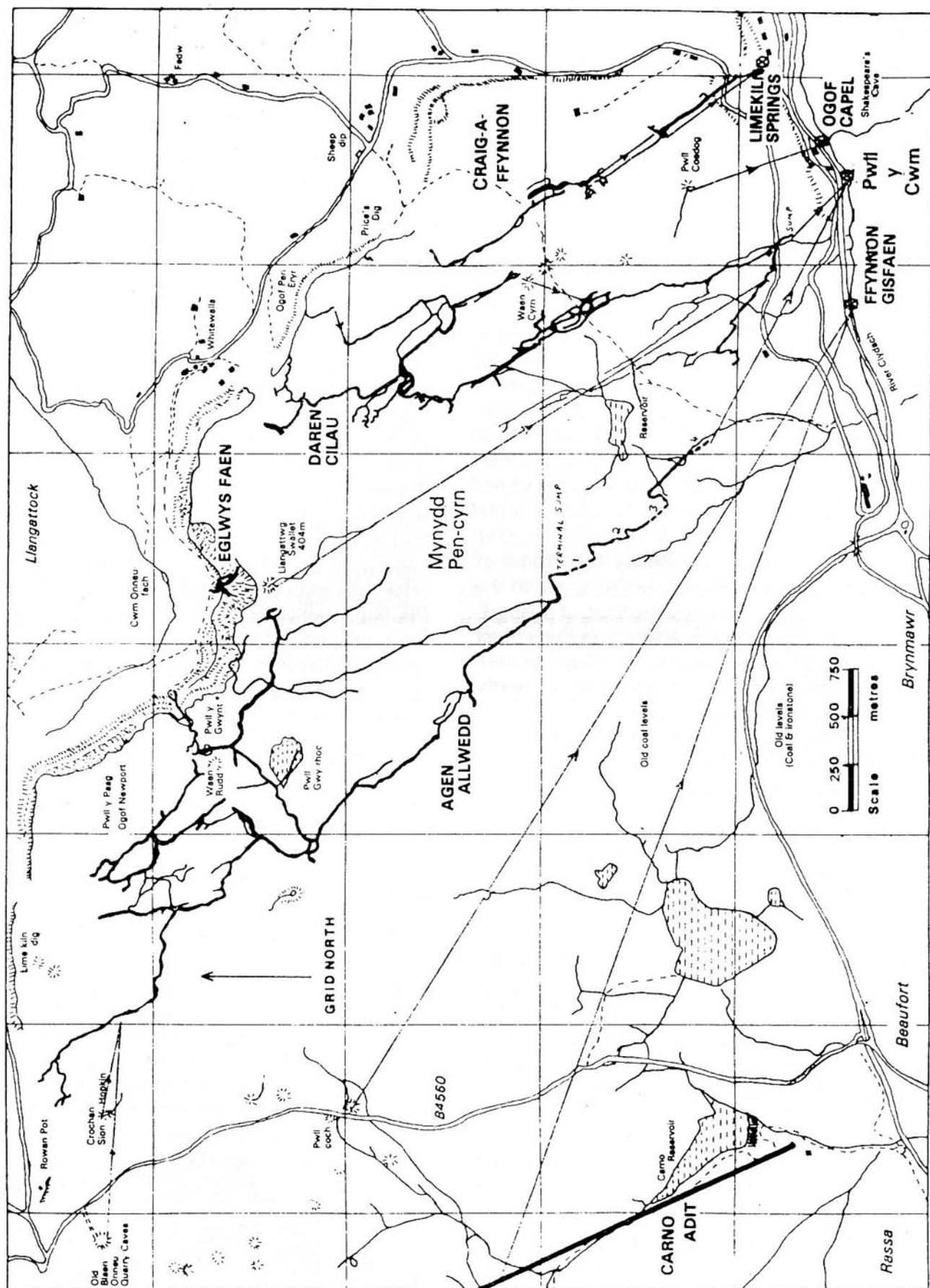
Despite being pipped at the diving post, John Parker was by no means put off. He had more than one theory concerning cave development under the mountain and soon proved his point. At least twice a week, every week, John and friends toiled away at a dig behind the Rock and Fountain public house. Considerable scepticism was expressed regarding the scree slope into which efforts were poured. Then in 1976 Craig ar Ffynnon was entered and rapidly explored for 6 miles/1.6km. What a strange and beautiful cave it was. Unlike Agen Allwedd to the west, the new system had pitches!, a wealth of formations! and a strong draught! A hint as to the complexities of the system had now been revealed. But despite penetrating deep into the mountain there was still no positive suggestion of a connection with Agie. John, Jeff Hill and the now 'Craig ar Ffynnon Caving Group' persevered. They were and still are, confident that one day their cave would lead to greater things beyond. So, twice a week as ever, work continues - currently at the North West Inlet - the source of the floodwater which prompted the initial activities and a site possessing a tremendous draught. Excavated to provide easy access and equipped with a 'railway line' a level has now been driven here for 300 feet/90m - a clear indication of their determination and commitment.

Then in the early '80s new blood arrived on the Llangattock scene in the form of Clive Gardener of the Chelsea Speleological Society. A new era of exploration commenced. Clive's philosophy was simple. Everything had to be checked out again, double checked. The smallest passages had to be pushed to the absolute bitter end - and then dug for half an hour just to make sure.

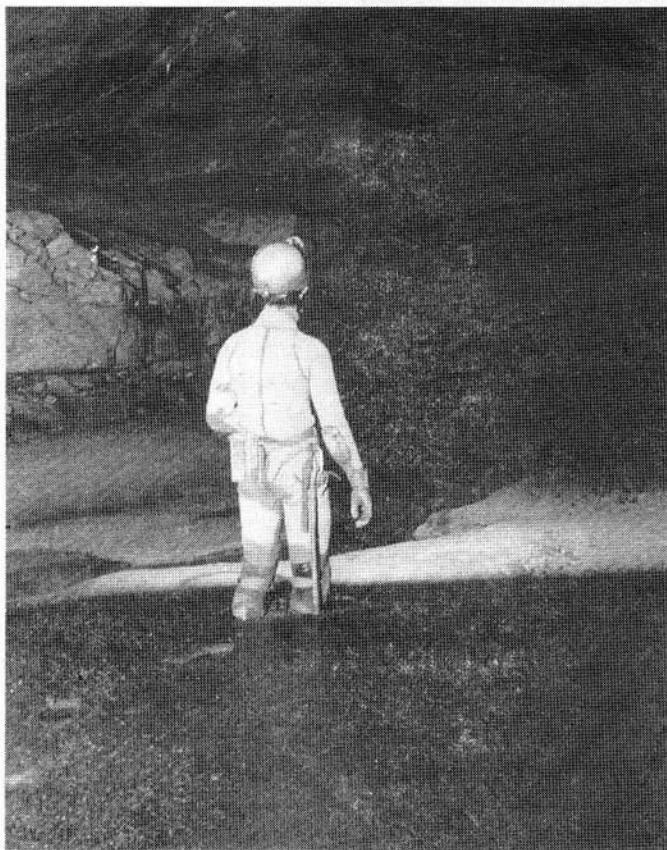
Strategically sited near the eastern end of Agie Main Passage, Trident Passage was the first to succumb to determined efforts. Slowly but surely it was pushed steadily south east, over 6 months work taking the cave on a parallel course to southern stream and directly into that tantalising blank area where the ultimate rewards lay. Trident Passage was extended to over 2000ft/600m before a major obstacle blocked the path.

A similarly thorough examination of the area at the start of Southern Stream Passage likewise proved fruitful. Clive was quickly through a boulder obstruction and another 2250ft/675m was discovered "Northern Stream". My 1700 feet/510m

The Llangattock Mega System



discovery, the '1984 Series' (once again all dry stuff) was to see the last of the work in Agie for some time for in September Daren Cilau came into the limelight, a position it has dominated in the area ever since. With these explorations, initiated by Clive, came the first real chance of making the illusive connections.

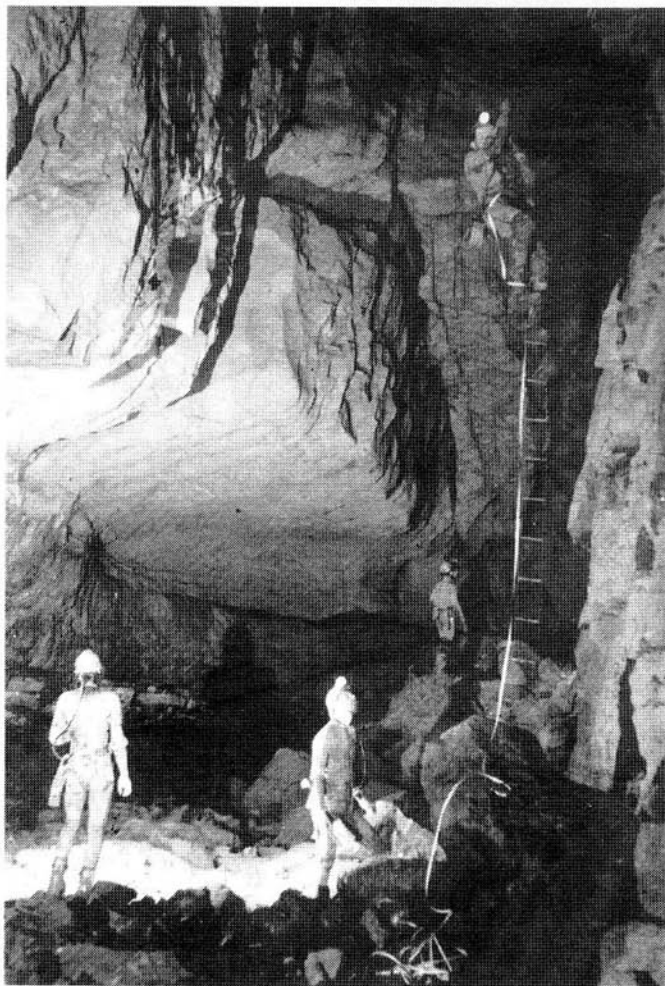


Tony White taking 'First Footsteps' in the three mile extension in Daren Cilau.

From the existing half mile/800m, largely discovered by Mike Boon and Fred Davies back in 1963, mile after mile has been quickly explored. At the furthest extremity lay the sumps reached on 2nd March 1985. Less than a week later a surprisingly accurate grade 2 survey had been drawn up, conducted on the exploration by Tony White and Arthur Millett, and revealed how close these were to the Resurgence and to Agen Allwedd. Daren lay about ½ mile/1km from Sump 4 in Agie and just 1625 ft/500m from the resurgence. And from the outset it was clear — diving at the end of Daren was an extremely daunting proposition. All the gear needed had to be carried in - all the gear would then have to be carried back out! But it was, all the same, an extremely exciting challenge, impossible to ignore.

The sumps provided two objectives: upstream towards Agie and Eglwys Faen and downstream towards the resurgence. The latter, although seemingly feasible from a distance viewpoint, appeared initially the least inviting. The downstream sump was clearly spacious and open, but the prospect was a continuous dive, in poor visibility, to ever greater depth - with little or no hope of exit at the resurgence end.

Explorations upstream were far more exciting with not only the lure of connecting the various caves but the prospect of several miles of additional passages. Spurred on by the distinct possibility of 'piracy' (divers from the north of England) horrific bottle carrying sessions got underway. It took eg 7hrs to transport the first 45 cu.ft. bottles to the sump base. As we became more familiar with the system and modified out techniques to suit the varying sections of the cave, times were significantly reduced. Just under 3hrs is the best to date.



The 70ft ladder pitch in Daren Cilau.

In April '85 the first dive took place in the Upstream Sump, St. David's. This was passed by the author after an easy dive of 130ft/40-50m and led to an impressive half mile long extension named Psychatronic Strangeways. The actual stream was lost again at Sump 2 just a couple of hundred metres from Sump 1, but by following a large high level passage the route led on for a considerable distance. A grade 2 pace survey made at the time was to halve the gap towards Agie; the terminal sump, The Gloom Room, lay approximately 1666ft/500m from Agie Sump 4.



Ian Rolland and the 'Antlers' in Daren Cilau.

During the early summer Ian Rolland and Steve Ainley assisted me on 2 attempts at this isolated location. The large tubeway continued below water but in visibility of one metre. Complex route finding only allowed about 330ft/80-100m progress on the first occasion and a further 130ft/40-50m on the second. By the time 'thirds' has been reached all difficulties seemed to be sorted and the way ahead was clear and open, the depth a constant 43ft/13m. This is the current situation at the Gloom Room Sump.

The Hydrology in this sector of the mountain is, as yet, not fully understood. On the day of its discov-

ery the water issuing from St. David's Sump was found to contain Fluorescene - a strong visual trace from Llangattock Swallet. It is assumed therefore that the stream issuing from Sump 2 is also from the swallet. As there was a possibility that Sump 2 could lead to somewhere other than the Gloom Room, Ian Rolland set about tackling the place. On 23rd November '85, Ian found this site impossible within a very short distance (approx. 26ft/8m) but upon a thorough examination of all the dry leads in the extension with Rob Parker made an exciting discovery close to the Gloom Room. Encilio Passage, examined initially by me and later by Ainley was pushed through crawls, squeezes and awkward ground to a new streamway. This was followed in a north westerly direction for a hard won mile to the Seventh Hour Sump. Several marathon trips of up to 24hrs duration followed before Ian was able to mount an operation here. Unfortunately the main passage became impossibly tight within a very short distance (approx. 50ft/15m). One other site close by remains to be dived but the entrance to this requires enlarging with a lump hammer before entry is possible.

Whether the water flowing from this passage is that from Llangattock Swallet or from somewhere else e.g. the Aqueous Choke, beyond Misfit Passage, is unknown. Several dry leads in this vicinity have yet to be fully examined.

If the water from Seventh Hour Sump is from Llangattock Swallet then it would appear logical that the Gloom Room Sump could well be an old overflow from the Agen Allwedd stream. There are several longstanding question marks associated with this area, not the least of which concerns the difference in level between Sump 4 in Agen Allwedd and the actual rising in the Clydach Gorge. Separate surveys down Southern Stream Passage and Main Stream Passage would indicate that a vertical interval of at least 110ft/33m exists beyond Sump 4. With the state of knowledge at present it seems difficult to envisage how such a long section of streamway (given such a constant gradient through the mountain) can be squeezed onto the survey - down - dip of Psychatronic Strangeways? or west of the Gloom Room? From a diving point of view Sump 4 in Agen Allwedd is a difficult proposition but considering the trend of the Gloom Room, a link with Agie would certainly appear feasible. Time will tell.

Explorations upstream beyond St. David's Sump were lengthy, arduous and tiring. Work beyond Sump 1 also required the assistance of at least one

support diver. By contrast the trip to the downstream sump was short and required only the normal portering support. On average a carrying party could reach this point in less than 5hrs. This rendered the downstream sump an ideal fall back objective - if time was short or one wasn't feeling up to scratch.

The first dive downstream took place on 15th May, '85. From the outset this was regarded as a diving project, the start of the underwater link up, but there was a slight, a very slight, possibility that one might enter the Agie conduit within a very short distance and then be able to dive upstream towards that illusive missing streamway. The most memorable aspect of the exploration was not the length of line laid but rather a heart stopping encounter about 83ft/20-25m into the dive. Just as the diver was getting the feel of the sump - a large bedding passage festooned with boulder breakdown and fine silt - something distinctly alien appeared through the murk. There, in the typically poor visibility, stood what any mortal would regard as a ghost - a white shrouded apparition standing full in the passage. In the lonely gloom there was a moment of pure horror, the totally unexpected, a real life spine chiller. Fortunately, or unfortunately, the forward motion through the water was such that it was impossible to turn and flee; it was an unavoidable face to face encounter with - Bill Gascoine's big lycodium net! (No one - not even Bill - had been aware that it was in the sump. It had been presumed hidden in some place of safe keeping, not washed away in the previous high water.)

The rest of the dive was uneventful. 455ft/140m of line was laid along the left hand wall at a maximum depth of 30ft/9m - trending directly towards the resurgence.

On 2nd June '85 a 42 minute dive was made and added another 290ft/90m of line in the same direction. Fortunately the depth remained shallow and the passage was straightforward. Owing to atrocious visibility progress was slow. One had to follow the wall - in and out of alcoves and dodge around all manner of obstacles that wouldn't exist if one was only able to dive straight down the middle of the passage.

It was 22nd March '86 before the third dive took place. This extended the sump to a sudden 'drop off' at 1000ft/310m. The passage had remained fairly shallow (max. depth 39ft/12m) all the way to this point but there it went deep. From an exploratory point of view this obviously meant greater air

consumption but it was a significant development. It was known from previous dives at the resurgence in 1974 that the main route from Agen Allwedd was deep and despite the visibility, one could 'sense' the greatly increased passage dimensions. It was impossible to discern any flow as such but it was felt confident that here at long last the diver had reached the Agie passage. Given the distance covered from Daren towards the resurgence it also meant that the connection was not within the realms of reality.

If a connection was to be made it was known all along that the final work would have to be done from the resurgence end. It was completely impractical carrying more and more bottles into Daren Cilau. The focus of attention now changed to the Clydach Gorge.

For those unfamiliar with the Clydach Gorge the situation is basically simple. The actual rising for Agie and Daren water is a flooded pothole in the middle of the river bed known as Pwll y Cwm. Unfortunately, but quite predictably due to its situation, the shaft is blocked by silt and boulders at around 10m depth.

In 1974 the closely associated tortuous cave Elm Hole was dived. The carry to the sump might only be 200ft/60m or so but its a pig. Likewise kitting up has to be undertaken under somewhat awkward conditions. Once in the water, a tight rift drops vertically to 33ft/10m depth at which point a squeeze about 30cms/1ft has to be negotiated. At 39ft/12m depth conditions improve slightly, only slightly, when a rift aligned passage leads back towards the entrance and the river bed. Obstructions abound here but after 100ft/30m an immense grey void is reached - The Window - at a depth of 48ft/15m. There is a sinister, unnerving feel to this place. The difficulty of exit does not help matters but the prospect of descending even further with medium/small capacity bottles is not to be relished. This is clearly the roof of a much larger passage - the Agie Main Drain - but in poor visibility neither passage dimensions nor any detail can be discerned.

Just two dives were made in 1974 by the author before explorations were deemed too hazardous to pursue. John Parker quickly came to the same conclusion.

"It doesn't go."

Elm Hole was abandoned, to receive no further serious attempt until spring '86.

From 1974 onwards it was realised that if the main underwater conduit was to be explored beneath the Clydach Gorge there was, and still is, only one practical way of doing it - by opening Pwll y Cwm itself. The idea of a dig had been born as early as 1982 but the dramatic discoveries in Daren prompted a realistic plan and a determined assault. Work commenced in 1985, John Cooper, Steve Ainley, Owen Clarke and a host of others have been busy on many weekends.

A barrier to deflect further debris from being washed into the hole was an essential first step; in essence the stream was rerouted against the south bank. An airlift was a great asset in the removal of the very fine silt and a large 'A frame' was soon facilitating the removal of the larger rocks. Clad in a dry suit Steve Ainley has now undertaken several dives of the order of 2hrs.

However despite the initial optimism it soon became clear that the rising would be a rather longer project than initially anticipated. A tremendous volume of debris was removed from the hole but even so the depth was not significantly improved.

Having more than halved the distance from Daren to the resurgence on 22nd March the author was lured to Elm Hole on 31st March. Surely the remaining 660ft/200m could be achieved on just a couple of dives? With vastly improved equipment, new techniques and a wealth of experience to call upon the psychological barriers were pushed aside. Dives in Elm Hole could also shed light on the underside of the main rising, possibly encourage greater effort,

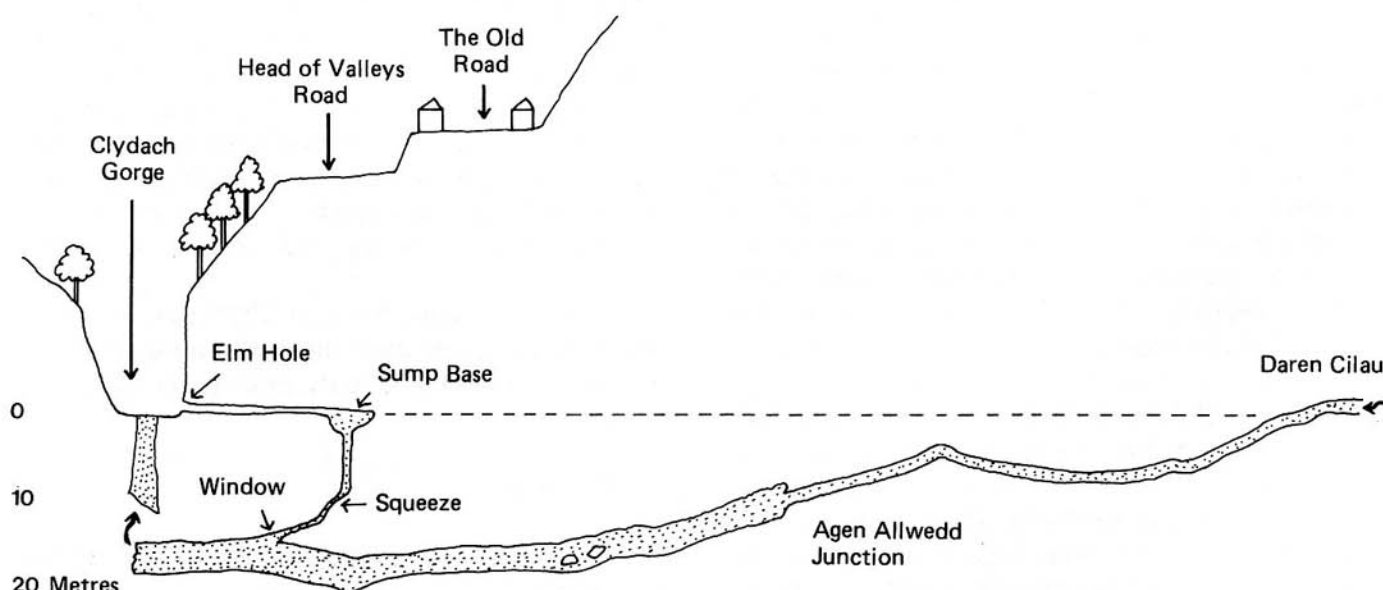
and consequently a quicker entry.

The dream was dashed. On diving the place was found to be just as daunting as in 1974. Were it not for the fact that the diver knew of the existence of the big passage somewhere ahead the exploration would have been aborted. Having laid just over 100ft/30m of line and not having found the Window the dive was terminated.

Twelve days later real progress was made. The Window was reached and dropping to 58ft/18m depth beyond the diver followed the right hand wall first north and then - south west! 81ft/25m further and suddenly a sharp corner was rounded, the depth reached 70ft/22m and at last the passage headed off in the desired direction, ie north west. The reel was dropped 100ft/30m on, the depth now stable at 65ft/20m.

On 4th May a point 227ft/70m from the corner was reached, the limit of the two bottles carried. On 22nd June these were supplemented by a hand held 30 cu.ft. 'stage bottle'. It was a struggle passing the constricted rifts using the side mounted 40 and 50 cu.ft. bottles but the additional supply allowed the diver to reach a point 812ft/250m from sump base. Here the depth had eased and according to the rough survey there could only be a few metres to go. There was still a slight discrepancy in terms of depth however, 39ft/-12m at the Daren end compared to 48ft/-15m at Elm. Unfortunately 'thirds' were exceeded on this dive which meant that another stage bottle would be required.

Cross Section of the Daren Cilau - Elm Hole Dive



It was physically impossible wearing or indeed carrying 4 bottles through the rifts so on 29th June a staging dive was undertaken, depositing another line reel and a full bottle at the Corner for a future dive.

The final push took place on 3rd July. A hand held bottle was breathed all the way to the Corner and then dropped. The second stage bottle was then used from this point for a further 200ft/60m before it too was dropped off. Visibility was greatly improved on this occasion - to all of 1.5m. Tying on at the end of the line the normal procedure was adopted - following the right hand wall at floor level. At the absolute limit of 'thirds', 146ft/45m beyond the previous limit and 960ft/295m from base the thin green line, the Daren line, appeared. There was no great elation - just incredible relief that I wouldn't have to make another push via Elm Hole.

The exit was something of an epic and of necessity one of the stage bottles had to be left near the Window. Several harrowing minutes were spent tangled and then caught in the rift. Having expended over three quarters of the original supply a cold, shaken diver bobbed to the surface after nearly 46 minutes - very, very glad it was all over. Daren Cilau was at long last connected to the Clydach Gorge.

The stage unit was retrieved on 18 July, at which time the diver took the opportunity of examining the passage downstream from the Window. This was followed for 42ft/13m to the foot of the Pwll y Cwm boulder slope. The roof at this point lay at 45ft/-14m, huge rounded boulders visible for over 3ft/one metre above. How much easier it will all be when this blockage is cleared!

A link up between the caves of Llangattock and those of the Clydach Gorge has been actively sought for well over 40 years. That the first connection should be by diving was perhaps inevitable. But the story obviously doesn't end there. Now that we know precisely where the Agie/Daren routes diverge and given the gradually shallowing nature of the phreas the future looks extremely optimistic. When Pwll y Cwm is opened dives of 2-3 times the duration will be perfectly feasible and if the main conduit proves difficult it will also be perfectly feasible to gain easy access to the lower reaches of Daren and tackle the Gloom Room.

The Agie link up is assured; likewise in due course the longest and deepest complex in the British Isles.

For the moment the cave between Daren Cilau and Elm Hole constitutes both the longest - 3 miles, and the deepest - 692ft/213m through trip in Great Britain.

The through trip, Daren Cilau to Elm Hole, was made on 11 August and filmed by HTV despite atrocious visibility of 2 feet or less the dive took 50 minutes, the entire trip just 7¼hrs. A lifetime's ambition had been achieved.

Old SWCC Headquarters at Penybont



1958



March 1954



January 1956



Les Hawes in the living room

Windrift '86

Caving in Nelson, New Zealand

by Mike Coburn

Cavers have been irresistably drawn to Mt Arthur now for some 20 years. Situated in the Arthur Ranges near Nelson, its higher slopes are pock-marked with dolines and open shafts. Over the years, many shafts have been explored and, although some have been up to 200m deep, they always disappointingly closed down before leading into the large cave system which was believed to lie beneath Mt Arthur. Then, in 1973, Fred Kahl found an entrance in a nettle patch in thick bush above the rising. This led to a sizeable cave which Fred called 'Nettlebed'. There was no sign of the underground river but, at the end of the cave, a small hole with a howling draught promised great things. In 1979, this squeeze was first passed and the exploration and mapping of 'Nettlebed' began in earnest.

At the time of writing, 'Nettlebed' is New Zealand's largest cave with 26 kilometres of surveyed passage. Some of the Pearse River runs through its streamways and waterfalls and the higher levels contain huge caverns, some beautifully decorated with stalagmites and crystals. All this is still only accessible, however, through the one tight and convoluted squeeze 200 metres in from the entrance near the valley floor.

When the size of the find became apparent and with the growing map showing the trend below ground, we once more turned our attention to the 'tops'. This time with the objective of finding a higher entrance to the known cave. A second entrance might make the cave safer — it would certainly provide a very sporting through-trip — possibly with a world record depth between entrances but, above all, with the amount of distance and height still involved, it presented a challenge.

With this background, Greg Houston, in early 1985, was searching the Horseshoe Basin area above the Mt Arthur bushline when, in an unlikely spot at the

foot of a small bluff, he noticed a crevice with a strong draught. After a few hours 'gardening', he had uncovered a small, tight rift going straight down. The draught was so strong that grit and dirt loosened with the boulders came flying out of the entrance. The rift dropped 10 metres to a constriction and could be seen to continue below. So Greg, once below the tight section and dangling on the rope had to determine whether it was possible to force his way back up. It was, but it never got easy. The bottom of the first pitch was quite roomy but the only way on was, yes, through another squeeze! This time, horizontal and about 10 metres long.

This ends with the caver popping out, headfirst, 15 metres above the floor in the wall of a large shaft. This pattern was to be repeated for 19 pitches to a total depth of 340 metres before the main stream was reached. But that was another six trips and much hard work into the future. What had become known as "Greg's hole", was apparently a going cave and Greg, as the discoverer, had to give it a name — the name he chose was 'Windrift' to mark the discovery of the entrance.

Things have progressed well this year, we started off with a nine day expedition down 'Windrift' and although we surveyed about 4km, the main leads



Mike Coburn passes tubular packs of expedition gear along a narrow rift passage.

sumped at -350m. Windrift encouraged us to keep prospecting on Mt Arthur and four months ago we discovered a hole on the bushline which we named 'Blizzard Pot' due to the atrocious weather which prevailed every time we visited it. After three trips we had got to -150m and were stopped by a large and very wet boulder pile.

About this time I got a phone call from Canada which went something like this, "Mike, tis Paddy, yes Paddy O'Reilly, look it seems I've scored a trip to New Zealand in my capacity of world-famous expert on avalanche control. How about some caving while I'm there?" Paddy arrived at the start of the ski season in June and quickly became accustomed to Kiwi Beer, he went ski-touring in the Southern Alps, visited all the north and south island ski-fields and appeared on TV. Altogether a most gruelling and onerous itinerary. In July we met in the south island for the fun part of his tour, a three day trip into Nettlebed cave and our first caving together for fifteen years. I had tried to steer him towards a weekend of more social caving in Waitomo but Paddy would have none of it. Nettlebed is New Zealand's largest cave and just to get to the entrance involves a 2½hr tramp from the road end with ten river crossings, we usually carry straight on into the cave and sleep at the underground camp-site in Salvation Hall about half-way through the cave. Dave Chester was the third member of the party. Dave is an English caver working with BP in Wellington and although he had been on every Mt Arthur tops trip since he arrived 18 months ago, he still hadn't visited Nettlebed. It was Dave's idea to inspect a chamber that had recently been discovered at a high point of the cave. The route lay up the "funk-hole" a 100 metres high boulder pile and at the top is a chamber 100m x 150m called "Goodbye Yellow Brick Road". According to the survey this was the closest point of Nettlebed to our blizzard pot discoveries so we rooted around the back wall in loose boulders until a shout from Paddy told us he was in "Real Passage". We explored and surveyed an inlet series which we named "Old Joke Inlet" as it was found by an Englishman, an Irishman and a Welshman.

Paddy went home and we waited for some of the snow to melt before our next assault on Blizzard, in October four of us set off along Mt Arthur Ridge once more in the usual snowstorm. We dug through the boulders at our last limit and several pitches later were gardening some tons of boulders down a rift and knotting our last two ropes together. Johnathan Ravens, our tame cartographer, was feeling despondent as he had predicted that

Blizzard would connect with Old Joke Inlet and he now thought we had gone too deep, I was feeling despondent as I was on the wrong end of far too much rope for my peace of mind when our next abseil took us right into Old Joke Inlet! The excitement was intense and when we finished yelling and shaking hands we tied in the survey and pushed on down to Salvation Hall where we spent the night so as to emerge from the valley bottom entrance in daylight. Then of course we had to climb the mountain on the outside to retrieve our gear from Mt Arthur hut. The final entrance to entrance depth was 867 metres, not as deep as a Windrift-Nettlebed connection would have been but it was still a two day wonder in the local press!

Cavers conquer Nelson network

WELLINGTON (PA). — A group of cavers proved that Nettlebed Cave in northwest Nelson is the deepest in the Southern Hemisphere.

Wellington Caving Group members Dave Chester, Mike Coburn, Jonathan Ravens and Trevor Worthy, said they found the long-sought after connection between the top of Mt Arthur and the Nettlebed Cave system.

The party was the first to go into a hole at the peak and come out at the Nettlebed entrance at the bottom. It took about 25 hours to make the trip and the men slept overnight in a cave passage. They descended 867m through the mountain, making the route the second deepest cave entrance-to-entrance trip in the world after the Sistema Badalone Cave in Spain.

Climbing Mt Arthur from the inside is unlikely to become a tourist event. The trip, at the weekend, included walking over steep slopes covered with loose boulders and dropping by rope for 10m to 30m in vertical passages and chambers. One of the chambers, the largest in New Zealand, is 150m long and 100m wide with a floor sloping about 45deg, covered with boulders. The explorers were unable to see the walls or roof as they descended, and when they talked the echo lasted for 4s.

Near the top and bottom entrances of Nettlebed are "squeezes" (narrow passages) so tight that the arms need to be extended in front and the helmet taken off to get through.

Mt Arthur trip regains cave depth record

MOTUEKA, Oct. 20.

A party of four Wellington cavers made a long-sought breakthrough at the weekend when they linked a higher cave system with the Nettlebed cave on Mt Arthur.

By joining the Blizzard Pot with Nettlebed the cavers were able to journey a total vertical distance of 800 to 900 metres.

This means the Nettlebed system regains the record of deepest cave in the Southern Hemisphere. Earlier this year Nettlebed's record of 696 metres deep was overhauled when exploration on Mt Owen near Murchison showed the Bulmer cave system had a vertical depth of 723 metres.

The new discovery is a result of persistence by members of the Wellington Caving Group.

Party members Mr Dave Chester, Mike Coburn, Jonathan Ravens, and Trevor Worthy made the breakthrough about 5pm on Saturday when they emerged into a chamber of Nettlebed known as Yellow Brick Road.

They slept at a camping place known as Salvation Hall and journeyed through the Nettlebed system on Sunday to emerge at the main entrance near the Pearse River.

They have still to check their calculations to work out the precise depth of the cave. The estimated depth is thought to put Nettlebed in the list of the top 20 deepest caves in the world.

Mr Chester, Mr Coburn, Mr Ravens, and another Wellington caver, Mr Noel Pepperal, discovered the entrance of Blizzard Pot four months ago after numerous attempts on another cave, Windrift, had failed to yield a link with Nettlebed.

In their first exploration they descended to about 80 metres in the Blizzard Pot and were encouraged to return by strong draughts being sucked down the cave. These indicated the cave was substantially deeper.

A party of Wellington cavers made a further trip a month later and descended to about 150 metres where they entered a large chamber.

Their progress was blocked by a rockpile, and the party at the weekend returned to overcome this obstacle.

Mr Chester said today the rockpile involved a tight squeeze, and he described Blizzard as "not a fat man's cave".

After negotiating the rockpile, the cavers descended three vertical pitches but they believed they had descended too far to link with Nettlebed. However, at this stage one of the party discovered a cairn that indicated they were into the Nettlebed system.

Mr Chester described Blizzard Pot as clean with some difficult squeezes.

The exploration and discovery of Blizzard cave comes after numerous attempts during the past 18 months to explore the Windrift Cave, in Horseshoe Basin of Mt Arthur. This was discovered in 1965 and explored to a depth of about 340 metres.

The cavers found a stream flowing through marble which suggested they were getting close to the Nettlebed system, but further exploration was blocked by a series of sumps.

The SWCC Ogofone

by Bob Williams & Ian Todd

The Ogofone is a two-way magnetic induction device for communication between underground parties and those on the surface.

Although magnetic induction communication techniques have been in use in caves and mines now for over half a century, it is only in recent years that a number of designs have appeared that are both effective and portable enough to be suitable for routine use (Glover, 1976).

The present availability of microelectronic components makes it feasible to produce such equipment which is light, cheap and technically sophisticated.

In response to requests by various members of SWCC for an underground communication system, we undertook to produce such a device which we christened the Ogofone.

It became obvious that the instrument could have two major purposes: that of voice communication and that of a surveying/locating device. To fulfil the needs of a surveying device a tone generator was incorporated to enable bearings to be taken accurately. A further mode was added where a short 'pip' of tone is transmitted every 3 seconds, with the Ogofone returning to receive mode between pips. This mode consumes very little power due to the brief transmission period and gives the users confidence that they are in contact with the other station. This would be of particular value where communication was needed over long periods such as during a rescue. Further power saving was achieved by the use of a single sideband (SSB) transceiver which also has advantages in maximising receiver sensitivity.

Our early reference was an unpublished paper produced by Peter Hart of WCC on a prototype that

was successfully tested in 1978. This article raised two points of particular interest: the frequency used and the size of the antennae.

With little information available to us on the propagation of magnetic fields in limestone, we decided to use a similar frequency (for which crystals were readily available) to that of the prototype. Both theory and experimentation told us that, as usual with antennae, 'the bigger the better' held true.

This left the usual compromise between performance and convenience. With no other yardstick to work to we decided to adopt the size proposed by Peter Hart. For convenient laboratory testing, smaller test antennae were constructed which had similar electrical performance.

After some initial research into SSB integrated circuits (ICs) the present line up of microchips was selected for best performance. Eventually a full circuit was assembled experimentally, breadboarded, with favourable results, and a printed circuit layout was prepared for the first prototypes. Two of these were built and overground testing showed that performance looked quite promising.

First Field Trials of the Ogofone

The two prototypes were then taken to the SWCC headquarters in Penwyllt for underground testing. The electronics were of a production standard but the antennae used at this stage were makeshift, being purely for testing.

Some initial tests were performed in Cwm Dwr quarry using the small (4in diameter x 3in length coil) test antennae. Patchy communication was achieved through an estimated 30ft of rock. The above ground party then switched to a larger antenna and solid communication was possible in both directions. The underground party next moved further into Cwm Dwr (beginning of the crawl) while the top party remained on the top of the quarry face. At this stage an attempt at direction finding was made but the signals were so strong that no 'null' point could be detected at any antenna orientation.

The following day tests were made in OFD 1 streamway at three locations:

1. The Toast Rack (under the road leading up from the valley to the SWCC HQ)
2. The Upstream Sump.
3. The Boulder Chamber (which provides a good depth of rock).

The surface party established itself on the road while the underground party made its way to the Toast Rack where it initially transmitted tones to help the surface party locate the best spot on the road. Very solid communication was possible here, which boosted everyone's confidence.

At the Upstream Sump we were again successful but two problems became apparent. Firstly the sound of the stream was louder than expected and somewhat drowned the signal, secondly the surface party were now suffering from a strong interfering signal. This will be discussed further.

We attempted to maintain speech contact while advancing through the cave to Boulder Chamber. This was a two man operation carrying both Ogofone and antenna on a short lead. Maintaining contact was very difficult, especially when an unseen pothole threw everything onto the floor in a painful fashion. A considerably longer antenna lead would have enabled the following caver a view of his own feet. The lead is much more visible if light in colour.

The next communication was held at the Waterfall and was again successful but the signal was noticeably weaker. Interference was still a serious problem for the surface party.

The following day the interfering signal was not apparent and the underground party proceeded directly to Boulder Chamber. Immediate, if somewhat faint, communication was established. Study of the survey of OFD 1 back at SWCC HQ then suggested that we had achieved voice communication through about 300ft of rock with the small underground antenna.

Since then we have built larger antennae (1m) from flat ribbon cable. These are much less convenient in use, and somewhat more fragile, but they perform far more effectively. Indeed, from the cliff above the road a static surface party maintained voice contact with a party moving from Boulder Chamber out to the bottom entrance.

Interfering Signal

During the initial tests of the equipment, as has been mentioned, an interfering signal, sounding like Morse code, played havoc with reception by the surface party. The underground equipment, being shielded by a considerable thickness of rock, suffered much less. Eventually it became obvious that a change of frequency was necessary. Some time

spent with a communications receiver revealed very little spare space in the spectrum. However, a small apparently unused 'slot' was located and the MkII Ogofores were prepared for use at this new frequency. Immediately a large improvement in performance was obvious.

The initial frequency used was 125kHz (Mk I Ogofores) and the new frequency chosen was 87.5kHz (MkII Ogofores), the latter being a 'good' one for use near the SWCC HQ. Tests held in the Cheddar Gorge have since produced a different picture, with the situation being reversed. This leads to the conclusion that frequencies may have to be chosen very carefully for a particular area. It is suggested that careful research is done into this prior to any construction and particular attention should be paid to mid-week, as well as weekend, conditions (interference problems at SWCC are only present mid-week). In many cases mid-week performance will be irrelevant to the caver but might become important for a rescue.

It should be pointed out that the reception of interference does not necessarily mean that the interfering source will be able to receive an Ogofone signal. The Ogofone antennae are very small and essentially radiate only a magnetic, not an electric field. As the power of a magnetic field is inversely proportional to the sixth power of the distance from the transmitter (Glover, 1976) it decays extremely quickly.

Using The Ogofone

The following notes are supplied as an aid to use of the equipment.

Logistics

- a) If the user possesses more than one pair of Ogofores then care must be taken to ensure that each pair used are of matching frequency and are used with the correct antennae (do not mix up MkI and MkII parts).
- b) The two parties (underground and surface) should identify the exact locations at which communications are to be established. Ensure that the surface party has a map and compass. A compass is also useful underground if movement of the station is anticipated.
- c) Determine precise times at which communication is to be established and a protocol to be followed should either party be delayed, eg try pip tones for fifteen minutes then speech, then pip tones to maximum time agreed.
- d) If communication is to be from several points in sequence within a cave then both parties must agree

on a procedure if communication fails at a particular point, eg try for one hour then go back to the previous location.

e) At all times try to adhere to the times of transmissions agreed upon as the trip progresses.

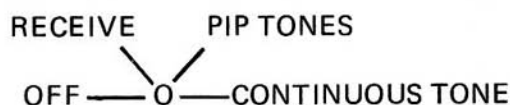
Operation

a) Lay out the antenna and fit the spreader bars and legs (if needed).

b) Connect the antenna cable at both ends.

c) Turn the Ogofone switch to 'receive'. A hissing noise indicates that the antenna is connected properly. A broken cable or antenna will result in a quiet handset.

d) Switch positions.



OFF — In this position the units are 'dead' and consuming negligible current.

RECEIVE — The units are active and will receive signals. Pressing the transmit button on the handset will cause the units to transmit speech. This is the normal position for speech communication.

PIP TONE — This is identical to RECEIVE but every 3 seconds or so a short 'pip' is transmitted. Speech is also possible when signals are strong. This mode allows both stations to have confidence that the communication link is being maintained and is useful for initial location by the surface party.

CONTINUOUS TONE — A tone is transmitted by the unit for the purpose of direction finding. No speech is possible in this mode, so it should only be used for brief periods of, say, two minutes at a time, with speech contact in between.

To set up a communication link, the continuous tone mode can be used to get the surface station directly above the underground station for best signal strength. 'Swinging' the receiving set's antenna until the loudest signal is heard will result in the antenna 'pointing' towards the transmitting station. In some circumstances (eg on steep hillsides) it may be an advantage to tilt both the surface and the underground antennae to obtain the best results.

NOTE: The directional properties of the equipment allow it to be used as a location device, but any metallic objects nearby (ladders, chains or gas pipes near the surface, etc) may result in an inaccurate 'fix'.

Direction finding where the signal is strong may be effected by turning the surface antenna on edge and swinging it for a 'null' (ie loss of signal) in both

east-west and north-south planes (Bell, 1986 and Glover, 1976).

e) The loop antennae are 'de-tuned' to some extent by being in close proximity to wet sand or soil and thus become less effective. Plastic legs may be used to space the antennae a short distance above such surfaces. In practice, the surface party always uses them, but the underground need not if the antenna is on rock.

f) Due to the nature of the SSB transmission technique used, there is a small delay at the beginning of each transmission while the receiver 'locks on' to the level of signal. This results in the total loss of monosyllabic transmissions. It is good practice to precede each transmission with some noise (eg a whistle) to allow the equipment to function. For the same reason, long pauses in speech will cause the receiver to again require a 'lock in' period.

At the end of each transmission a distinctive word (eg 'over') should be used to indicate that the transmission is complete and not paused.

Care of Equipment

The equipment is delicate and should not be dropped down pitches nor thrown onto ledges, but carefully handled at all times.

The antennae are fragile and will certainly be damaged by cavers' boots or buttocks. For storage they should be carefully rolled up whilst avoiding forming any kinks. The Ogofones should be stored in a dry, and preferably, warm environment. If the equipment is transported in ammunition boxes these should be stored with their lids open to prevent condensation. If lead acid batteries are used these should be disconnected from the Ogofones and put on trickle charge.

NOTE: The circuit is very sensitive to moisture on the printed circuit board (PCB). Our prototype was not waterproof, an ingress of moisture usually being indicated by loss of the 'pip' tones. The usual cure was drying the equipment in a warm place (eg a boiler room).

We hope to publish a more detailed account with constructional details in 'Caves and Caving'

References: Glover, R. R. (1976) Cave surveying by magnetic induction. in Ellis, Bryan. Surveying Caves. British Cave Research Association, 1976 pp 42-56.

Bell, A., and Bell, A. (1986) The Ogof Beacon SWCC Newsletter No. 101. pp 17-27.

The Dachstein Trip

Anyone who has been to the Eastern Alps will have heard of the Dachstein, in Austria's Salzkammergut. The range is comparatively low, just over 3000m, has none of the long alpine climbing routes of the Tyrol and Swiss Alps, but is nevertheless one of the most spectacular mountain ranges of Europe.

Much of the charm of the Dachstein and its subsidiary group, the Gosaukamm comes from the fact that they are composed of limestones. The Dachstein has a really unique set of caves too. The Dachstein Mammothohle, Eishohle and Koppenbruelleshohle are well-known show-caves while on the plateau near the Simony hut and Wiesberghause are literally hundreds of caves and pot-holes most of which are still unexplored.

It was the prospect of unexplored caves that brought the South Wales Caving Club to Hallstatt at the foot of the Dachstein this August. Having been reconnoitred on several occasions by SWCC members, the main caving area was a days plod up from the valley so it was decided to set up camp in Hallstatt and to rely on huts once out of the valley. The campsite was continually manned by some of the families with young children, making a welcome base for the number of small groups who went off to explore different areas of the mountain. Unfortunately the campsite was rather expensive and made a retainer charge for people who were hutting, something that the owner did not let on until later, so that valley tent accommodation proved to be more expensive than many of the huts!!

The valley camp had its attractions though, not the least of which were the local cafes which were very reasonable, so reasonable in fact that most valley nights ended with someone or other going for an unexpected 'swim' in the lake. Swimming, shopping and the chance of a shower were daytime attractions too - not to mention the topless sunbathing!

Up on the plateau one group had set up shop at the Wiesberghause (1882m) having sent up caving equipment by cable railway (materialeiseilbahn, not for passengers!) while another group had moved over to the Gosau valley and another had gone, via the Schonbergalm and Krippenstein seilbahn to the Simony hut. The Simony hut (2203m) is everyone's idea of a real alpine hut. Perched on a cliff it commands wonderful views of the Hallstättergletscher and the Dachstein itself - (the Hoher Dachstein 3004m)

The area between the Krippenstein, Simony hut and the Dachstein is an enormous set-piece of geomorphology. The active glacier has exposed whole sedimentary bands, faults, folds and inclines, enough to fill a geology textbook, whereas lower down the scrub and pine cover acres of limestone pavement as good as any in the Julian Alps, the classic 'carso'. For cavers, who are not generally given the chance to delight in surface-features, it was an absolute dream come true. Each small fold of the rock offered the chance of a cave or pot-hole, probably unexplored. In one half-hour walk from the Simony hut three promising shafts were found, dozens of other 'holes' could be seen dotted about and the limestone here was over 1600m deep!

In our two week stay the club crammed in as much as time and weather would allow. During the early days the glacier and weather were perfect. Several groups climbed the Dachstein and subsidiary glaciers by several (sometimes unorthodox) routes. SWCC surprisingly, take great interest in crevasses and visits to "have a look at holes in the snow" often mean a painstaking retreat out of crevassed areas. Not an interest to be exhibited by the unprepared or inexperienced! Later in the week the weather warmed and the glacier became very unpredictable with ice falls nearly every day - the higher caves proved to be nearly all plugged with snow and ice so a retreat to lower areas was called for.

Meanwhile the group at the Wiesberghaus had found what proved to be one of the most significant cave finds in the region. A cave in the area of the Tiergartenloch fault went down in a series of drops to over 100m and was as yet unexplored.

John Young takes up the story.....

The Mammut/Hirlatz system lies at an elevation just above that of Hallstatt village. Previous exploration by the NCC and BEC over the past few years has been concentrated on the upper part of the limestone near the Weisberghaus hut. These expeditions have yielded several vertical systems, most notably



Crossing a crevasse on the Hallstatter glacier.

the Barengasse Holhe, 687m deep and ending in a sump. However, the majority of the area has largely remained unexplored due mainly to the vast expanse of limestone and also because once off the path, the going is extremely rough!

By the time we reached the Weisberghaus, the resident cavers had already claimed some new 'going' shafts. Our first day was spent simply trying to come to terms with finding new shafts every few metres or so. An area north of the Barrengasse fault was looked at, but all the shafts were blocked with either snow or rocks, and nothing was seen to warrant a return to this region.

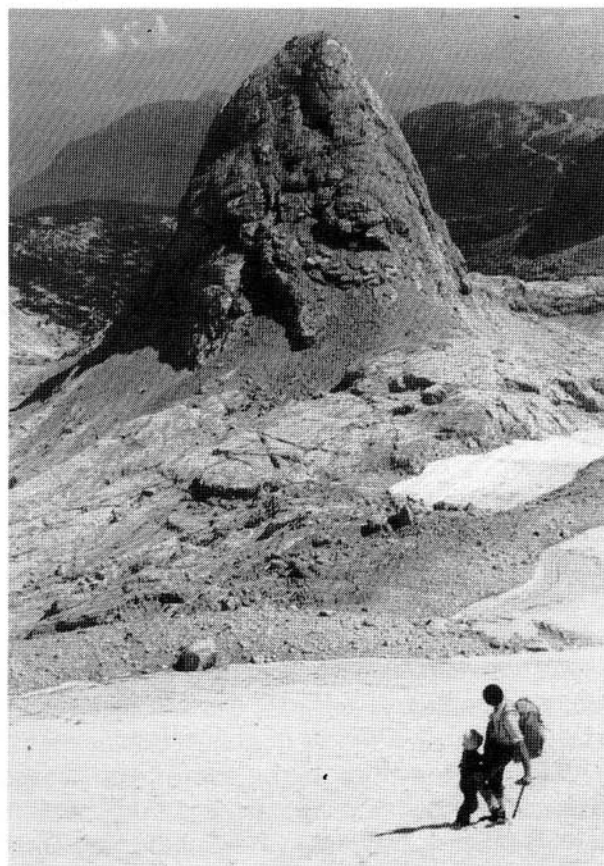
The next day saw us looking at several holes in a cliff face bounding the Weiss-Alm valley, a green alpine pasture near to the Weisberghaus. The caves in the rock face were only a few metres long, but whilst we were climbing, Chris Fry ventured to the other side of the valley and discovered a small entrance leading to a steeply descending rift which continued on down.

A return was made to the cave and easy progress was made for an estimated 80m to a squeeze and a draughty crawl. This emerged in a large chamber and a pitch. We were fortunate enough to have brought a rope with us and the pitch was rigged and descended to -40m.

Passages continued off from the base of the pitch and were pushed the following day to the head of the second pitch (roughly 60m deep), which presented many interesting rigging problems.

By the Saturday, the BEC had joined us and the cave (then Jager Höhle, now called Weis-Alm Höhle), was pushed to pitch no. 4.

After a couple of days 'rest' (an excellent trip up to the summit of Hoher Dachstein), we rejoined the pushing teams (now including the NCC).



Limestone pinnacle near Hallstatter glacier.

Over the next few days, Weiss-Alm Höhle was pushed deeper and deeper. However, rain during the week suspended play for much of the time as the caves of the area are subject to rather rapid flooding as we discovered!

* * *

....Meanwhile groups of cavers back at base camp made visits to the Mammuthöhler beyond the show cave where that cave system moved towards the plateau in the direction of the Wiesberghaus cave and other visits were made to the Hirlatz cave which also trended in the general direction of the Wiesberghaus. (The Hirlatz is one of Austrias biggest cave systems). It now seemed likely that the new Weis-Alm cave might link the labyrinth of the Hirlatz and Mammuthöhler making it one of the longest through-systems in the world. Calculations showed the cave passages already explored to be within a few hundred metres of each other but the way ahead was so much of a labyrinth that it was difficult to know which way to proceed.

On the day before departure the majority of our group had returned to the base camp, except for a small group which wanted to make a final attempt in the Weis Alm cave.

The weeks had been eventful. Our group from the Gosau valley returned via the Adamek hutte, a 'ladies only' trip crossed the now much crevassed Halstatter glacier from the Dachsteinwarte hutte (2720m only 8 beds and floor space!) while one of our group climbing on the limestone pinnacles of the Gossaukamm had fallen off shattered limestone and needed hospital treatment, returning to camp safe and sound but much plastered. One party had been bowled off its feet by a groundflash during an electrical storm (caves and cavers seem to attract lightning!). While nearly all of us got plastered and bowled off our feet at the Hallstatter festival - where climbing the church tower "on the outside" proved to be a favourite game with the local climbers and Welshmen!

Our hopes were high that the group still at the Wiesberghaus would make the breakthrough into the Mammut or Hirlatz cave system. The base camp packed and waited. Eventually the exhausted group arrived, still covered in cave mud but looking happy. They had run out rope at the top of yet another series of shafts but had not made the connection. However, they had explored deep under the Dachstein where no man had ever been before, they had trodden new ground and had every right to be happy about that.

By the time we had to return to Wales, Weis-Alm Holle had been pushed to about -400m with about 17-18 pitches.

A few BEC and NCC members remained in the area for a further week and continued exploration of the system discovering several more shafts, an extremely large passage "of Time Machine proportions" and an horrendous boulder choke. The cave currently stands at -580m deep with 26 pitches. Exploration ceased at the head of an estimated 30m pitch.!!! still going down.

The Weiss-Alm Holle is heading directly for the Hirlatz system and a connection seems more than likely. The cave is already the 4th deepest in the Dachstein region and a connection to the Hirlatz would be a major event in Austrian caving. The whole Dachstein trip was certainly a major event in SWCC caving!!

The journey back was like the trip out, "eventful" — no-one who was there will ever forget the race to catch the ferry, the pub crawls, the doss-out in Heidelberg, picnicing by the Rhine, the hours in the coach and Jeff the driver's statement — "you can't pack all that in there!!!" — but its surprising what you can pack into a couple of weeks isn't it?!!



Summit group - The Hoher Dachstein 3004m.

Admirals Cave Revisited

by Noel Dilly

This year I had an opportunity to revisit Admiral's Cave Bermuda (SWCC NL 100) and to undertake a survey of the cave. This was a splendid chance to run a seminar on cave survey for the Bermudian Cavers. The first surprise was that there was only one American accent amongst them, the rest were British. The cave had been surveyed once before, but the only copy of the survey was on a tiny scale with no vertical sections, and extra bits of the cave had been discovered since that time.

The main reasons for the survey were to "tie in" the surface topography and to try and explain two things - firstly, why two of the four lakes in the cave had become polluted in the last two years, and secondly why the drips had stopped falling from the roof onto the stump of the Admiral's stalagmite.

On the way to the entrance I discovered the secret of recognising poison ivy. It has a trefoil pattern of leaves, hence the saying "If it has three, let it be". The treatment for a poison ivy sting is unusual. It is to rub the stung area with meat tenderizer. I'm told it works, but fortunately I have not had to try it yet.

Caving in Bermuda is a joy, shorts and shirt and track shoes supplemented by jeans when squeeze forcing are all that is required. The caves are beautiful, and mostly completely unspoilt, jealously guarded by the Bermuda Cavers with their fine record of scientific investigation and conservation.

The surveyors were split into three teams, each with tape, compass and clinometer, and each team contained a "sketcher" who would ultimately be responsible for adding the "meat" to the bare bones of the survey lines. Just to make things interesting and to demonstrate the accuracy or otherwise of each group I organised the survey as a series of closing loops.

The survey progressed a pace, it took about two days to complete, the main problems were those of sketching. How do you handle a large boulder ruckle with chambers interconnecting on several levels?

Most interesting for me was drawing up the survey, especially the plan. Now you know that to turn tape length into a plan length is simply a matter of multiplying the cosine of the dip angle by the tape length, and then plotting it on the plan. I thought that I was being clever doing this with my pocket calculator. I had reckoned without my wife and her computer and mathematical expertise. She just wrote a program and the program simply produced the coordinates of the next station and then plotted them. This produced rivalry between the two plotting teams, but there is no doubt that the coordinate method is faster.

Most loops closed with 3-4ft in 200-250 foot lengths. The tapes and the plots were in metres, but its simpler to understand real measurements. Again the computer was extremely useful spreading the error amongst the legs to close the loop. One loop had an enormous closing error, and such was the enthusiasm of the team that they went straight back to the cave and found the error. A result written in the wrong column.

Once the surface features had been superimposed upon the survey, the reason for the cessation of the drips to the Admiral's Stalagmite was obvious. The stalagmite now lay immediately below the newly laid tarmac car park of the hotel workers residence. In effect a waterproof layer had been placed above the stalagmite catchment area.

What of the polluted lakes? Nearly all cave lakes in Bermuda are tidal and of salt water usually crystal clear. The polluted lakes were turbid with a slight scum on the surface. The real horror was to disturb the surface, when the stench of rotten eggs was released. Water collected for bacteriological analysis was initially slightly turbid but after 24 hours became quite black. It is almost certain that the bacterium responsible is one of the disulphuricans group. It is a little strange that this should be so because if there is one thing they don't like its fresh air. They are anaerobes; they live without oxygen. They thrive where there is no free inter-face between the water and the air, and in stagnant water which cannot be aerated. Most natural water contains some dissolved sulphates and the bacteria reduce this to the gas hydrogen sulphide. Where are the bacteria coming from? The lakes tied in with a

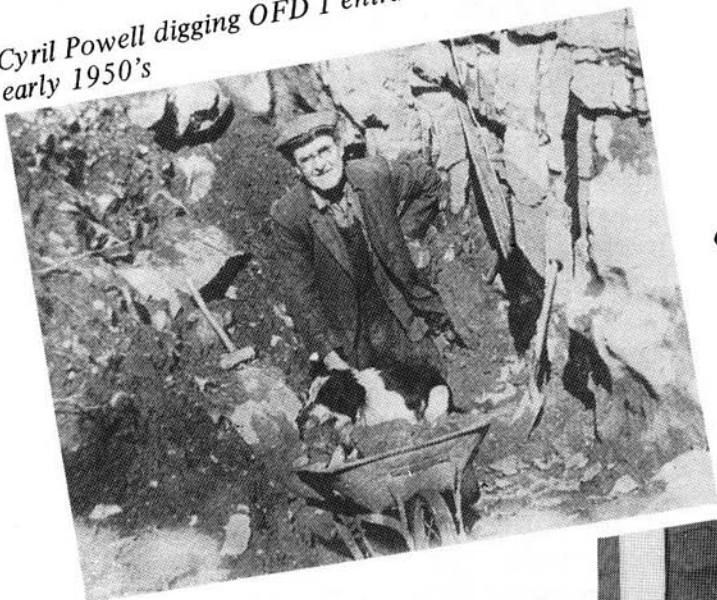
corner of the hotel workers newly built hostel. Closer investigation revealed that this was the area of the cess pit. Was the cess pit leaking? Lifting the lid showed it to be bone dry. Enquiry amongst the Bermudian building surveyors and at the local hospital revealed the reason. The cess pits in Bermuda are not cess pits but soak aways, that

exploit the very porous nature of the limestone. Since the use of such pits is common practice on the island it is difficult to act swiftly to counter the threat, but the fact that one of their most spectacular show caves is similarly polluted is adding urgency to the quiet diplomacy that is going on to resolve the problem.

Dan-yr-Ogof party, Gwyn Arms May 1938



*Cyril Powell digging OFD 1 entrance
early 1950's*



*Agen Allwedd - 11.1.58. the Turkey
stalactite. destroyed on 13.12.58.
Only known photograph.*



Early 1960's Harry Golinsky





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