

South Wales Caving Club

Clwb Ogofeydd Deheudir Cymru



Newsletter No 123 2003



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Editorial by Jenny Johnson

Dear Members, welcome once again to our long awaited newsletter. As you may have noticed there has been quite a pause between this and the last newsletter, in which I hope you have all done many great cave explorations and had many fantastic adventures. So now is the time I call upon you to share your adventures with the club and write it down, so you don't have to wait so long again! All kinds of articles required from the most important history of SWCC Pub going to the ones about actually going caving in exotic jungles, and all the ones in-between. If you have a story that will amuse us in the past or present or just want to share humorous thoughts, if you have discovered exotic caverns, homegrown grovels or a new way to go caving without getting muddy, we need to know.

I hope you enjoy this issue's wide selection of articles, thank you very much to those who submitted them, and apologies to those who submitted them so long ago they thought they would never see them again. We cover the most recent events at Rescon this year, an impressively swift piece of writing there, along with several expeditions in recent years, more in our series of 101 personal great caving trips, also how to find caves, what you might find in them, how to build cave gadgets and the history of the area and the social life of the club.

Happy reading, happy caving and happy writing too!

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Front cover photos from top:

Straws in OFD II by Jenny Johnson; Ash
in the Brickworks, OFD II by Jenny Johnson

Back Cover photos clockwise from top:

Floating stretcher in the Dan-y-ogof re-
surgence by Phil Buckberry; Diving in
Riwaka by Martin Groves; Bullmer Cavern,
S. Island NZ by Martin Groves; Rescue
practise mini traverses OFD II by Graham
Christian

Opinions expressed in the Newsletter are
the contributor's own, and not necessar-
ily those of the Editor, or of South Wales
Caving Club

Rescon03 — International Cave Rescue Conference 2003 at Penwyllt — 21st-25th July

By Rhys Williams

Before

The weather was fantastic, relentless scorching sunshine for several weeks. Surely it will last another week and shine on us at Rescon? Sadly not. The weather broke and Penwyllt was bathed in cloud and rain for almost the entire week of Rescon. Personally, I had missed the conference in 1992, but believe it had been much worse that time, so let us be grateful for small mercies!

The planning and organising teams started to arrive on the Wednesday and Thursday before the event and things started to take shape; a marquee went up in the quarry and was rapidly filled with a bar, a stage, chairs and tables. The rescue garage became an office served by high-tech computers and bearded operators. The kitchen was scrubbed and began to fill up with supplies for mass catering and Soup Dragons.

International delegates turned up in dribs and drabs, the Swedish party were amongst the first and were so keen they managed to visit almost every cave in the Swansea valley within a couple of days.

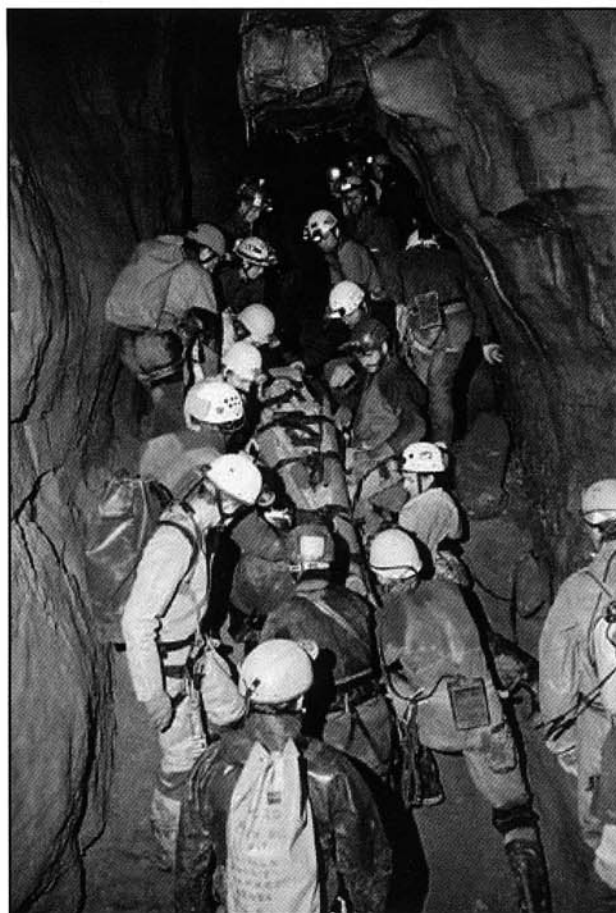
Monday

Monday arrived and so the start of Rescon proper. The morning saw delegates settling in and getting the chance to do a half day of sport caving. This was followed swiftly by lunch and then the first talking sessions of the conference. These were held in the marquee in the quarry. The history behind cave rescue in the UK was described by Bill Whitehouse (Chairman of the British Cave Rescue Council - BCRC). After that we had a brief history of the West Brecon Cave Rescue Team and rescue in South Wales from Jopo, then Gary Evans brought us up to date with developments from recent years.

In the evening the delegates descended on Dan-yr-ogof show caves for a free tour of the cave and the official opening, rather unusually, underground (courtesy of the cave owner, Ashford Price). Following the evening meal, the bar in the quarry opened despite the damp conditions.

Tuesday

So to the second day of Rescon; The first activity would be communications. This revolved mainly around the relatively new Heyphone system used in the UK. The sets were described indoors first and then parties headed underground to attempt communications back to the surface and



Rescue practise OFDII
by Graham Christian

Floating stretcher in the Dan-y-Ogof resurgence *by Phil Buckberry*



headquarters. In the afternoon, delegates had the option of sessions on rock removal or stretcher/casualty packaging. Needless to say, cavers being cavers, the majority preferred the chance of seeing rock being smashed rather studying stretchers!

The evening session saw Steve Thomas giving a talk on cave diving and rescue. It was during this talk that the telephone rang

One by one, WBCRT members got up and left the Long Common Room (where the diving talk was taking place). Steve gave us all evil looks as we wandered out, thinking us to be most rude. However, we had been beckoned from the door and had no choice. We had been called out! I kept thinking It s a set up. Someone s playing a mean trick on us But no. Within 10 minutes or so I was in the Land Rover and we were speeding towards Chepstow, aiming to beat the tide and get into Otter Hole before it closed for the night. The Otter Hole rescue was successful and received extensive media coverage so I will not describe it any further here.

Wednesday

On Wednesday morning whilst many of the WBCRT cavers were still at Otter Hole or sleeping following a night underground, the delegates were, unfortunately, left a little to

their own devices. Some went caving and others made trips out to local attractions such as Big Pit. Later on in the day, there were first aid talks and in the evening, when all the WBCRT folk returned from Otter Hole, the fun began again It was time for the first big party of Rescon. The Squirts, a band well used to playing at Penwyllt livened up the tired cavers. Drinking and dancing carried on into the early hours.

Thursday

I believe on Thursday morning the rock removal and stretcher sessions were repeated. Having barely slept for over 40 hours and having drunk far too much, I missed the morning sessions, but was out of bed in time to put my damp muddy wetsuit back on and sober up in the Dan-yr-ogof resurgence whilst the delegates practiced there with the floating stretcher.

Friday

Friday was set aside as the day when we would all take part in the International Practice. The intention was that this would be a larger scale exercise than the more focussed, workshop type practices that had taken place during the week.



Entertainment in the quarry *by Ian Todd*

An initial plan was to return to Dan-yr-ogof. Here we would be able to start with an easy stretcher carry in the showcave, then attempt the narrow passages of the cavers' entrance, lower into the river and the floating stretcher then finish off in daylight with a haul up to the canopy at the showcave entrance. The route may sound a little contrived, but would have involved the use of several different techniques and would provide good viewing for rescuers and the press. Unfortunately, the rain really came down on Thursday night. The Dan-yr-ogof resurgence was inspected in the morning but it was judged to be unacceptably dangerous for practice purposes, so plan B was put into effect. The scenario for plan B was based in Ogof Ffynnon Ddu II. There would be a haul on the Arete Chamber practice pitch followed by a stretcher carry out of the cave. Given the shortness of time, excess water flowing down the pitch and potential communication problems, members of WBCRT rigged and demonstrated a partial lower and haul on the pitch. Following this, the casualty was handed over to the delegates for a very efficient stretcher carry.

The afternoon saw an interesting talk on the legal aspects of cave rescue given by the BCRC legal advisor Tony Rich. Whilst this took place, Jopo was outside roasting a pig. As the evening went on, more club/team members started arrive to join the party and enjoy the pig, when it was finally cooked!

The weekend

The final weekend of Rescon was intended to be the BCRC conference for British Cave Rescue Teams. Unfortunately, the only other team to get fresh faces along for the weekend was the Mendip Rescue Organisation. So in the end, the British conference did not really happen. Perhaps the Brits had been watching the weather forecasts. However, the caves were still there and there was beer to be drunk so the remaining people stayed on to enjoy the band Akmed's Camel and a small scale Ceilidh in the mud of the marquee on the Saturday night.

With Sunday came the task of clearing away, this effort was made a little easier by the fact that the sun came out. Typical Penwyllt weather timing!

Overall

There were caving representatives from Poland, Germany, Japan, Austria, New Zealand, Sweden, Switzerland and let us not forget the CRO from the Yorkshire Dales and the Mendip team who came over at the weekend. Sadly, the delegates from the Ukraine and Italy who had arranged to come were not able to make it. The visiting teams each gave brief presentations on rescue from their part of the world throughout the week, but I really cannot remember which days they took place on to include them in the diary above. Overall, I think most people had a good time and hopefully learnt a bit more about cave rescue. Many of the events turned into a demonstration of the way WBCRT works and the kit we use, but there was exchange and ideas spread from other teams.

Many more photos from the week are on the SWCC website, they are well worth a browse.

Finally, I must thank everyone who turned up and made the event a success; The delegates, the organising team (Jopo and Gary Evans), the Soup Dragons, the administration staff, the technical staff and SWCC for providing accommodation and supporting the conference — apologies if I have missed anyone.

Jopo promises he and the Soup Dragons will not be organising such an event again, but we have heard that sort of talk before, so see you next time?



Jopo and the pig roast by Chris Pepper

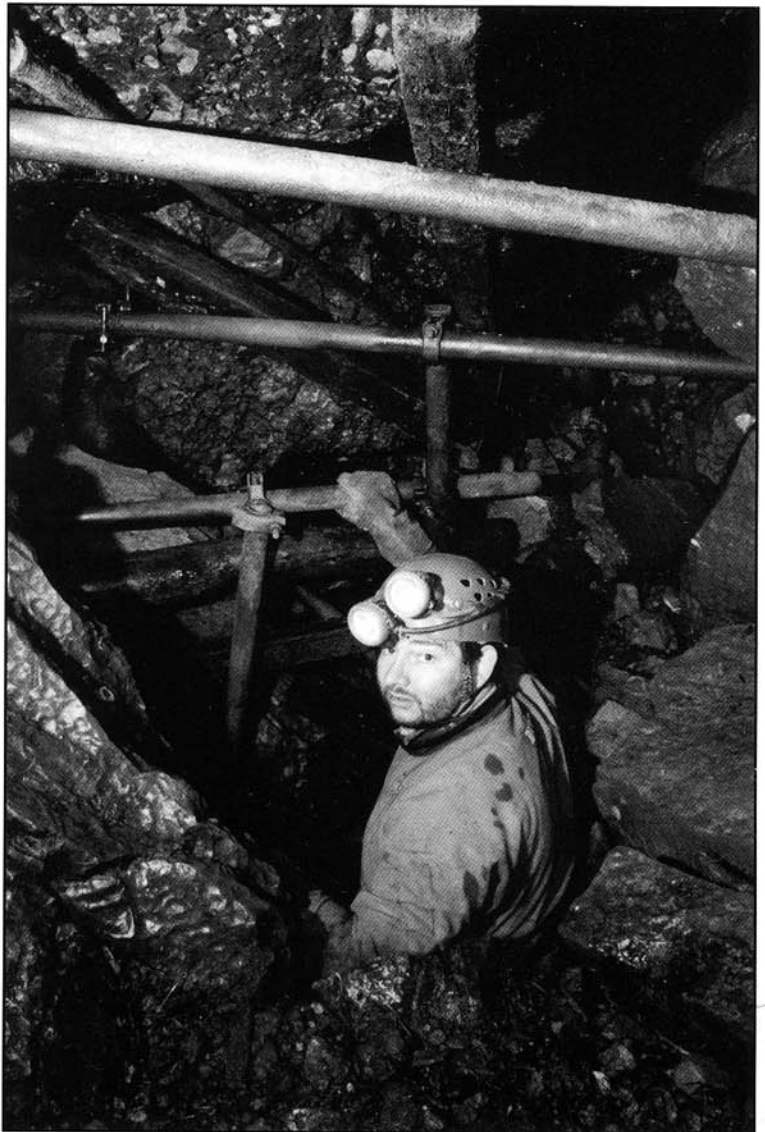
A Reunion *By Jules Carter*

Ogof Carreg Lem, it's a bit of a collector's piece. First opened up by intrepid members of SWCC in the early 1980s and then pushed through to a series of low crawls for a distance of around 400m. However, access became curtailed by a serious collapse in the entrance choke and activity stopped.

The clock goes forward. It's 1996 and Tim Long cajoles a mixed bag of individuals into reopening the cave. There follows an intense period of activity, which seems to spill over onto other sites. Suddenly the Mynydd Ddu is almost crowded with cavers, swamping the regular stalwarts on their tramps to long established digs such as Tal Draenen. Some weekends see what appears to be a guerrilla army stomping along the Dan yr Ogof skyline equipped with packs, and shouldering scaffold bars and shoring wood. Fresh assaults are made on Ogof Dewi Saint, along the Giedd and at Rusty Horseshoe. There would be occasions where rival teams would barter timber for scaffolding or vice versa!

The Carreg Lem team somehow manages to muster a digging crew every couple of weekends and gradually dug through the collapsed entrance choke, scaffolding the reopened route. In the end over 300ft of scaffold is carried up the hill. A particularly fine weekend was had during the Easter of that year when we camped at the Giedd and dug the cave. During the night we huddled around a fire of scavenged timbers and admired an intensely clear view of Comet Hale Bopp. Being out in the wilds of the Mynydd Ddu with such a view was about as good as life could get! Soon after we were back

into Carreg Lem. Some criticised us — why get so excited about opening known cave — but they failed to understand the feelings of teamwork and friendship that had been generated by the project. Sure there were politics, but you can't avoid politics in caving! However it didn't end with just being in the cave. We now had to get back to the end. The original diggers had told us of the potential problems. Floods would have filled in a lot of the awkward U tubes and the long low crawl to the end bedding crawls we were



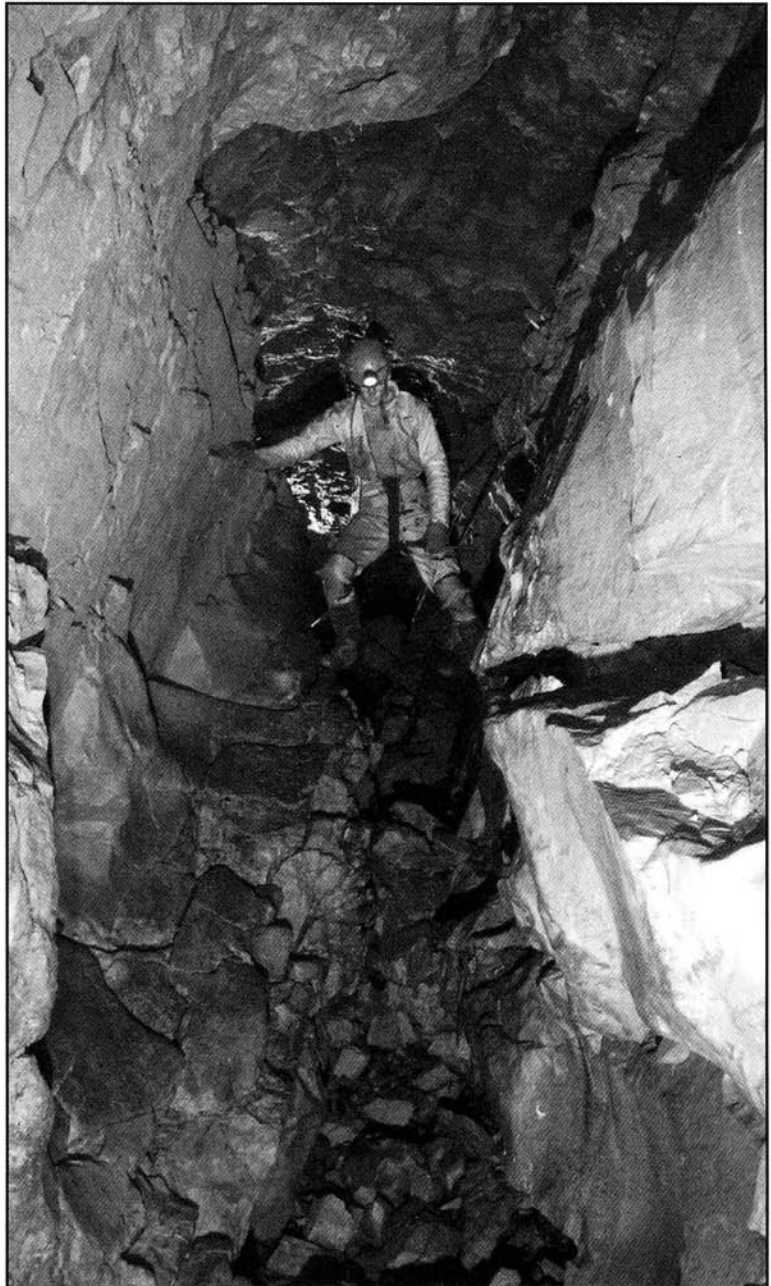
Tim Long - Carreg Lem

interested in. Despite this a couple of trips saw us back at the end of the cave and digging began!

There were a few false starts and restarts, but we selected our site and began enlarging one of the bedding planes. A 60cm long drill bit was obtained and we blasted a hands and knees crawl. Our visits to the cave started to become more infrequent, life and other caves started defocusing our efforts. And then suddenly we stopped going.

Realisation dawns. It has now been over three years since we had been to the end of the cave. The longer time passed, the more difficult it got to get motivated. The main problem being that we would have to dig ourselves to the end again. But a promising dig remains to be pushed and so do quite a few tools!

It's a Bank Holiday Monday in 2003. Standing at Dan yr Ogof are four of us. It feels like a reunion as with us is Tim Long. Somewhat larger and considerably less fit than he was back in the Carreg Lem glory days, but ready to do battle with a slog up the hill and even carrying caving kit. We have a steady walk to the cave, and remember what a good walk it is. At the cave we all change and prepare for our journey - even Tim is going to have a quick furtle but he knows he is not Carreg Lem sized. Despite the extra girth he successfully gets as far as the first U tube before returning to the surface. The rest of us push on. Ali and Andy quickly squirm through the second U tube, but become halted at the third. A gravel bank the other side of the tube has collapsed. We embark on a couple of hours digging and clear the worst, but the final push through will have to wait till the next trip, and then once again the end!



Ali - Carreg Lem

Popping out of the entrance we are amused to find Gareth Jones standing there. It's not a cave where you expect visitors. We catch up on activities and then stomp back to the cars where Tim is waiting. It has been a good day. We may not have got to the end but we've made our reunion with both ourselves and with the cave. The return date is being made !

101 Classic Caving trips No. 12 - or how the caver first saw the light. A just-so story.

By Keith Ball

I suppose that it is characteristic of advanced age that the great caving trips that you particularly remember are not those that you took part in recently, despite these being spectacular by any standards, but those that took place when you were young and relatively inexperienced.

In order to appreciate fully the setting, best beloved, can you remember, or maybe you were told about, the time before plastic bags were invented and before anyone even thought of producing equipment solely for caving.

And so to the setting. It is 1958. A bunch of sixth formers from Swansea, turned up at The South Wales Caving Club, when that august institution was ensconced at Pen y Bont Llynfell. We had just read up about Ogor Pant Canol in Britain Underground. In that guide book it indicated that there was a lake in the cave. We therefore equipped ourselves with torches and either borrowed miners helmets or used the ex-ARP steel variety, and to negotiate the lake, borrowed from the AirCadets a seven man rubber dinghy. It took four of us to carry it and it filled up the luggage space in the Swansea-Brecon bus. Such was inexperience. Ignorance is a wonderful state. On that trip we were fortunate on two counts: 1. we failed to find the cave, and 2. did find the SWCC HQ. Having introduced ourselves, we were invited back the following weekend for our first big caving trip, and to be introduced to the sport by experienced cavers. We duly turned up a week later to be lead around Ogor Ffynnon Ddu by Dai Hunt and Dick Underwood. Our equipment had not improved and the stream was four inches above the step. Lasting memories were of wellies filling with water that was breathtakingly cold to start with. The epic journey took us up stream passage, over Bolt Traverse through the Rawl Series, down Lowes Chain and then back down the stream. You might remember, those who are not old enough to forget, that in those days, sandwiches were wrapped up in grease proof paper or, if you were posh, in a table napkin. Neither of these media are waterproof. Abiding memories are of liquefied sandwiches, difficulties of caving with hand torches, feet

slipping around with smooth wellies in the rapid stream current, but enormous fun and satisfaction. And so we had a good idea of what to use for equipment at that time and eventually the seven boy party was whittled down to three who were sufficiently enthralled by the prospect of caving to start accumulating our own caving equipment.

So mining friends of family were persuaded to get miners helmets. These were of the papier m ch type and were consistently a poor fit until they got wet when they formed to the shape of your head like a glove. For lighting we obtained Premier carbide cap lamps. We could get these from local ironmongers along with loose carbide (bought by the pound in paper bags). Some of the carbide had to be broken up to fit into the lamp by using a hammer and flat stones. Spare carbide for caving was carried in old tobacco tins.

There were no furry suits, caving clothing was the stuff you were too ashamed to give away to a jumble sale. My own equipment for the trip to be described was: knitted woollen bathing trunks, old flannel trousers, a flannel shirt (green with an impermanent dye, that turned skin a leprous colour), old sweater and a cut down rain coat for a jacket. For the head: the aforementioned miners helmet and for lighting a bright new shiny Premier cap lamp. Spare lighting - candles, strike anywhere matches coated in candle-wax. Finally, to complete the ensemble, work boots nailed with triple hobs.

And so to the trip: Llethrid Swallet. Prior to the SWCC trip, we had carried out what could only be called a reconnaissance expedition. Four or five of us turned up at the entrance one summers day when the water was low and headed into the unknown. As usual it turned out to be a difficult trip with hand torches and little protection. The guide book indicated a tortuous stream passage, and this we found to be so. Using the good advice of the time we carefully paid out a length of wrapping tape (the narrow sort used for tying up parcels in shops - courtesy of Hodges, the gents outfitters in Swansea) and with difficulty and an enormous sense of adventure followed

the stream. This was fortunately low and we went along the trickle into the bowels of the earth. I suppose in retrospect we achieved quite a bit for our first unsupervised trip - we were all breaking new ground and had little idea of what to expect. We got beyond the squeeze or Filter, even the more corpulent members of the party, but were stopped short a few metres beyond when we reached the canals. These had deep water in, certainly over welly depth. and so we turned back. We did not wish to get our feet damp. Anyone who has tried to follow a string stretched tightly between boulders, where the string follows the shortest route, will appreciate that the human body cannot necessarily follow the string, and will further appreciate some of the difficulties with route finding. Eventually however we emerged with plans for bigger caving trips firmly in mind.

And so this time to the winter of 1958 two of us (Reg Harries and I) turned up at the Swansea bus station to catch the bus to Llethrid. For various reasons the original party had diminished. It had been snowing but a slight thaw had set in. The stream at the swallet was higher than the previous trip but not impassable. We had no qualms following the experience of our very wet trip through Ogof Ffynnon Ddu. What we did not realise until we got into it was how cold melt-water could be. However we changed into caving gear and stowed our kit neatly at the entrance and descended once again into the bowels of the earth, with our bright new and unfamiliar carbide lamps lighting the way. We speedily covered the distance that had seemed to have taken an age the previous trip, and with the improved lights were able to find a diversion over a wet low crawl that enabled us to keep relatively dry. It is a great advantage being able to see. We got through the Filter and plunged into the canals without trepidation, after all we were very experienced by now following our baptism in Ogof Ffynnon Ddu at four inches above the step.

Soon we emerged from the knee deep water to the dry series above and noted foot marks up a steep mud bank to the left. These had been made by the Taylors only a few months earlier although we did not know this at the time. We emerged into the Chambers. These are big- big by any standards and were totally unexpected. They are also beautifully decorated. It is difficult to describe the excitement of discovering these for the first time (for us). Time vanished, and we just wandered around awe-struck (gob-smacked - to shouts of Come and see this). Eventually some aspects of reality penetrated into our over-excited minds, such as hunger and tiredness and our lamps

starting to go out. We recharged the lamps with carbide and ourselves with some chocolate, and then decided to go out. The lamps had been going for about four and a half hours by then. The first mistake was to fill the water reservoir from a muddy pool. However initially the lamps worked well and we made it back through the canals without difficulty but by then the lights started to fade. We checked the carbide and this seemed all right. And there was water but nothing getting through the (ffw-ffw) valve. Inexperience told at this stage. Instead of blowing through the water cap or even adding small amounts of water directly to the carbide we decided to struggle on. By now we were through the Filter but only had a small bluish flame working on one of our lamps. This went out several times but we managed to relight it using the flint. We would light a candle by the flame and make our way for a short distance to the next awkward bit and then either crawl or climb by memory until we were past the obstacle to light up the candle again. By this means we were able to reach the surface. In order to make the route safer, we kept to the stream wherever possible and realised again that melt water is cold (cold as charity - colder - fish in a frozen pool). We soon lost the feeling in hands and feet and were grateful to reach the surface to a still clear starlit night with a sharp frost.

No feeling in hands and feet, certainly unable to undo boot laces. I realised the importance of getting out of wet clothes and can remember standing there otherwise stark naked, fortunately it was windless, but with my boots still on. So decided to cut boot laces with sheath knife that I had in my rucksack. Have you ever tried to hold a knife whilst carrying out a tricky operation with numb fingers. Eventually I managed to cut through the boot-laces by holding the knife between my two palms and sawing away. It seemed to take an age but the laces finally parted and I was able to get some dry clothing on. We had missed the bus back to Swansea by then and having packed our gear, and in the absence of local hostelry, started to walk back to Swansea. By Upper Killay some feeling had eventually and painfully come back to my feet and a bus was waiting at the bus stop to take us back into town.

So basically not a very big trip or long, and no new discoveries, it did not push back the frontiers of human knowledge at all - but what memories.

No Sense of Direction?

By Dave Edwards

Most of this story can be blamed on Ian Todd. It was his idea that an underground surveying unit could be made cheaply by using the increasingly available electronic gizmos. He had found a compass chip which, when combined with a microcontroller, could sense compass direction accurately. He intended to use a laser pointer as a pointing device. The idea was to aim the laser pointer at the remote survey station and read both heading and inclination data at the push of a button.

An electronic tilt sensor was also available but again needed a microcontroller to determine what the output was indicating. Here was the first problem: neither of us had ever played with a microcontroller!

Here then was the first step, to learn what made a microcontroller tick. Essentially, a microcontroller is a single chip computer with a limited range of instructions (35 in our case). It needs a crystal oscillator to supply a steady stream of clock pulses, ours runs at 4 million pulses per second and completes one instruction every 4 pulses, and is therefore capable of processing 1 million instructions per second! Each instruction is very limited in capability, being no more than, for example, get a piece of information from one location and put it into the working register; or add/subtract two numbers. This means that even the simplest job can take hundreds of separate instructions. This sequence of instructions constitutes the program that will do the job required.

The early learning was slow and painful, many hours being spent on the simple task of lighting LEDs in a particular sequence.

The next step was to obtain some tilt sensors. These came as an evaluation board requiring only a power supply in and two outputs to go to the microcontroller, one for the X axis and one for the Y.

The output for each channel (X and Y) was in the form of a square wave, the frequency of which was set by external components. The degree of tilt is determined by the degree of on-ness and off-ness of the square wave. For example, a 50% duty cycle means that the signal is high for half a cycle and low for half a cycle. (Think castle battlements.) As the sensor is tilted, the high portion of the cycle either increases or decreases in length depending on whether the sensor is tilted up or down. The maximum

variation is not very great, being only plus or minus 12.5% about the centre (flat sensor) 50% point to pointing straight up or straight down. The trick was to get the microcontroller checking the signal as fast as possible to determine whether it was high or low and to compare the readings. For greater accuracy, the signal was sampled 64 times and the readings averaged.

The next problem was to find a way of displaying the results without carrying a computer around. Initially a liquid crystal display was used and some considerable time was spent in learning how to get a microcontroller to talk to the display. This was eventually achieved and it was possible to start to calibrate the tilt sensor against known angles. To our surprise, the sensors did not appear to conform to the specifications and limits claimed in the data sheet. After some considerable head scratching, and contact with America to check our algorithms, we discovered that our units predated a known problem and were defective! A further set of samples were despatched from the USA and were also defective. At the third attempt, we received the correct units. The algorithms which we had used were derived from an American Application Note and were designed to make the mathematical calculations as easy as possible to apply to a microcontroller program. They did however tend to ignore the fact that the sensors were heat sensitive! It soon became apparent that this was a major problem, especially as it was intended to use the sensors at cave temperature.

At this time, cheaper laser pointers started to appear on the high street and so several were obtained and seemed ideal for the job.

As our expertise with microcontrollers increased, I branched off and started to play with LED displays. Although requiring more battery power, their output level could be increased and decreased through software and they were more robust and more easily read underground.

After some experimentation and more programming, I came up with an algorithm which overcame the temperature problem and guaranteed accurate results at any temperature. The Monday Morons now came into their own. With input from Brian Clipstone as to what he would like a clinometer to do, and compromises with reality, a basic unit was thrashed out. It was decided that the unit would only measure tilt in one direction (i.e. the X axis) to an accuracy of

0.25 degrees. The LED display could show 5 digits so a downward tilt could show, for example, -15.75. Upward tilt showed the angle without the minus sign. Above 75 degrees, the accuracy fell off somewhat so above this angle the display was made to show - - - - - so that inaccurate readings would not be recorded.

It was also decided that the unit would need a main On/Off switch and a separate push button switch which would, in three consecutive operations, 1) switch on the laser and the LED display; 2) switch off the laser and hold the current reading and 3) switch the display off again. All these requirements were successfully incorporated into the microcontroller program and work was started on bringing all the elements together into a working unit.



When completed as a simple prototype (mainly perspex and glue!) it was necessary to calibrate the unit for an accurate zero. This was achieved with an 18 metre garden hose with clear plastic tubes at each end for a water level, a garden fork with a strip of reflective tape at the far end and a pile of bricks at the other. By keeping the laser beam level with the water level at each end, the tilt sensor could be adjusted to read 00.00.

Since completing the prototype and handing it to Brian, it seems to have been in surveying use nearly every weekend. He says he has found that it reduces the vertical error in survey loops by a significant amount. Just try prising it away from him!

While Ian persevered with the digital compass, obtaining parts and laying out a sophisticated, double-sided printed circuit board (which I managed to manufacture using simple, home techniques) and doing some early tests, I became sidetracked by a request from Brian for a temperature sensing data logger. It was needed to assist in Clark Friend's work on Radon distribution in caves.

Again, the Monday Morons sprang into action and downed another pint. Brian produced the first circuit diagram which was used as a basis

for research. A set of requirements was formulated and the various components selected and bought. The complete system consisted of a real-time clock, a digital temperature sensor, two memory chips (each holding 8000 bytes of data), a microcontroller and a chip capable of turning microcontroller outputs (0 to 5 volts) into voltages capable of being read by the serial port of a computer. Ian had devised a method of data

compression so that the logger could store up to 83 days worth of data in its memory.

All of these chips talked to each other over two lines (I²C bus), one known as the clock line and the other the data line. Each chip has an address and the communications procedure consists of a complicated set of rules for deciding which chip was being addressed and whether it was

being written to, or read from. Most chip addresses could be selected but one was fixed. Unfortunately, the fixed address fell between the addresses of the two memory chips and required some awkward procedures; however, this problem was solved by some more clever programming by Ian. The next problem was how to talk to a computer serial port. The port works at a fixed speed (in this case, 9600 bits per second) and some considerable work went into programming the microcontroller (working at 1 million instructions per second) to produce the signals at precisely the right moment in time. Eventually, with the aid of a storage oscilloscope, it was possible to see what was happening and get the program working properly. Another assistance was a computer program which would run the microcontroller program step by step and (sometimes) show up any errors. It did not show up errors which could occur from outside influences or failure to take into account mistakes in the instructions so getting everything working correctly took some considerable time. The data logger program was finally completed on the 7th December 2001 and tests began on a prototype printed circuit board. The next consideration was what the units would be contained in. Whilst scouring the shops for suitable ideas, I happened

upon some food containers in clear plastic with screw-on, sealed lids that looked about the right size. It turned out to be so perfect that six more were purchased the next day (at £2 each) and required only one minor adjustment to the PCB. As a final test of the units ability to cope with a year change on December 31st and negative temperatures, the unit was left in the car at the HQ on New Year s Eve. It successfully coped with the year change and recorded a lowest temperature of minus six degrees centigrade!

Work was then started on building six more units and, once built, on adjusting the real time clocks for accuracies of better than 1 second per week. The units were then left in the same place for three weeks and the recorded temperatures compared. These were all within half a degree centigrade of each other, a very acceptable result.

The finished units are connected to a laptop and the current date and time downloaded into the logger. On removal of the computer connection the clocks start running and the unit goes to sleep until the point when the next whole hour is reached. During sleep periods, battery consumption is minimal (in the region of microamps). When the whole hour is reached the unit wakes up, measures the temperature and stores it in memory along with the time and date. It then goes back to sleep for 30 minutes and then repeats the process. Each waking session lasts for about half a second and is indicated by the flash of an LED. When it is required to recover the data, the laptop is again connected and the memory is transferred to the computer. At this point, the microcontroller is sitting in a loop waiting for this to happen again. Disconnecting and reconnecting the computer allows the data to be retrieved again in case of any errors first time round. The power supply to the microcontroller is then interrupted using a small pull-off connector. This resets the microcontroller and the date and time can be downloaded again.

There are currently five of these units spread from OFD1 to Top Entrance and results have been obtained monthly for five months now (Sept 2002). The intention was to look for temperature inversions (warmer at Top Entrance than at OFD1), the sort of thing that causes the mist level at HQ height. The results so far have been so interesting that it became necessary to have some idea of how the atmospheric pressure was changing in the immediate vicinity of the HQ. Accordingly, I became even further sidetracked by obtaining a digital absolute pressure sensor and building a suitable circuit. This has now been incorporated into the same circuit currently being run to record Graham Christian s rain data

(August Bank 2002) and we now have a permanent record of barometric pressure as well.

The temperature sensors are beginning to show that the cave may be thought of as a living, breathing thing. Time will tell us more, hopefully during the winter months.

In the meantime, Ian has been struggling with an horrendous task. After reading an article on the automatic calibration of electronic compasses, he has embarked on a mathematical nightmare. This has involved solving five simultaneous equations using matrix arithmetic. Since neither of us ever encountered this at school, this has involved him in a steep learning curve. Since microcontrollers are naturally programmed in integer (whole number) form, this has involved some very big numbers. Eventually he decided that big numbers were not giving sufficiently accurate results so he started to study floating point numbers. This involved identifying prewritten microcontroller subroutines and applying them correctly. He now thinks that the answers are coming out correctly, but he is only computing dummy numbers so far. The next stage is to feed the outputs from the compass chips into some analogue to digital converters and see what sort of real numbers come out. Then, using the pitch and roll information from the tilt sensor, the readings from the compass can be mathematically transformed to the values that would have been generated if the compass had been level. This mathematical transform has now been incorporated into the microcontroller program.

The next stage will be to build another circuit board which incorporates everything. We need this to test the accuracy of the theory against real compass bearings. We are now starting to discuss what form of output display is best (liquid crystal or LED) and what the thing might look and feel like because we only want to make the new circuit board once!

A full description of the intricacies of the use of the magnetic sensors and their interaction with the microcontroller is beyond the scope of this article; however, if we do achieve an accurate, working, surveying-unit then all details will be published in due course.

These projects have now involved us for over 2 years and we still have a way to go. Still, it beats football.....

The Speleology, Geology and Geomorphology of the Hepste Valley

by Keith Ball

This account is one of a series of articles investigating the relation between geology and cave development in rather remote areas, paying particular attention to the likelihood of there being more caves. It is hoped that these areas can be compared with rather more cavernous areas and help to focus attention for future exploration. The Hepste is a tributary (a feeder) for the Mellte Valley in which large caves are known, Porth yr Ogof being the main one. There has been a considerable amount of exploration around the Hepste, and a number of small caves have been discovered. Many of these are wet and require diving.

The Hepste valley is north east of Penderyn, and for the purpose of this account, the area considered is shown in Figure 1. It includes the limestone height of Mynydd y Garn, and extends to include the Cader Fawr (limestone) / Cefn Cadlan (gritstone) ridge that parallels the river to the south. Of course we are dealing with limestones in which there is underground drainage and the effective catchment area is larger than would be expected from the shape of the landscape.

Geology

Basic Geology

The geology has been studied by a number of workers, the most comprehensive and one of the most recent investigations being by Barclay, Taylor and Thomas (1988). This is published as a British Geological Survey memoir and describes the geology of the Merthyr Tydfil map area as shown on the British Geological Survey Sheet No 231. This map is at 1:50,000 scale and both solid and drift versions of the map are published. More detailed maps at 1:10,000 scale are also available.

The area is underlain entirely by bedrocks of the Devonian and Carboniferous periods and these are overlain by unconsolidated overburden, the main bulk of which is glacially derived drift but with some alluvium close to the river course. The glacial till is mostly coarse and gravely and provides easily drained soils with a reasonable tilth.

This gravely till is thickest in the river valley and relatively thin or absent over the higher slopes. Where the till overlies limestone the combination provides good drainage and this is reflected in the agriculture. This is mostly stock rearing and the fields these days are mainly pasture. Fenced pastures are mostly underlain by the limestone, more open moorland is underlain by more impermeable rocks or thicker drift deposits.

A simplified bed-rock geological map is given in Figures 1 and 2. This is based upon the geological survey sheets 231 and on observations by the writers. Figure 1 gives the distribution of the main rock types in the chosen area whilst Figure 2 is rather more detailed and covers that part of the area in which caves are known to exist and is at a larger scale than the first. The geological succession is included in Figure 1.

The oldest rocks in the area are the Devonian Brownstones, red-brown and purple sandstones with interbedded red siltstones and mudstones. These are overlain unconformably by conglomerates and sandstones of the Plateau Beds. These latter in concert with the Grey Grits (which may be basal Carboniferous), underlie the highest ground in the region. In Figure 1 these are all grouped together as the ORS (Old Red Sandstones).

The lowest definite Carboniferous rocks are a thin sequence (about 4m) of sandy limestones and dolomites (LL). In this area and further east these underlie the Lower Limestone Shales. The formation is sandier towards the base whilst at the very base is a thin conglomerate. It is overlain by the Lower Limestone Shales, a sequence of thin limestones and calcareous shales usually forming relatively low ground. The Abercriban O lite (AbO) makes its first appearance in this area being absent further west and quickly thickens to the east. It is a light coloured o litic grainy limestone, about 5m thick locally, and rests unconformably upon the Lower Limestone Shales. It may be divided into two sub-units which to the east become much thicker and in the Craig y Cilau area it is divided into several distinct formations.

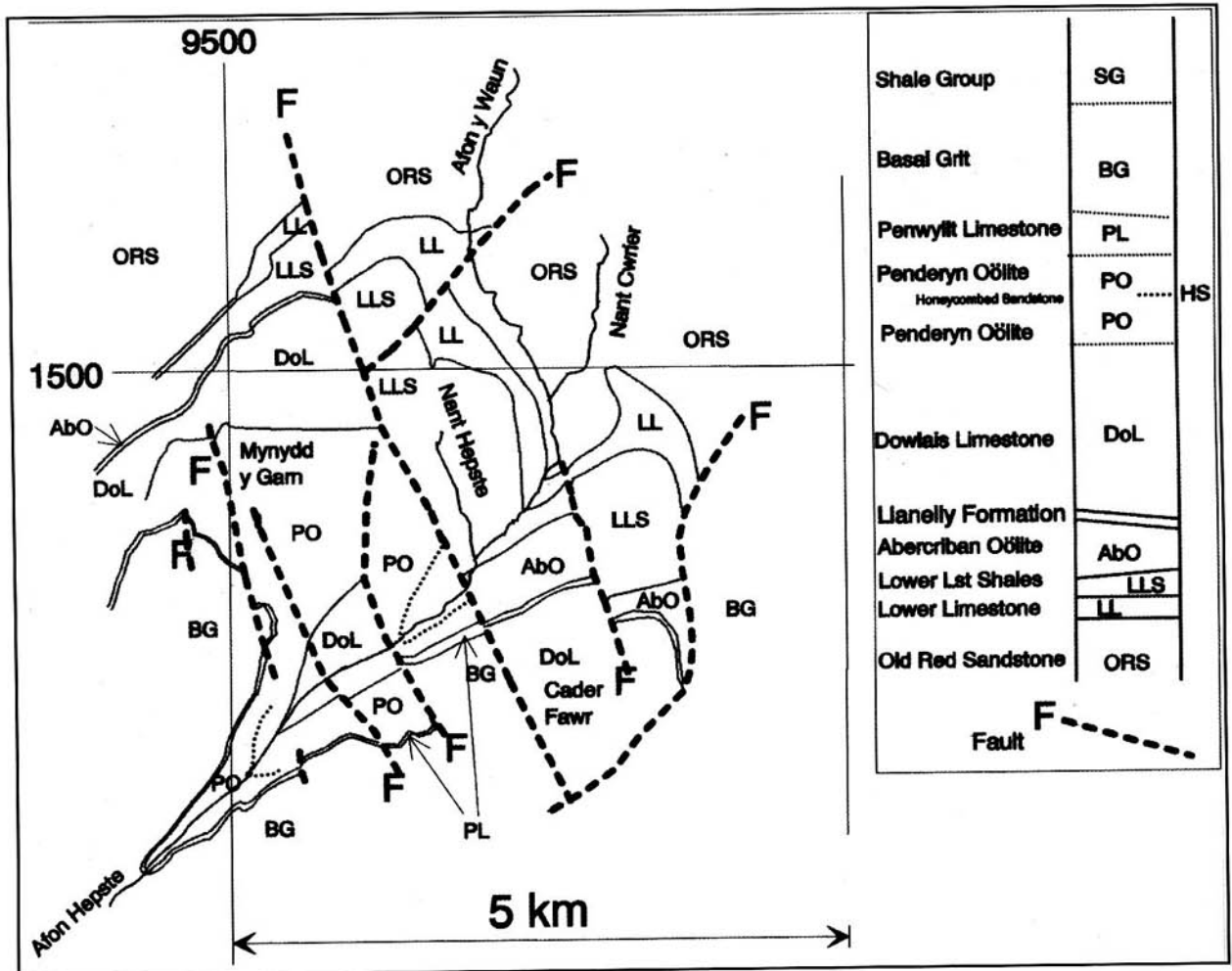


Figure 1: Simplified geological map of the area showing the distribution of the various rock types mentioned in the text. The main river and its tributaries are also shown. The area is largely drift covered but the various drift types are omitted for clarity. They comprise mainly alluvium, following the stream courses, and glacial drift and soliflucted head over the higher ground and slopes. The map is based upon the Geological Survey Sheet 231 and on observations by the writers.

An impersistent series of mudstones and thin limestones: the Llanelly Formation, separates the Abercriban Oölite and the Dowlais limestone. To the east it is over 10m thick but is completely overstepped west of the Hepste Valley. It is suspected to occur in our particular area because of a hollow feature, but exposures are poor.

The overlying Dowlais Limestone is up to 100m metres thick. The Dowlais beds are mostly grainstones with micritic and oölitic interclasts and algal remains that are common. Although weathering to a light colour the Dowlais Limestone is typically dark - grey on fresh surfaces, and gives off a sulphurous smell when struck by a hammer.

The Dowlais Limestone is overlain by the Penderyn Oölite (about 20m thick). It comprises pale-grey coarse-grained massive oölite. About half way through the oölite is a carious (honeycomb) weathering calcareous sandstone called Honeycombed Sandstone. This provides an use-

ful marker horizon within the limestone succession. Another Honeycombed Sandstone sometimes is found at the base of the formation but has not been observed in the Hepste Valley. The lower half of the oölite (sub Honeycombed Sandstone) has rubbly tops to the individual beds and the sequence is not as pure or as homogenous as the same formation west of the Nedd Fechan.

Overlying this in turn, is the Penwyllt Limestone which is about 5-10m thick. The beds show a stacked cyclic sequence of dark grey shelly and crinoidal grainstones. Locally sandy, the beds also contain chert nodules and sandstone layers. Sometimes seat-earths and thin coals are also present as seen at Bwa Maen near Pont Nedd Fechan. However exposures are inadequate to determine whether these are common in our area. The upper contact of the limestone shows commonly pipes and hollows filled with quartzite indicating that the limestone had been exposed and eroded prior to the deposition of the overlying grit, conglomerates and sandstones.

The limestone is overlain unconformably, but without an easily recognisable angular disconformity, by the Basal Grit of the Namurian Series. The Basal Grit in this area is about 35m thick and was originally deposited as quartz-rich sand and pebble banks in a large estuary which had its source material to the north. Many of the beds are lens shaped and others have U-shaped bases where the bottom of the bed has cut down into the underlying strata, whilst these were still soft. They represent sand banks and river channel infillings in temporary river beds which spread out and changed position frequently over an estuarine flood plain. The estuary beds sometimes emerged above sea level and were often tree covered. There are traces of tree roots and fallen trunks on the upper surface of many of the beds. Periodically the sea level rose and the sea flooded in, resulting in the deposition of muds. These have been converted into shales and have a characteristic fossil assemblage which indicate marine conditions.

Above the Basal Grit is another marine mudstone sequence. This is between six and ten metres thick and is followed by a group of sandstone beds: collectively called the Twelve Foot Sandstone. This is slightly variable in thickness but is usually, and not surprisingly, about 4m thick. Above this sandstone is a thick sequence of mudstones which include a number of bands which are rich in fossils. The beds above the Basal Grit and in-

cluding the Twelve Foot Sandstone are gathered together within the Shale Group. The Shale Group in this area is about 80m thick and often contains thin sandstone beds at outcrop. Beds above the shale group are not exposed in the chosen area.

The main limestone bedrock exposures are largely confined to the river bed. In the areas underlain by the Basal Grit and the Twelve Foot Sandstone, exposures are more numerous but are again sparse for the remainder of the Shale Group. The overall dip is to the south but there are variations in direction and amount near faults. In particular that section bounded by faults north and east of Bryn Cul dips gently towards the north-west.

Distribution of the rock types

The Hepste rises on the relatively impermeable upper part of the of the Devonian Old Red Sandstone (ORS), and flows across the hard sandstones and conglomerates of the Plateau Beds that elsewhere form the highest ground of the region (Pen y Fan, Fan Gihirych etc.). The first Limestone unit to be encountered is the Lower Limestone underlying the Lower Limestone Shales (Figure 1).

The river then flows over a short section of the Lower Limestone Shales and then clips a small corner of the Abercriban O lite. The high ground to the south (Cader Fawr) is underlain by the

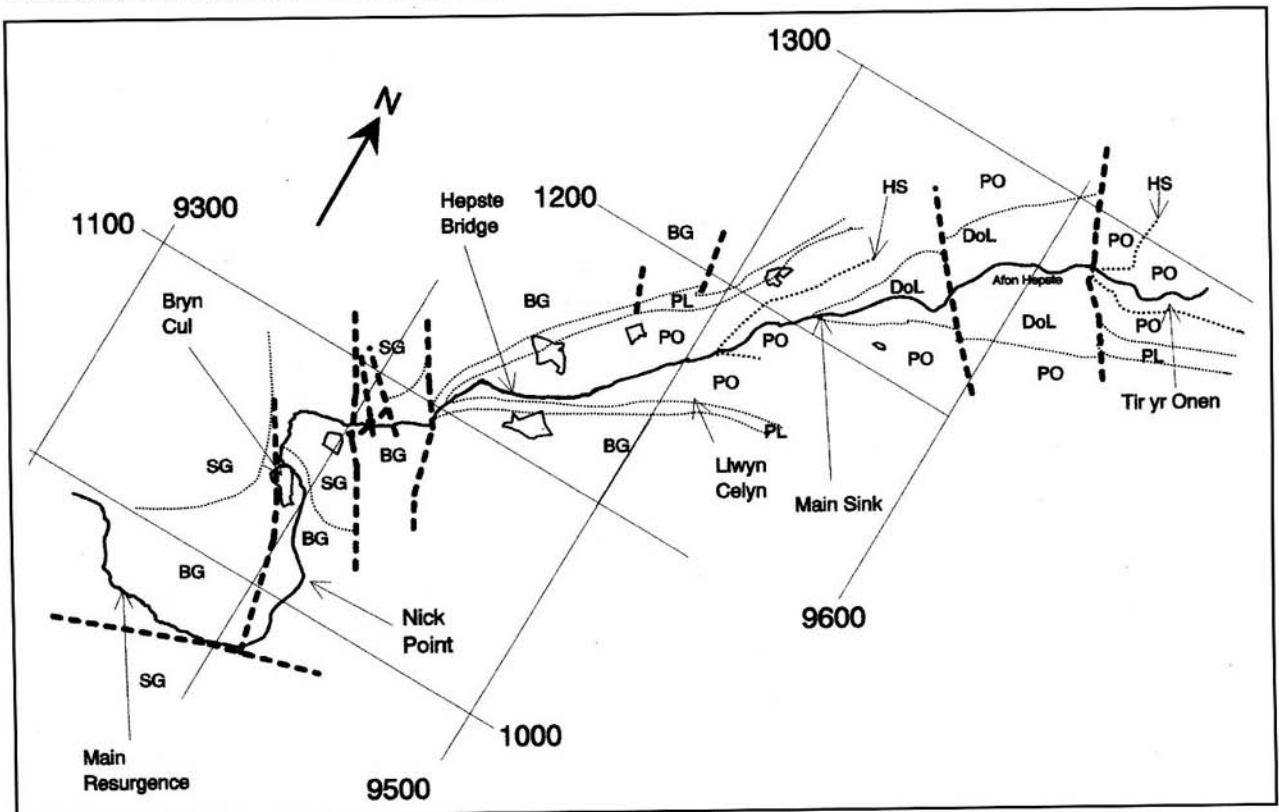


Figure 2: More detailed geological map of the area between Tir yr Onnen and the main resurgence. Symbols and ornament as in Figure 1.

succeeding Dowlais Limestone Formation. The river then encounters the first of the major limestone units: the Penderyn O lite, at a faulted contact.

Figure 2 covers the valley of the Afon Hepste from Blaen Hepste down as far as the resurgence. The drift is omitted to improve clarity.

As one follows the Afon Hepste downstream from Tir yr Onen the first bedrock to be encountered is the lower part of the Penderyn O lite. The Honeycombed Sandstone intersects the stream at about SN 9620 1280 and shortly after a major fault throws the Dowlais Limestone up against the Penderyn O lite. The latter limestone is then found for about one kilometre, the outcrop being faulted but with the Dowlais Limestone on both sides of the fault. At about SN 953 121 the Dowlais Limestone is replaced by the Penderyn O lite. The Penderyn Oolite extends up the dip slope of Mynydd y Garn to the north. Most of the sub-outcrop is in that portion of the Penderyn O lite that is above the Honeycombed Sandstone. The Honeycombed Sandstone is again exposed in the river bed, at SN 9510 1173, and in fields on either side of the river. Exposures are poor downstream from the Honeycombed Sandstone, the river bed being filled with cobble sized rounded boulders of Old Red Sandstone and limestone. However detailed mapping shows that the river is underlain by the upper part of the Penderyn O lite and then the Penwyllt Limestone to a point about 200m metres downstream from Hepste Bridge.

At this point a major fault brings higher parts of the Basal Grit against the contact between the Basal Grit and the limestone. Further faulting brings the upper surface of the Basal Grit to the surface. The river bed is firstly located within the Shale Group and then the river flows along the upper surface of the Basal Grit at the contact with the Shale Group. It gradually cuts down through the 35 metres or so of the gritstone to a point at SN 936 097 where there is a small exposure of the Penwyllt Limestone. The river normally resurges from joints in the Basal Grit some 60 metres downstream from this inlier. Much of the river bed from about SN 9451 1208 is dry under normal conditions. Tributary streams rising on the Basal Grit and Shale Group outcrops add a little water to the otherwise dry valley in places.

Karst geomorphology

The Karst area in Croatia is the type area for limestone dissolution phenomena. The term karst is however often used rather loosely to

describe areas and phenomena which result from the dissolution of a variety of rocks. Limestone Karst is thus distinguished from features affecting other rock types such as rock salt, gypsum and even sandstones and granites. Although the Basal Grit in the area is relatively insoluble, because of its proximity to the limestone it often suffers from collapse into holes produced in the limestone and can thus be regarded as karstified.

Caves

Caves are the most obvious karstic features and they show a very strong geological control (Ball and Jones, 1993). There are five main stratigraphical horizons where the frequency of cave passages are much more abundant than elsewhere in the succession. These favoured locations are: (1) at the contact between the Basal Grit and the Penwyllt Limestone; (2) within the lower part of the Penderyn O lite; (3) within the upper part of the Dowlais Limestone (although locally this zone merges with the Penderyn O lite); (4) within the Abercriban O lite and (5) within the lower limestone of the Lower Limestone Shales.

1. Caves at the contact between the Basal Grit and the Limestone:

The chemical control for this location is strong and well documented (Burke, 1967, Burke and Bird, 1966, Ball and Jones, 1993). Waters percolating through the joints in the Basal Grit (which is often overlain by acidic peat) remain or become acidic and react strongly with the alkaline Penwyllt Limestone beneath and caves are frequently found at this location. The caves at Gwaen Cefn y Garreg and Gweunydd Hepste are all of this type (Pulpit Hole SN 9420 1345 and Pwll Derw SN 9420 1235). Entry has also been made into caves directly related to the Afon Hepste, especially near the main resurgence (e.g. Ogof Afon Hepste, Lloyd, 1979, Waltham and Everett, 1988). Although the walls of these caves are in limestone, the Basal Grit is often exposed in the roof. The caves are young and immature, under normal conditions require diving to explore, and it is only under drought conditions that access may be gained through some of the sumps because of the strong water flow.

Figure 3 shows a plan of part of the Ogof Afon Hepste system. The map of the cave system is from Waltham and Everett, (1988) and has the surface geology superposed. Much of the system is developed close to or at the contact between the Basal Grit and the Penwyllt Limestone. According to Gascoine (1988) the passages amount to some 880 metres length overall. An inlier of the Penwyllt Limestone occurs near Ogof Tarddiant Hepste. The remainder of the surface

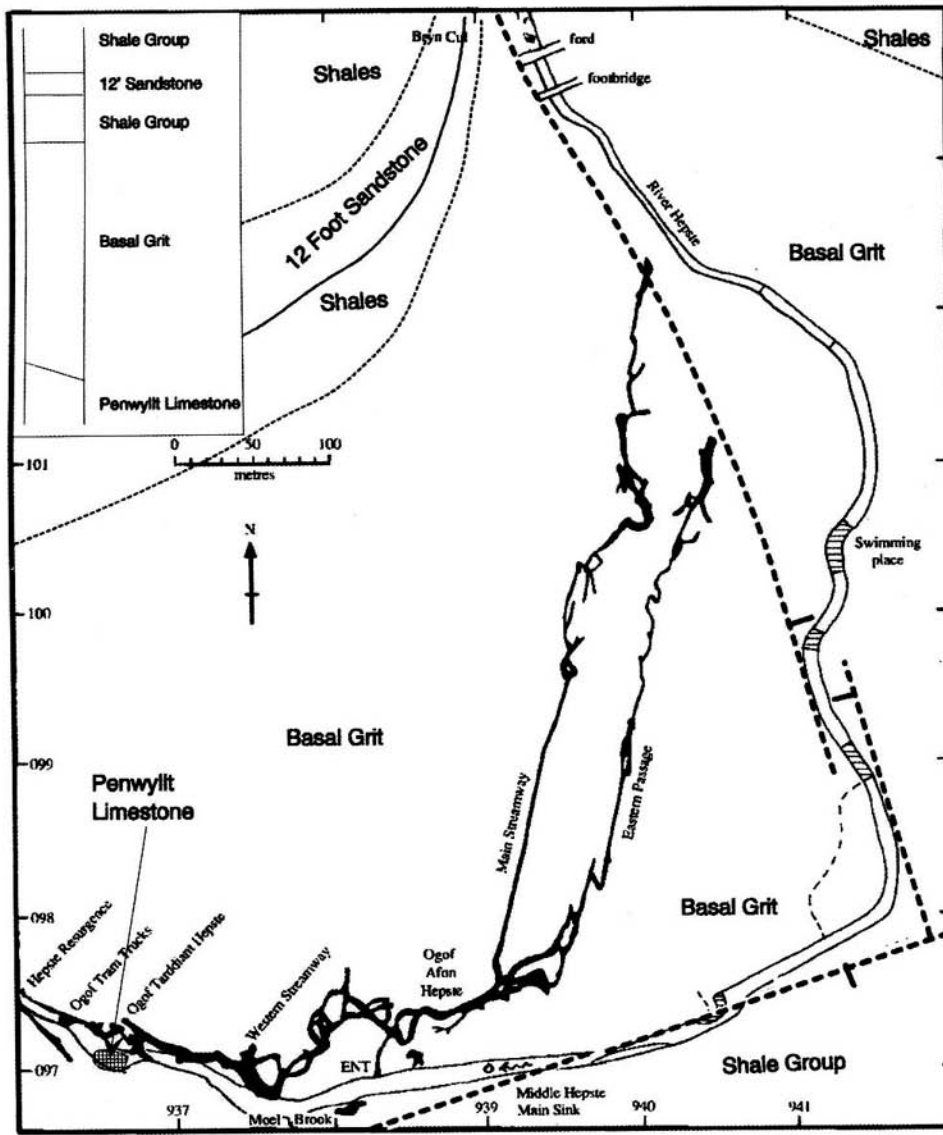


Figure 3: Geological map of the area around the main resurgence that includes the plan of Ogof Afon Hepste. The latter is based upon Waltham and Everett's (1988) compilation.

Drain, Bridge Cave etc.). Will's Hole at Craig y Ddinas is in part also firmly located within this zone (see below). In our area the caves are small and shallow, they are confined to the lower Penderyn Oolite near SN 9518 1158. The caves reach a static water table at shallow depth and are too tight for divers to penetrate deeper.

3. Caves within the Dowlais Limestone:

Further west in both Nedd Fechan (Ogof yr Afon Nedd Fechan)

is mostly underlain by the Basal Grit. A major fault (the Coed Hir Fault) throws the Shale Group against the Basal Grit forming a strip along the southern portion of the area shown on the map. A family of faults trending NNW-SSE affects the area (see also Figures 1 and 2) and one such affects the cave development by downthrowing the junction between grit and limestone and effectively truncates the Eastern and Main Streamway passages. Although the surface trace of the fault is west of the cave limits, because the fault plane dips to the east it corresponds with the limits of the cave at the base of the Basal Grit. The downthrown side of the faults is marked by a tick in the figures.

2. Caves within the Penderyn Oolite:

Another particularly favourable location for cave development is within the Penderyn Oolite and especially that part of it beneath the main Honeycombed Sandstone. Within this zone are found the bulk of the Porth yr Ogof system and many of the Nedd Fechan caves, especially those related to Cwm Pwll y Rhyd (White Lady, Town

and the Tawe valley (Ogof Ffynnon Ddu and Dan yr Ogof) there are major cave systems within the Dowlais Limestone. In the Tawe valley caves are almost entirely confined to this formation, the overlying Penderyn Oolite being devoid of anything other than brief excursions from the underlying Dowlais Limestone hosted cave passages. Will's Hole at Pont Nedd Fechan actually bridges across the upper beds of this formation and the lowest beds of the Penderyn Oolite.

Cave passages in the Dowlais beds are uncommon further to the east of our area and even where they exist they are close to or at the contact with the Basal Grit (the bottom of the Basal Grit is unconformable and rests on progressively lower levels in the limestone succession as one travels to the east).

(4). Caves within the Abercriban Oolite:

This area displays the first substantial thickness of the Abercriban Oolite, which becomes much thicker to the east. Near Brynmawr it contains

the major systems of Ager Allwedd and Ogof Draenen. Close to home it is much thinner but in the area just north of Merthyr the Ogofau Rhyd Sych and y Ci are to be found within these beds. In our area Ogof Abercwrier (Moss Risings) occurs within these beds.. It is mainly a divers cave and about 250m long. The entrance series of about 60m is often dry but floods easily.

5). *Caves within the Lower Limestone:*

No caves are known within this sequence in the Hepste area, although there are a small number of springs (see for example Table 1). However, caves are formed where the sequence is thicker e.g. above Dyffryn Crawnnon, north of Trefil.

Listing of caves:

Table 1 is a list of some of the sites of spelological interest in the area with their geological position. It should be noted that despite some of the features being identified as occurring within the Basal Grit they are often close to or at the contact with the underlying limestone. The locational data are the same as in Figure 1. L(Lower)PO and U(Upper)PO denote that part of the Penderyn O lite succession below and above the Honeycombed Sandstone. It is clear that there is slight confusion concerning the attribution of some of the caves. Ogof Blaen Hepste according to Stratford (1978) connects with Tucks Rift. However it is Ogof Glan Hepste that connects with the rift.

Hydrogeology

The flow of water in the area of concern is complicated but accords to expected principles. From its source on the slopes of Fan Fawr, the Afon Hepste flows south and then south-west and finally westwards to join the Afon Mellte. The headwaters are made up of input from three major sources . The main one is from Afon y Waen and then Nant Cwrier. These both rise on the Old Red Sandstone. Nant Hepste rises on the relatively impermeable Lower Limestone Shales (Figure 1). The river mostly flows in a broad mature valley with slightly raised alluvial flats and a meandering plan to a nick point at about SN 9410 1015 (Figure 2 and 4). The banks in this section are low and seldom rise to more than a metre above the river bed.

Under normal conditions there is a sink in the river bed at about SN 9660 1300. This normally takes all of the water which re-emerges strongly from enlarged joints in the Penderyn O lite just above the Honeycombed Sandstone at about 9630 1280.

Between a major sink at SN 9451 1208 and a major resurgence at 9360 0973 and under normal conditions, the bed is mostly dry, although there are several sinks and risings in the river bed. The main sink under normal conditions is exactly at the contact between the Dowlais Limestone and the Penderyn O lite although under drier conditions the stream sinks over a stretch of about 60m upstream. Attempts at exploring caves systems in the section underlain by the lower part of the Penderyn O lite have shown that there is a static water table a few metres below the river bed. The water table is high and in periods of high rainfall there is abundant water flow over the surface, further indicating that any cave passages developed at, or slightly above, the water table are small. This is a good indication of the immaturity of any cave passages in the area.

There is also a number of small streams that flow into the river bed downstream of the limestone sub-outcrop and these aggregate and flow over the impervious rocks as far as the neighbourhood of the main resurgence.. A rising near SN 9405 1075 is at the faulted contact between the Shale Group (downstream) and the Basal Grit. The water seems to be forced upwards at this point through joints in the fractured Basal Grit. The flow is normally much smaller than that at the main upstream sink. The limestone at this locality is at a depth of at least 30 metres. Under normal flow conditions this resurgence and the other streams entering the river bed provide a moderate surface flow of water as far as the vicinity of the main rising, where it sinks into the Penwyllt Limestone inlier. Sometimes this water sinks into the river bed at SN 9390 0969 before reaching the inlier.

The most extensive cave system is associated spatially with the main rising (Waltham and Everett, 1989; Gascoine, 1989).. Gascoine records the results of water tracing and has shown that the Main Sink at SN 9451 1208 has been traced to the Main Resurgence in under 24 hours. Further north a sink at Pwll Derw (SN 9413 1235) has also been traced to the main rising. The Coed Hir Fault (Figure 3) brings the shale group up against the Basal Grit and affects the subsurface water flow in this immediate area.

There are two main types of groundwater aquifer in the area; Karst and Fractured Rock types.

The flow in limestone will be of both types: flow along fractures and flow through the cave systems. The main part of the groundwater flow will be through the cave system karst aquifer. The Basal Grit will also support fracture flow through joints and some of these joints will be opened by

Table 1 :1 a list of some of the sites of spelological interest in the area with their geological position

Feature	National Grid Reference			Geology
	SN			
Blaen Hepste Resurgence	SN	9614	1279	Fault Dol/PO
Doghole	SN	9541	1095	BG
Craig Fawr (Carreg Fawr??) Foxholes	SN	9661	1162	BG
Hepste Bridge Sinks	SN	9475	1132	UPO
Hepste Caves (Potholes)	SN	9518	1181	LPO
Hepste Fawr Road Cave	SN	9491	1195	BG
Hepste Fawr Road Sink	SN	9492	1195	BG
Hepste Fawr Sink	SN	9528	1190	LPO
Hepste Fawr Sinks Right Hand	SN	9518	1189	LPO
Hepste Flood Resurgence	SN	9363	973	BG
Hepste Foxholes	SN	9379	965	BG FAULT?
Hepste Rift 2	SN	9518	1185	LPO
Llwyn Celyn Spring	SN	9472	1133	UPO
Middle Hepste Cave	SN	9381	966	BG
Middle Hepste Main Sink	SN	9389	969	BG/FAULT
Middle Hepste North east Cave	SN	9386	969	BG/FAULT
Middle Hepste Rising	SN	9431	1107	PO
Middle Hepste Sink	SN	9381	966	BG
Middle Hepste South east Dig	SN	9389	968	BG
Middle Hepste South west Dig	SN	9382	968	BG
Nant Cwrier Bridge Rising	SN	9748	1396	LL
Ogof Dau Gi	SN	9233	1235	BG
Ogof Glan Hepste	SN	9519	1182	LPO
Ogof Glan Hepste No 2	SN	9518	1181	LPO
Ogof Gorrlewinol Cader Fawr	SN	9751	1234	DoL
Ogof Hepste	SN	9518	1181	LPO
Ogof Pioden	SN	9511	1409	LPO
Ogof-y-Ci Mawr	SN	9319	1242	BG
Ogof yr Uwd Lwyd	SN	9738	1236	BG
Pwll Heol Brychan Sink	SN	9489	1068	BG
Pwll Hepste	SN	9518	1187	LPO
Pwll Mawr Sink	SN	9541	1095	BG
Tarddiant Hepste Sink	SN	9367	970	BG
Tir-Duweunvdd North Sink	SN	9471	1177	BG/PL
Tir-Duweunvdd South Sink	SN	9474	1173	BG/PL
Tir-Duweunvdd well	SN	9489	1180	BG/PL
Tir-Duweunvdd Well Cave	SN	9485	1189	BG/PL
Tir-Duweunvdd Well Sink	SN	9489	1179	BG/PL
Tuck's Rift	SN	9518	1185	LPO
Twyn Du Swallet	SN	9599	1160	BG
Unner Henste Heol-las Dig	SN	9600	1268	DoL
Unner Henste Heol-las Resurgence	SN	9604	1268	DoL
Unner Henste Heol-las Sink	SN	9568	1231	DoL
Unner Henste Main Sink	SN	9541	1208	DoL/PO
Unner Henste Neuadd Hole	SN	9527	1191	LPO
Unner Henste Resurgence Cave	SN	9632	1283	LPO

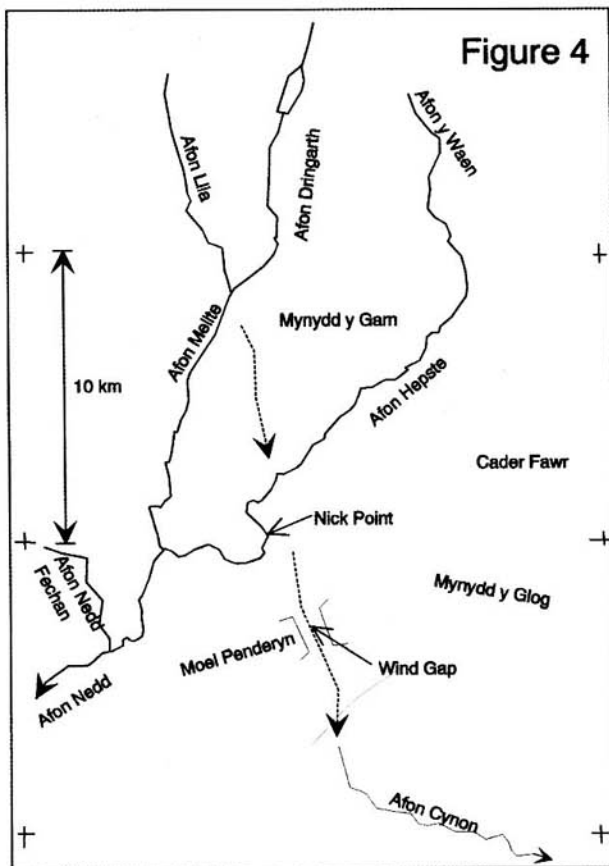


Figure 4:
Simplified drainage map of the district showing the position of the Hepste in relation to the other rivers mentioned in the text. The wind gap between Mynydd y Glog and Moel Penderyn is marked, as is the conjectural course (broken line) of the early Hepste / Llia / Mellte river.

collapse into voids formed at the contact with the limestone. The Shale Group on the other hand is almost impermeable to water flow and provides an effective barrier (an aquiclude - at least at shallow depth) to any ground water flow south of the Afon Hepste near the resurgence. Groundwater will therefore be forced upwards near the fault to emerge close to the exposure of limestone. This is the lowest location for limestone at surface and effectively controls the groundwater flow regime and hence the water table in the area.

The overall river course itself can be divided into several sections. The upper section shows a relatively mature profile to a nick point (SN 941 102, Figures 2 and 4). Then follows a rejuvenated section from the nick point to the confluence with the Mellte. The rejuvenated section is characterised by waterfalls and rapids and steeply walled gorges mostly within the Basal Grit. Jones (1939), North (1962) and George (1976) have speculated that the upper part of the Hepste originally flowed into a proto Mellte and Llia river system. The

combined rivers flowed through the now drift filled gap between Foel Penderyn and Twyn y Glog to join the Afon Cynon (Figure 4). This was before the capture and deflection of the lower part of the Hepste by a rejuvenated Mellte. The rejuvenated Mellte had a base level advantage and thus captured the lower Hepste, deflecting it along its present course.

Synthesis

The area surveyed has many interesting features. In particular it exhibits an intermittently dry valley, active sinks and resurgences.

The post glacial geological history is particularly interesting since it probably relates to active downcutting of the lower part of the Hepste, and the resulting exposure of the topmost section of the Penwyllt Limestone. The unroofing of the Penwyllt Limestone at the main resurgence has resulted in the local resetting of the base line to which the river upstream has to adjust, and has resulted in the lowering of the water table and the total underground capture of the Hepste under normal to low water level conditions. That the capture is recent is shown by the small passages discovered by cave divers, and the ease with which the cave passages fill following moderate rain, thereby forcing a surface flow over the normally dry river bed.

Two separate speleological regimes may be recognised. The most impressive and best developed is that related to the main resurgence where there is active cave development at the contact between Basal Grit and limestone. This contact surface almost exactly coincides with the water table. It is at the water table that most of the active cave development is likely to take place, since it is a zone where the chemical erosion is at its most active (Ball and Jones, 1993). However even here the indications are that the system is immature, the passages are small and there is no indication of the large water table passages that are so characteristic of the other caves in the area, for example in the Nedd Fechan and Mellte river systems.

The other potentially favourable zone is that part underlain by the lower part of the Penderyn O lite and the upper Dowlais Limestone. No extensive cave systems have been found and the general indications are that major discoveries are unlikely. This conclusion depends upon considerations of the longitudinal profile of the river in relation to the geometry of the rock formations. In the Nedd Fechan and Mellte valleys the gradient of the river is steeper than the dip of the rocks so that any favourable group of beds in the limestone is ex-

posed, top and bottom, and water is allowed to flow freely through any karst aquifer thus developed. In contrast, in the Hepste area the dip (or that component aligned along the valley) is steeper than the river gradient, thus the lower parts of karst aquifers are not exposed. This certainly applies where the river is on limestone. Steeper gradients, in the rejuvenated section of the river, have resulted in the tapping of the water table, exposure of the gritstone and limestone contact and the development of caves. However this occurrence is geologically recent and the caves developed at the contact are small.

What cave passages exist are easily flooded, extensive digging in that section of the river bed underlain by limestone open up passages that reach water at a shallow depth. There seems insufficient relief to support large fossil cave systems that might possibly have developed in response to earlier higher water table levels.

The more recent geological history is dominated by the glaciation. The likely pre-glacial profiles of the valley upstream from the nick point suggest that the relief was low and that the upper part of the valley was broad with gentle slopes on either side. Certainly the present and likely pre-glacial topography was much more subdued than that in the Mellte, Nedd and Tawe Valleys. Glacial infill has further smoothed out many of the irregularities. During post glacial times the river cut down through the till and produced, mostly rather narrow, alluvial flats along the river. The alluvium is mostly found over limestone and shales. Exposures of bedrock in the river bed indicate that the river has simply re-occupied its pre-glacial level. In the gritstone area much steeper banks are exhibited and these mostly are found in the rejuvenated section downstream from SN 9420 9515. No evidence for glacial drift infill is apparent in the rejuvenated section of the river so that it might safely be assumed that much of the downcutting post-dates the latest major glaciation that came to an end about 15,000 years ago, although it is likely that the course of the river was in place before this.

Conclusions

The cave systems are small and immature and the potential for finding caves, which are in any way comparable to those in the Mellte and Nedd Fechan, are low.

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The Cave Fauna of Lesser Garth Cave

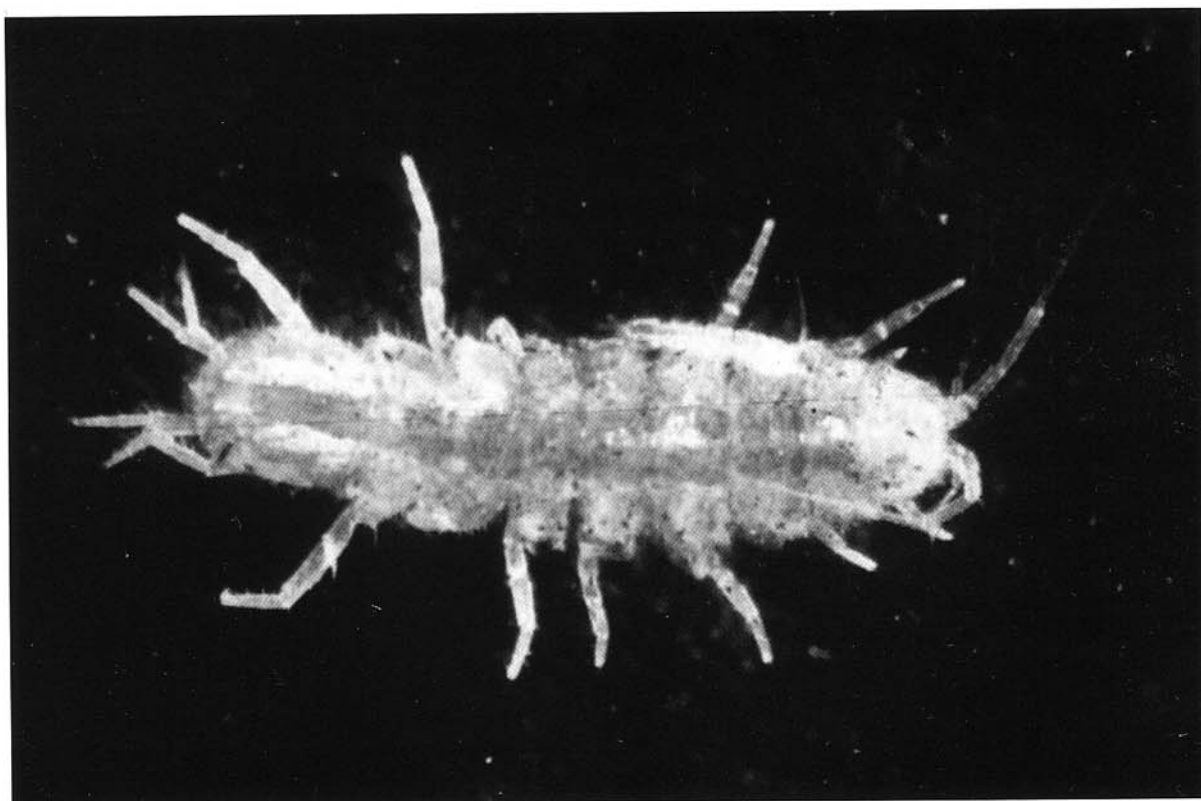
By Jules Carter

Lesser Garth Cave is a short cave located on the outskirts of Cardiff (at ST125821). The cave has long been known, and indeed the entrance area has in the past yielded some bits and pieces of archaeological interest. It has also been considered the resting place of King Arthur! The cave itself is formed in the Black Rock Limestone, which is mainly dolomitised. The cave appears to have formed along a bedding plane with vadose downcutting (Davies, 1983), followed by a collapse once the passage had been abandoned by the stream. Lesser Garth Cave is part of a complex of small caves in this area which includes Ogof Ffynnon Taf (which can now only be accessed via Lesser Garth Cave) and Ogof Pen y Craig. In all the complex consists of about 400m of accessible passage. Of the three caves only Lesser Garth Cave has any significant biological records, although Ogof Ffynnon Taf has a number

of cat skeletons, one of which has become calcified.

Despite its short length and apparent isolation from any significant, larger cave system, Lesser Garth Cave has an interesting variety of cave associated life, and is biologically diverse for a British cave site. Caves form an unique environment that has many specific problems for the animals living within it. Such animals can represent relic species which moved underground to escape past events such as glaciation, or have moved into the cave environment to escape competition and predation. The cave can be divided into a number of biological zones (Jefferson, 1983). Simplified these can be considered as;

- < Threshold — the area around the cave entrance.



Proasellus cavaticus

Table 1: Lesser Garth Cave Fauna List

Animal Group / Order	Family	Species	Ecological category	Conservation status	Cave zone
Woodlice					
Isopoda	Trichoniscinae	<i>Androniscus dentiger</i>	Troglophile	Common.	Th / DZ
	Trichoniscinae	<i>Trichoniscus pusillus</i>	Trogloxene	Common	Th
	Oniscidae	<i>Oniscus asellus</i>	Trogloxene	Common	Th
	Asellidae	<i>Proasellus cavaticus</i>	Troglobite	Local	DZ
Millipedes					
Glomerida	Glomeridae	<i>Glomeris marginata</i>	Trogloxene	Common	Th
Julida	Julidae	<i>Ophiulus pilosus</i>	Trogloxene	Common	Th
Polydesmida	Polydesmidae	<i>Polydesmus angustus</i>	Trogloxene	Common	Th
Harvestmen					
Opiliones	Sabaconidae	<i>Sabacon viscayanum ramblaianum</i>	Trogloxene	Notable B	Th
Spiders					
Araneae	Nesticidae	<i>Nesticus cellulanus</i>	Troglophile	Local	Th / DZ
	Tetragnathidae	<i>Meta menardi</i>		Local	Th
	Tetragnathidae	<i>Meta merianae</i>		Local	Th
	Linyphiidae	<i>Porrhomma rosenhaueri</i>	Troglobite	Vulnerable (RBD2)*	DZ
Beetles					
Coleoptera	Leiodidae	<i>Choleva spadicea</i>	Trogloxene	Common	Th
Flies					
Diptera	Limoniidae	<i>Limonia nubeculosa</i>	Trogloxene	Common	Th
	Dixiidae	<i>Dixella martinii</i>	Trogloxene	Local	Th
	Sphaeroceridae	<i>Crumomyia nitida</i>	Trogloxene	Common	Th
	Sphaeroceridae	<i>Gigalimosina flaviceps</i>	Trogloxene	Notable	Th
	Heleomyzidae	<i>Leria serrata</i>	Trogloxene ?	Common	Th / DZ
	Mycetophilidae	<i>Speolepta leptogaster</i>	Troglophile	Common	Th / DZ
	Mycetophilidae	<i>Bolitophila cinerea</i>	Trogloxene	Common	Th / DZ
	Tipulidae	<i>Limonia nubeculosa</i>	Trogloxene	Common	Th
	Culicidae	<i>Culex pipiens</i>	Trogloxene	Common	Th
Moths					
Lenidoptera	Geometridae	<i>Triphosa dubitata</i>	Trogloxene	Common	Th
	Noctuidae	<i>Scoliopteryx libatrix</i>	Trogloxene	Common	Th
Sprintails					
Collembola	Entomobryidae	<i>Not determined</i>	?	?	DZ
	Onychiuridae	<i>Not determined</i>	?	?	DZ
Other					
Diplura	Campodeidae	<i>Campodea sp</i>	Troglobite ?	Local ?	DZ

Key and Notes:

Cave Zone - Th: Threshold; DZ: Dark Zone.

Conservation Status — Species termed common are found throughout the UK; local are usually widespread species but limited to specific habitat; notable tend to be rarer species whilst vulnerable are rare species perceived to be at particular risk. This risk is further broken into what are called RBD or Red Data Book categories as defined by the IUCN (international Union for the Conservation of Nature).

- < Deep threshold — the furthest limits of the cave which light can penetrate.
- < Dark zone — the region of permanent darkness.

The animals themselves can be grouped into several different ecological categories based on the use they make of the cave;

- < Troglonexes — species that are found in caves but do not complete their lifecycle there. Can be accidental (unintentional visitors to the cave) or habitual (part of their lifecycle e.g. bats) troglonexes.
- < Troglophiles — species that live successfully underground, but also occur in suitable habitats elsewhere.
- < Troglobites — species found only in underground habitats.

The threshold and deep threshold zones of Lesser Garth Cave has the greatest diversity of cave animals, with a good mix of troglonexes and

troglophiles. In all over 20 species of invertebrates have been recorded in these zones in the cave. A visit to the cave will quickly reveal the most common animals, such as the large colourful cave spider, *Meta menardi*, and the Herald moth, *Scoliopteryx libatrix*. However some notable species have also been found. The interesting harvestman *Sabacon viscayanum* has been recorded in the threshold zone. *Sabacon* is nationally quite rare in the UK, but appears to be doing well in the South Wales area. Also recoded is the small sphaerocerid fly *Gigalimosina flaviceps*, which is a shade loving species previously unrecorded in Wales.

The cave s Darkzone is where we find the true troglobites, although a few troglonexes and troglophiles can also be found. Lesser Garth is the home to a number of true troglobitic species, the most notable of which is the tiny, blind spider *Porrhomma rosenhaueri*. This is a very rare

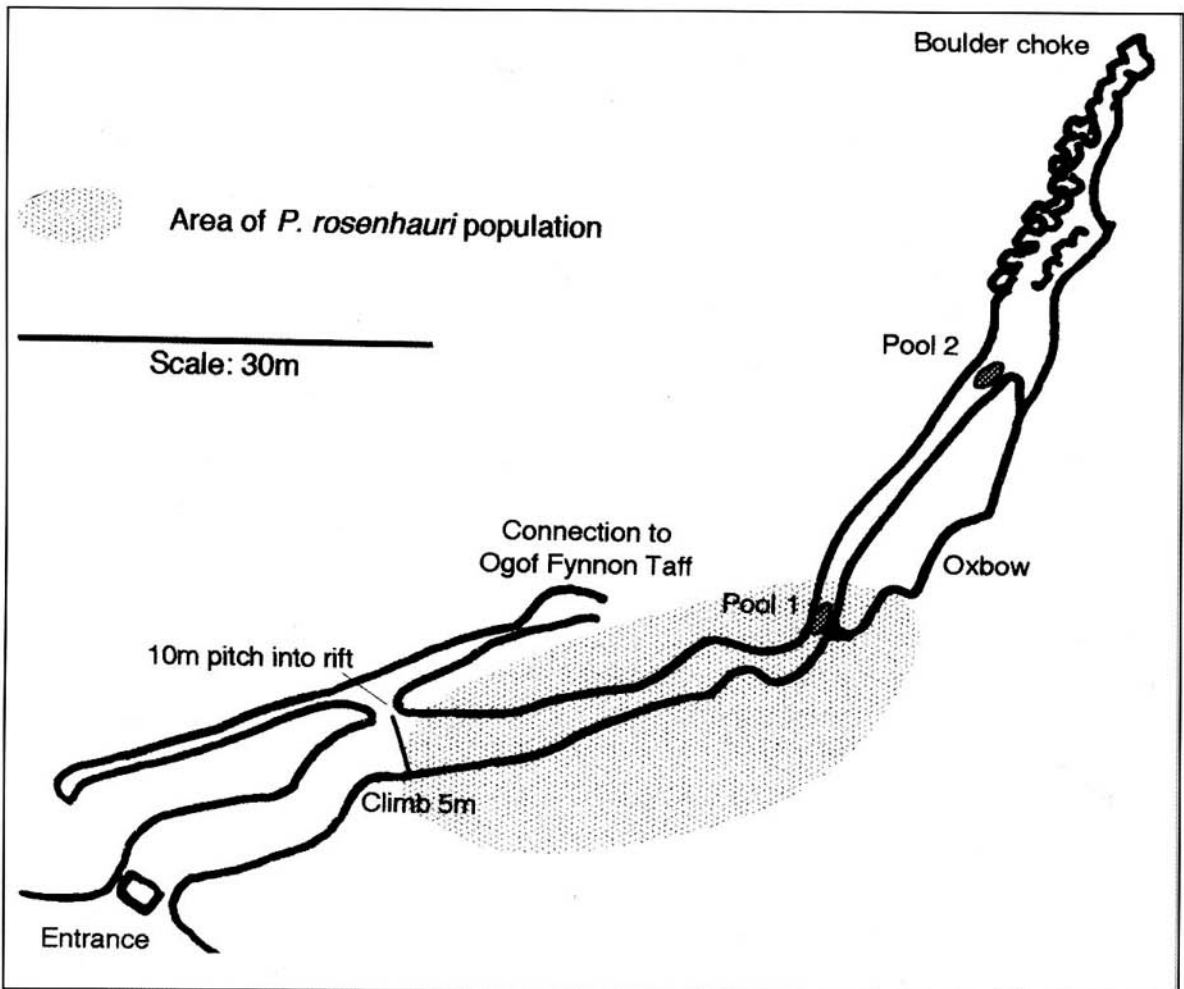


Figure 1: The main area of the *P. rosenhaueri* population in Lesser Garth Cave.

species in the UK. The only other site it is known to occur is at Ogof y Ci near Merthyr. This spider is unique to the British fauna and is considered to be the only paleotroglobitic spider. Whilst many aspects of our cave fauna are under-recorded, sufficient work has occurred to suggest that *P. rosenhaueri* is genuinely rare (Fowles, 1994). Recent survey work in the cave suggests that the population is well established and viable and figure 1 shows where the bulk of the population appears to be found in the cave. This small spider is very difficult to spot. It is a pale calcite colour and is often found living in pockets and cracks in the flowstone that covers much of the walls of the cave.

Also present in the darkzone is another key group of animals, the collembola or springtails. These tiny insects are usually noticed on the surface of pools of water. Collembola from two superfamilies have been noted in Lesser Garth — the Entomobryidae and the Onychiuridae. The collembola are undoubtedly a key part of the cave fauna. They probably feed on bacteria and micro-fungi, and are then subsequently preyed upon by predators such as *P. rosenhaueri*. Further study is needed on these tiny but fascinating insects. This should prove easier in the future as a new and fully revised key to the group is currently being tested.

Another key troglobitic species found in Lesser Garth is the isopod, *Proasellus cavaticus*. This species is known from throughout the limestone caves of the central outcrop of South Wales. Its presence in Lesser Garth can be considered unusual since it is more usually associated with active stream caves. Future DNA based studies

on the Lesser Garth *P. cavaticus* population may well prove of interest. Such studies will allow us to assess how this isolated population relates to other populations of the species. Table 1 lists the known fauna of the cave.

Despite its short length and isolation from other known cave systems, Lesser Garth cave contains a rich fauna for a British cave. It is important that the site is properly protected. Fortunately the cave is now part of a local SSSI. It has been further protected from the active quarry next to it by recent agreements with the quarry company. So if you are visiting this small but worthwhile cave, take a little time to look around and remember to tread carefully

ADDITIONAL READING AND REFERENCES

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Exploration of the Cefn Cil-Sanws Mountain

by *Tony Donovan*

Just to the north of Merthyr Tydfil lies the mountain of Cefn Cil-Sanws with fine views across the Brecon Beacons.

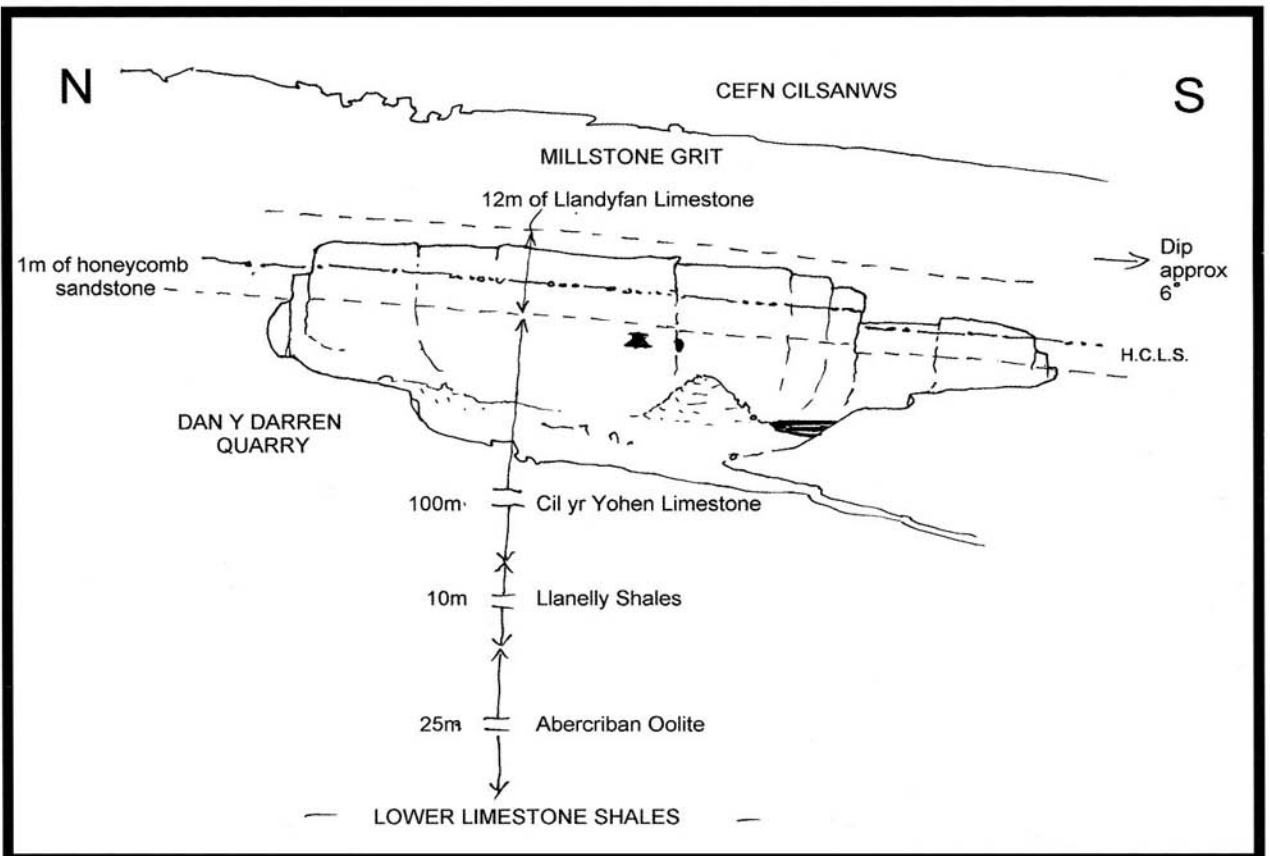
The mountain is 461 meters above sea level and the geology of this mountain is comprised mainly of limestone to the north of the trig point which dips under millstone grit to the south. There are very few known caves associated with this mountain although it is pock marked with shake holes.

This is the story of the exploration of the Cefn Cil-Sanws Mountain.

Ogof Cil Sanws

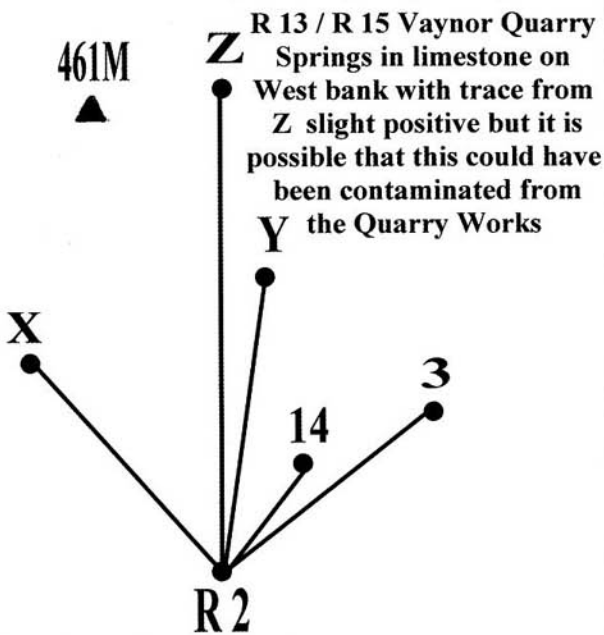
On the west side of the mountain is a fine limestone escarpment where several quarrying operations have taken place in the past. In the 1960s the now disused Dan y Daren quarry exposed the first significant cave associated with this mountain which was first explored by the British Nylon Spinners Spelaeological Society. From the entrance an inlet was soon encountered which ended in a boulder choke, back at the junction the main way on led to the south to a silted up stream bed, making the cave then 200 meters long.

Several years later the quarry face had cut back into the hill and divided the inlet passage and the southerly trending passage into 2 separate cave



Geology of Cefn Cil-Sanws Mountain

HYDROLOGY OF CEFN CIL SANWS Done over a 6 month period by Roy Morgan



X Grit shake hole wet weather sink
Y Grit shake hole wet weather sink
Z Shake hole in Limestone wet weather sink
3 and 14 A burst water main in Trefechan housing estate was
 dye traced as the water sank in the nearby Llandyfan limestone
R1 Cefn Coed Rising proved negative on all occasions
R2 / R12 a series of 4 permanent and 6 intermitant springs
 in the upper Dowlais Limestone strong positive Trace from all
 the above sinks all with unual through times of 5 1/2 hours

Cil Sanws No 2 which was also dug by a number of caving clubs for some distance and still continues as a low flat out dig

Since the discovery of this cave no other significant caves had been found in the area although there had been lots of small caves discovered and digs pursued by various clubs.

It was not until Roy Morgan of the Brynmawr Caving Club carried out a detailed study of the hydrology of the Cefn Cil Sanws mountain that any further light was shed on this promising area. The study clearly showed most of the water which sinks into the many shake holes on this mountain resurges from several resurgences on the north bank of the Taff Fechan River.

Roy began systematically digging these resurgences using the fire setting technique, which worked effectively enough not to need to use explosives, as the noise in this gorge would have drawn unnecessary attention from passers-by.

Roy entered several of these resurgences for several meters but the rift-type entrances got smaller as he headed into the river bank and only the 2 westerly resurgences looked promising.

After several years of digging Roy entered a significant chamber at R2 after 20 meters but disappointingly this was totally blocked from a surface collapse.

The Discovery of Ogof Sanws

Roy and friends then turned their attention to a Rift 25 meters east of the above dig at NGR SO 0220/1028. They added a second entrance to allow spoil to be removed more easily and eventually reached a point just over 12 meters from the entrance before work stopped due to commitments elsewhere. The find was named Ogof Sanws.

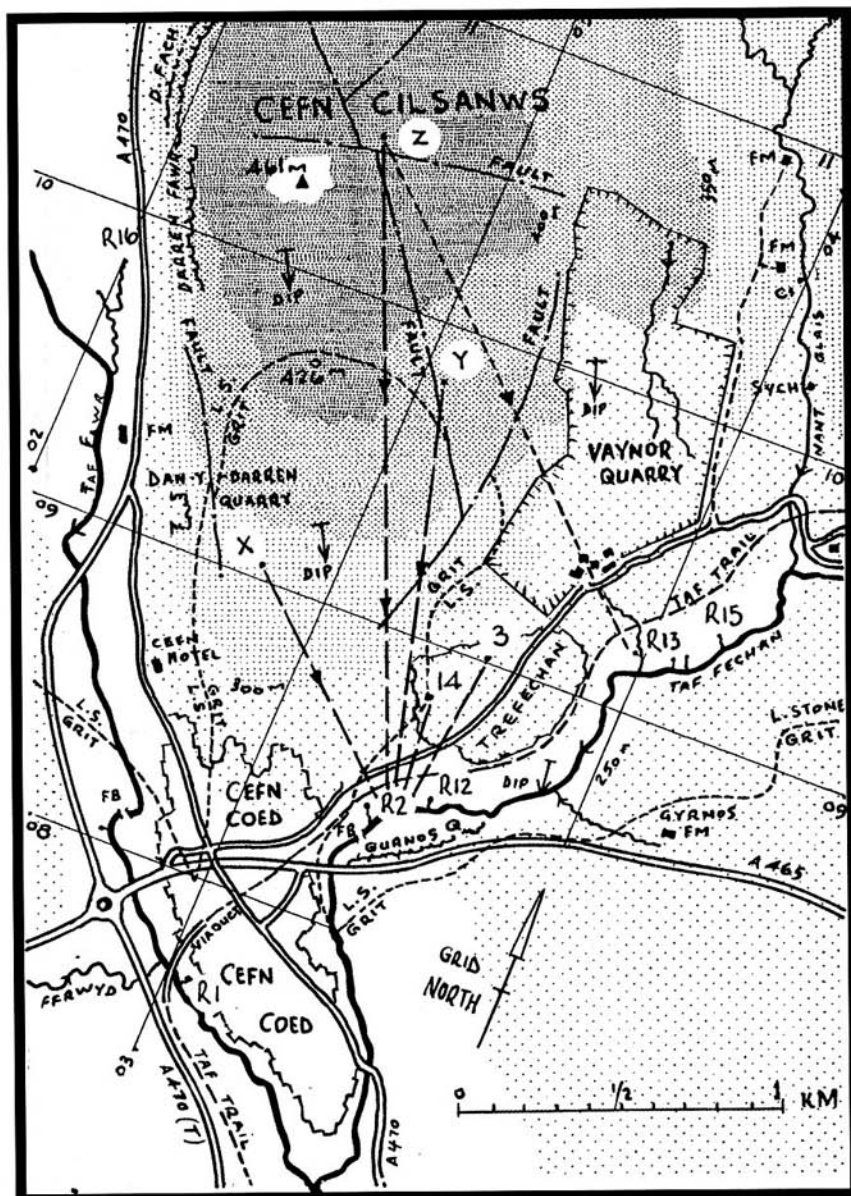
On the 30th October 1999 Roy asked me to have a look at Ogof Sanws. It was hammering down with rain and soon after leaving my house a

entrances, these were named Ogof Cil Sanws No 1 and No2.

The boulder Choke at the end of No 1 (formerly the Inlet passage) was dug and finally passed for another 90 meters in the 1980s and led to a T-junction. Off to the left at this T-junction led to a drafting upward trending choke (this upward trending choke was to be an important link with another find discussed later). To the right at the T-junction led to a silted up stream bed which shows signs of flooding and where the Brynmawr Caving Club have applied much effort over the years. In Dec 1991 SWCC members Malcolm Herbert, Helen Langford and Steve West produced a grade 5 survey of the cave, which now showed Ogof Cil Sanws No 1 to be 90 meters long.

Several years later the Gloucester Caving Club lit a fire at the entrance and the smoke appeared out of a shake hole high up on the hill several hundred meters back from the quarry face. They also dug out the floor of the silted streambed in

Hydrology of Cerf Cil-Sanws Mountain



pointing upwards to the sky and the vehicle looked as though it had been through the Daren Cilau entrance series several times. I shouted up and I heard a blood curdling groan then a blood stained face appeared at the drivers window, his head was squashed against the windscreen due to the airbag and the driver looked as though he had been buggered by a herd of wilderbeasts. Looking around I began to think I was in some sort of a dream as there were 8 salmon on the road. No wonder he aquaplaned I thought. It turns out he had been fishing and the fish had been throw clear when the vehicle was being thrown around. An ambulance arrived and the driver was taken to hospital and after pulling out the wing of Roy s car we continued our journey.

To cut a long story short 50 trips later Roy Morgan, Bernie Woodley and I had blasted our way along a 3" high bedding plane for 30 meters and on the 27th June 2000 while I was out of the country Roy cleared and hammered the last section and entered a large chamber. Off

Suzuki 4x4 came hurtling past, it aquaplaned across our path hitting the front of Roy s car then hit the crash barrier before it somersaulted lengthways 3 times at the same speed as Roy s car was travelling. Looking at this vehicle bouncing only a meter away from me it all looked as though it was all happening in slow motion. I was undoing my seat belt to make a dive for the back seat behind Roy as I was expecting the vehicle to fall in my direction off the crash barrier and in the position I was I would have been killed with the full weight of the 4x4 falling directly on top of me so at least I stood a better chance in the back seat, but it bounced over the crash barrier and ended up stuck up a tree which was a good start to the day.

Getting out of Roy s car I ran back to see how the driver was. The front end of the 4x4 was

to the left led to a boulder choke while to the right there was a way on low down and above this another chamber could be seen but the boulders were too large to move. While digging the lower route Roy dropped a large rock on his hand and broke 2 fingers but continued digging with his hand swollen and bleeding and managed to pass the choke, only to find the route ended in a sump within 4 meters which was too small to dive. We named the chamber Broken Fingers Chamber.

The 3 amigos returned on the 22 July and Roy had the piss taken out of him with jokes like I hope you re going to give us a hand today and I hope you re going to pull your finger out today . This piss taking continued all day as we drilled and popped the large perched boulders where the chamber could be seen above and we

entered Squirrel chamber (so named as there was a dead Squirrel outside the entrance to the cave). Disappointingly this aven chamber was trending back to the surface but a way on could be seen at the top of the boulder pile before Squirrel chamber is entered. This could be seen to continue so was dug following the draft and after 3 meters a tall rift was found where another chamber could be seen below us. So we drilled and popped the floor over several trips and entered Sump Chamber which was the source of water from the mountain above. We then set about clearing the entrance to the sump but found the sump full of compacted gravel.

At the foot of the climb down to Sump Chamber a strong draft was felt emanating from the tall

rift above so our next task was to drill and blast up this rift, after several trips on the 25th May 2001 we eventually reached a small T-junction. We dug to the left first which lead to a total infill then off the right where we finally reached the source of the draft. There was a tiny chamber with tree roots hanging through the shattered rock which was close to the surface this was causing the draft which we had so faithfully followed for nearly a year and a half. A cruel blow indeed. The total length of Ogof Sanws is 60 meters long.

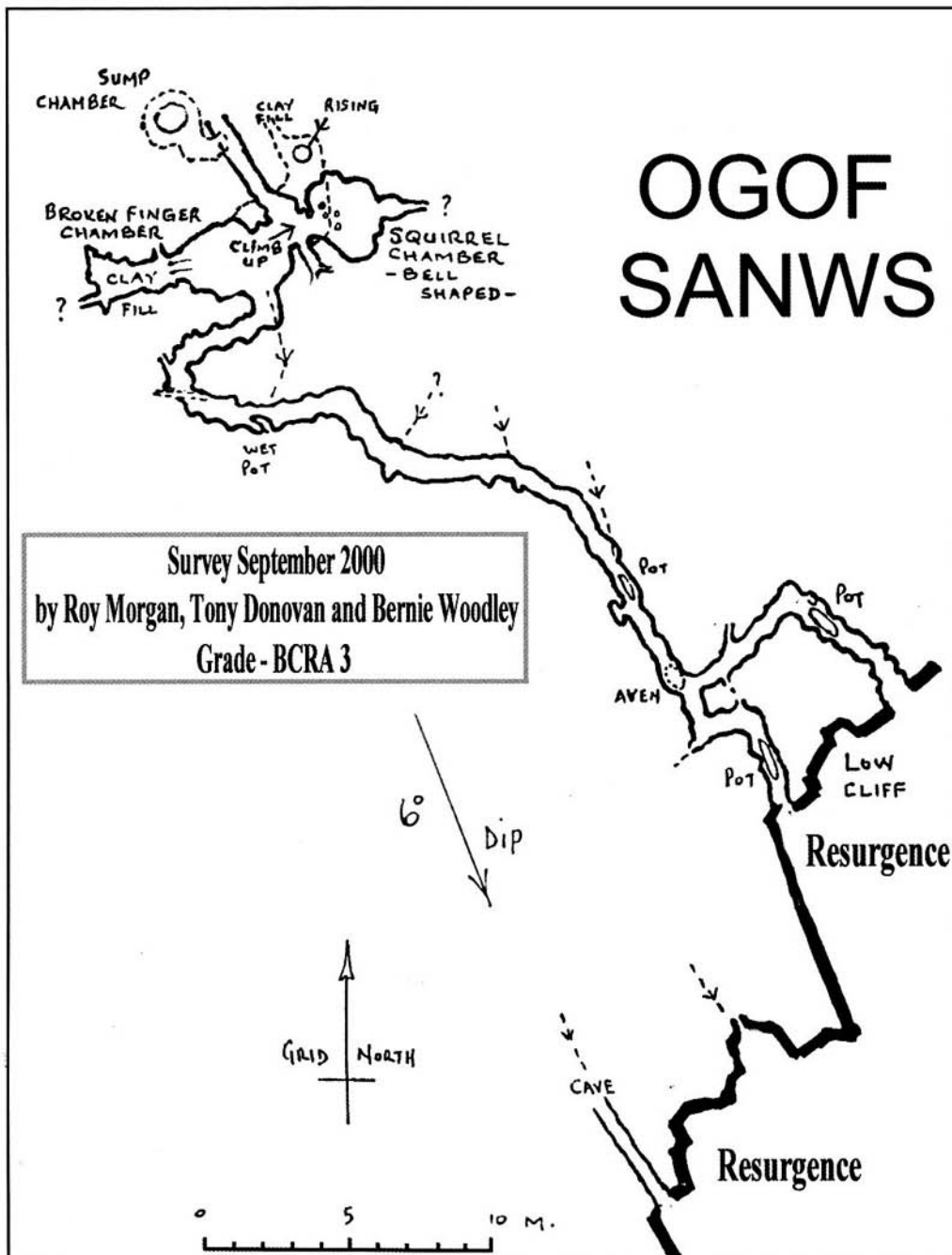
Ogof Tee

But luck was on our side as a chance encounter with Toby Stuart (GSS member) and Adrian

Paniwynk (CCC member) whilst Roy and I had been on a digging in Eglwys Faen was to reveal a significant find.

The two had been digging the shakehole where the smoke had appeared from the smoke test done at Ogof Cil Sanws No 1 by Toby's club several years previously. The pair had found a small grit chamber with a serious boulder choke leading on downwards.

Nig Rogers a SWCC Member then got wind of this find and managed to send a young lad on down through the boulder choke like some victorian chimney sweep boy who popped out at the bottom of the choke into a large



chamber with a walking passage leading off which he followed for several hundred meters where he reported that the way on was blocked.

On the 28th September 2000 Adrian, Toby, Chris Crawley, Roy and I went to the entrance of the new cave which they named Ogof Tee (at NGR SO 0261/0915) as the shake hole is on the edge of the Cil Sanws Golf Course. Unfortunately only Toby, Adrian and Roy were thin enough to worm their way through the choke of hanging death. Toby and Adrian almost doubled the length of the cave and had started a survey which eventually showed that the cave was over 400 meters long.

Over the following week Roy and I made the entrance slightly safer and enlarged some of the tighter sections of the choke and we also completed some shuttering but this is without doubt one of the most dangerous cave entrances in South Wales. It was not until the 7th October the following weekend that choke was enlarged sufficiently enough for me to pass and reach the very large entrance chamber which is one of the largest grit chambers in South Wales. The passage leading from this chamber was followed to some impressive passages with some nice formations.

Half way along the cave a small inlet appears which runs down into a small tight streamway which is too tight to follow. We poured the dye into this stream having placed check bags in all the known resurgences in the area but as expected the dye appeared in all the Taff Fechan springs. The bags were only checked 4 days later so it is not known how fast it took for the dye to come through, although the dye traces done on the other sinks on Cil Sanws mountain took just 5 1/2 hours to go from sink to resurgence which proves there is a large open conduit between here and Ogof Sanws in the Taff Fechan Valley (which I have mentioned above).

On the 14th October Toby, Adrian, Roy and I found another extension in Ogof Tee heading north off the large Grit Chamber, which was pushed for 30 meters to a dig. We then went to the end of the cave which was heading south where a good draft was felt coming from the floor. A charge was set and fired and we waited for the fumes to clear. Toby was able to squeeze through into a mass of hanging death so we started digging further back where it was safe

enough to work. We soon began opening up spaces below.

On the 22nd October Bernie Woodley, Roy and I carried up a simple gate to cover the entrance to stop the sheep and golfers from falling down the 19th hole. Bernie Woodley and I then completed taping the whole of the cave to protect the formations, some work was done to enlarge the end of the cave and a charge was laid and fired.

On the 12th November Martin Groves, Roy Morgan and I returned to Ogof Tee we excavated the floor at the end of the cave until a space appeared down which we could throw stones. Martin squeezed down onto the top of 2 huge hanging boulders, squeezing between these he dropped into a 12ft high chamber onto the top of another large boulder with a blue poly propylene rope hanging down to the floor below. Martin then climbed down to the bottom and found several digging tools and drag trays, it was clear that we had connected Ogof Tee and Ogof Cil Sanws No 1.

The only other significant find in Ogof Tee was on the 20th October 2001, which was close to where we carried out the dye trace. A bedding plane was dug out and extended for 10 meters to a tight section with a calcite floor where brute force bloody mindedness and a great big lump hammered proved the order of the day we spent several hours hammering out the calcite floor in turns until we entered a 3 meter x 3 meter chamber with no possible way on which we named Bin Lardins Doom.

The entrance choke and breakthrough point between the 2 caves deserves respect as both areas are extremely dangerous. Also the entrance of Ogof Cil Sanws No1 is flooded for long periods of time and only dries up after several weeks of good weather. There is an emergency food dump left in a rocket tube in the large grit chamber for emergencies only, in case the entrance choke collapses and the entrance to Cil Sanws No 1 is flooded at the time.

Riwaka 2003 expedition

by Martin Groves

Arm outstretched driving home another bolt as I braced myself precariously within the sanctuary of the narrow dry channel running along the flank of the waterfall. Less than a foot to my right the might of the underground river thunders down the narrow shoot. Instinct forces my right leg outwards to maintain balance, the power of the water unceremoniously flicks the leg back and the awrquard stance is resumed. At long last after an eighteen month build up I am finally at the end of the Riwaka Resurgence. What a place, the further one gets into the cave the wilder it gets.

The entrance series consists of two short sumps or a ten minute grovel, both bring you out into a huge chamber. A kilometre or so of boulder hopping follows before the river is met again. Several hundred metres of wading through crystal clear water ends at sump 3A from which the river spews. A couple of hundred meters of flood overflow passage, passing several lakes, lead to a beach of coarse sand and the spectacular sump

3B. It is here that the cave really comes to life. Weightlessly gliding in the middle of the huge tunnel passing errie rock projections following the thin dive line which leading off into the azure blue horizon is a truly inspirational experience. After 160m at a depth of 25m a boulder-strewn ramp leads steeply up to air. Upon surfacing the silence is abruptly broken by the roar of the river tumbling into the sump pool. Carefully stowing away the diving equipment it is time to get back into caving mode. Following the water upstream up several sporting cascades to the base of a ominously looking wall of black marble towering off beyond the range of our feeble lamps. Appropriately named Momentary Lapse of Reason, following an epic free-climb by the Kiwis in 92, the aven hits a large horizontal passage after 50m. Following a short section of horizontal passage a 25m hand-line down a horrendously loose rubble slope leads back to water level. The river pounds in a thunderous rage down a 10m waterfall, fortunately a route around the torrent exists. From the top of the waterfall the river channel narrows and the strength of the flow



Riwaka resurgence

becomes intimidating. Laying back with feet fumbling beneath the maelstrom of white-water frantically searching for the hidden footholds a 3m high waterfall leads to a steep slippery slab of marble at the foot of the terminal waterfall that stopped the Kiwis in 94. Just to get here is no mean feat besides the 40kg or so of diving kit each required for sump 3B all climbs including the 50m aven had to be redone.

Having placed half a dozen bolts on this climb and over come a particularly tricky rock pinnacle that acted like a skewer I was knackered and cold, it was time to back off and let Mike take the lead. In no time at all I was back on the deck describing the current situation. Tucked away within a milled alcove, protected from the unrelenting cold spray emanating from the waterfall, it is certainly the first time that I have ever been warmer belaying than climbing. A good solid hex placement and a couple more bolts saw Mike top out. Prusking up the rope, passing exceptionally tight deviations to keep the rope away from the water I was soon greeted by smirking Mike whom excitedly exclaimed, I think we ve found the mother of all sump pools!



Flowstone in Riwaka resergence

He was right, before our very eyes lay an enchanting sump pool, some 20m long by 5m wide. The clear turquoise coloured water certainly gave the impression of a deep sump, although we were aware that this could be deceptive. There was nothing else to do except head out of the cave and contemplate the next trip. Framed by the dark elongated entrance the first rays of early morning sunlight illuminating the familiar entrance pool provided a most welcome view upon surfacing after some twenty hours underground.

The discovery of another sump was unexpected, it was further waterfalls that we anticipated. How to tackle this obstacle was the subject of much discussion over the next couple of days. The portering time beyond 3B was the critical issue. A trip time way in excess of 24 hours was anticipated. The decision was made to establish a camp beyond 3B, this gave us far more flexibility in how to structure the push, the down side lots of floaty objects must be dived through 3B. Neville Lucas (CPC) greatly assisted in the portering of camping gear to 3B. A total of three trips through 3B were required to transport all of the camping gear and extra cylinders. My sleeping bag was stuffed down the front of my drysuit making me look like a black teletubbie. Due to their excessive buoyancy we each ended up with a mere quarter of a carry mat to sleep on. Cold Mammias Caf (named in honour of Hot Mammias Caf , Motueka the usual R and R spot) was soon established and a surprisingly good nights sleep was had. Twenty-four hours later with two dishevelled cavers huddled around a stove totally downbeat. The day had been a complete flop, some ten hours of portering and we had got nowhere near the sump. A decision had to be made, with limited time left either we had to de-rig the cave or come back for one last crack. Having put so much effort in we both agreed that we could not end the expedition on this note. We exited the cave the following afternoon.

What should we do differently next time? On the first attempt we had given the cave far too much respect. A disproportionate amount of time had been spent trying haul kit up pitches and setting up tension lines to transport kit across lakes. Generally one person worked whilst the other froze, despite good teamwork momentum was lacking.

A single rest-day was all that time allowed for and most of that was spent delaying our flights to give a bit of a buffer should anything go wrong. Waking up early the following day and things could not have looked worse, it was raining and the sky looked ominously grey. Much of the system is flood prone with a very fast run off time, the prospect of been stranded the far side of 3B should the system flood was not one to be relished. With a reasonably good forecast for the next couple of days and a gradual improvement in the weather during the next couple of hours it was time to go for

it. Thirteen hours later as the clock struck midnight and two excited divers were ready to explore sump 5B. What had we done differently this time? Basically we had decided to do what we do best and chimp it, there are certain times and situations where brute force and ignorance pay dividends. Working almost independently we each hauled kit past one obstacle whilst the other person concentrated on the next one. Few words were spoken all day but we progressed steadily nearer our objective. Having made such good progress and with our concerns over the weather it was decided to hit the end that same day. Provided we were committed to pulling all of the dive kit back beyond the flood zone that night then we would have minimised our exposure to flooding.

An initial probe of the sump pool suggested that route finding may well be tricky and the decision was made to dive together. I laid the line whilst Mike spotted the route on. After one false start, 60m of line saw us surface in a large lake chamber. The obvious way on was blind but a narrow channel ending in a spectacular circular milled pot seemed far more promising. Gradually dumping the air out of my wing I slow sank down captivated by the beauty of my surroundings. At a depth of 8m the pot broke out into a large underwater chamber, a contorted rock pinnacle standing up right some 15m away signalled the way on. That vision will remain with me for the rest of my life. The sump was soon passed to reach a small air-bell. Onwards we continued

Surfacing after a dive



through three more fine sumps, turning around after just passing thirds, with the way on wide open at the start of sump 10B. It was two cold yet ecstatic divers who surfaced back at dive-base at around two o'clock in the morning having laid two hundred meters of line. It was half past five before aching bodies could be put to rest in soggy sleeping bags. Despite being totally shattered I could not sleep, thoughts of our discoveries just bounced around my mind. Due to the multitude of skills required to get there the new extension was christened The Realm of the Aqua-monkeys. A monkey with gills would be the ideal creature to explore this part of the world.

It was a real effort to get back to the grindstone later that day. After numerous brew it could be delayed no longer. The motivating one self to trade thermals for a cold wetsuits was difficult. The rest of the gear was pulled back, the ropes de-rigged and the camp packed away. We exited the cave just after nightfall.

A day in the sun revealing in our success proved all too short when a total of twenty hours was spent over the following two days retrieving all of our kit. An estimated 200kg of gear was pulled out of the cave. Many thanks must be passed onto Nick Smith, Danny Smith, Steve Holyoak and especially Neville Lucas for their sterling assistance in this task.

Life in my village - Growing up in Penwylt

By D. W. L. Morris

PENWYLLT: - The english translation is roughly Wild Head . The village lies in a saucer shaped depression 900 ft high in the southwestern corner of the Brecon National Park, also known as The Black Mountains. Today little remains of the village but the row of cottages used by SWCC as its headquarters, 1-10 Powell St. However the village used to be a vibrant community, and was at its largest in 1937/38. Most of the homes were occupied up until the end of the 1939/45 war when the village life blood began to drain away. In the words of a resident of the village at that time, here is a description of times past.

Below is a description of the layout of Penwylt village and a summary of the inhabitants when all the homes were full during 1937/38.

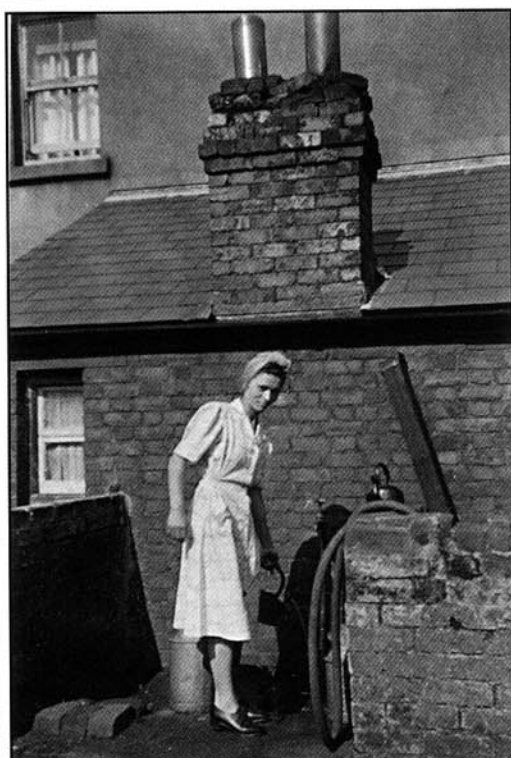
The village is divided by the railway running northwards from Neath (Riverside Station) to Brecon. On the east of the railway there were 4 streets of houses. Powell Street running north to south consisted of 9 houses and the Mission Hall. Kershaw Terrace which ran parallel with Powell Street but not in line, approximately 15 yards west consist of 4 Houses. Brick Row was 3 Bungalows running southwards in line with Kershaw Terrace and separated with a path leading to Butlers Terrace and consisted of 4 bungalows built at right angles to Kershaw Terrace gardens. 50 yards northwards from Butlers Terrace was the village billiard hall (Where only adults were allowed to play?).

South of the eastern part of the village was the Brickworks the main source of employment for the village and also the reason for most of the village being built. The Brickworks was originally The Dinas Silica Brick Co and owned by a Mr. Kershaw who sold it to Kidwelly Brick Co. during the early 1920s when it was renamed The Penwylt Silica Brick Co. Ltd. ,

the Managing Director being Sir Alfred Stephens. In among the Brickworks was Dinas House last occupied in 1914/15 by Mr. David & Mrs Harriet Davies and family.

To the north of Powell street were limestone quarries and a working pair of lime kilns 200 yards east of the railway station. There are other old dilapidated lime kilns dotted about the countryside surrounding the village. e.g. 4 kilns known locally as Dicksons situated north and east of the station. The Limestone was quarried from Twyn Dysgilfa being an area of land surrounded by a stone wall and known as The Commons . Dicksons Lime Kilns had a private tramway serving them with coal. The tramway stretched for 6 miles south to Onllwyn Collieries. Evidence can be seen today of how the tramline was laid. The rails were secured to round flat sandstones with a hole in the centre. A tie bolt was passed through a hole in the rail flange into the hole in the stone. These stones can be seen outside the rear of Kershaw Terrace. South of Dicksons were the stables, grain store and blacksmith shop. These buildings were known as The Company Stables and were in use until approximately 1942 by Messrs J. W. Morris & Son Ltd. who worked the first mentioned lime kilns. On the south side of the Commons there was another kiln which disappeared when the mountain under it was quarried away. There were 4 other kilns on the west side of the railway line directly opposite No 3 Butlers Terrace and to the south/south east of Wern House and adjoining Penwylt Inn.

On the west side of the railway there are Penwylt Cottages, a street of 6 houses, which was also called Patti Cottages by the villagers only because they were once owned by Madame Adelina Patti, the international opera soprano, who lived in Craig-y-nos Mansion in the valley below Penwylt. On the rim of the saucer westward of Penwylt Cottages there were 2



*Clockwise from top:
Penwyllt children to the rear of Powell
Street; Drawing water at The Tap
Kershaw terrace; Girls going
fruitpicking, Girls near Cwm Dwr
Quarry.*

semi-detached bungalows called Tymawr. These commanded a magnificent view of Swansea Valley. West of the station and adjacent to the roadway that terminated at the entrance to the railway yard was Maesyrcrug a detached house that was the village Post Office and shop, in the grounds of the P.O. is a 2 bedroom bungalow originally built as tea rooms. 300 yards southwest of the P.O. and on the north side of the road was

The Bungalow that originally had 10 rooms, inclusive of the servants quarters, in its own plot the lawn being a large enough for a full size tennis court. It was known as The Bungalow locally but when it was built in 1914 by Mr. Kershaw it was called Dinas Bungalow the name being changed to Hillcrest in 1954 when purchased by the writer of these facts. Southwards across the road from The Bungalow was Penypant a detached house with a long front garden and the rear garden reaching nearly to the boundary of Penfoel Quarry. Five hundred yards west of the railway and opposite Butlers Terrace was Penwyllt Inn called for some unknown reason The Stump. Attached to the Inn was Wern House.

There are ruins of 2 other houses on the west side of the railway, Pantyil ynon being one which was situated approximately 500 yards northwest of Tymawr, the other was Penfoel House situated behind Penwyllt Inn but on the slope of the mountain facing Swansea Valley and overlooking the village of Pen-y-cae and Craig-y-nos.

From the Brickworks there, was a 3 mile long tramway to a silica sand quarry where the River Bwfra starts and where an entrance to a caving system begins terminating at Ogof Ffynon Ddu. For the first and half miles the heavy wooden trams were hauled up the mountainside by a wire cable operated from the haulage mechanism situated at a point called The Central. From here the trams were hauled by a steam locomotive. The gauge of the tramway was 2 feet. The Station consisted of 2 platforms the east one was The Down platforms and the other was The Up, the signal box was located on the north end of the Down platforms, on the Up platform were south to north the gentlemen's toilet, The booking hall and waiting room served by the same entrance door, attached was Madam Pattis private waiting room with its own toilet and wash

room, next and separated by a path was the water pump house, attached to the pump house was the goods storage shed then there was a 6ft. high wall to the end of the platform, behind the wall was the station coalhouse. In the centre of the Down platform was a wood and glass waiting room.

Above, is a description of my village, below is the account of the inhabitants of the village in and around 1939 before the outbreak of the war:

Powell Street:- The origin of the name is not known - possibly a person of that name built the street.

No 1 Mrs. Brown who was partially blind with her sons Herman, Oswald (nick named Happy Dick) daughters Nora and Anne.

No 2 Mrs. Cousins with her daughter May and her brother in law Sam.

No 3 Potters?

No 4 Mrs Doyle with children James, Tom, Ernie, Will (who was captured by the Japanese in Singapore and lost his life when the ship he was being transported in was sunk by the allies), Edith and Maggie.

No 5 Mr. & Mrs William Williams their children Julia, Wyndham, Verly and Elfyn. The Williams family moved to Penwyllt in the middle of the 1930s.

No 6 Mr. & Mrs. John Owen with Trevor. Their daughter Mary was married and lived in Butlers Terrace.

No 7 Mr. & Mrs. Tom Morgan and their daughter Dilys.

No 8 Mr. & Mrs. Boucher who had a large family only the following lived with them full time during the 30s:- Dolly, Bernard and their grandson Vernon. Prior to Mr. & Mrs. Boucher becoming residents David and Harriat Davies, my grandparents were in residence and it was here my mother was born on March 19th 1898, and also Uncle David John and Uncle Stanley were born. Early in the nineteenth century the Davies family moved to Dinas House in the Brickworks because my grandfather was the quarry foreman.

No 9 The Mission Hall. The rooms above were allocated to No. 10.

No 10 Mr & Mrs Charlie Jones retired stationmaster of Penwyllt station and also the last at Penwyllt. The duties were taken over by the

The Penwyllt children



stationmaster based at Coelbren. All their children were married, 2 daughters living in Penwyllt the others living away from Penwyllt.

Kershaw Terrace:-

No 1 Stanley and Ethel Davies with their children Ronald, Harriet (Hetty), Desmond, Eric who died aged 6 months,

David, Kenneth, Ruby and Phyllis. The family moved to Graigcefnparc just before the beginning of the war in 1939 where their fourth daughter Joyce was born. Mr Davies was the brother of Mrs Morris 4 Kershaw Terrace.

No 2 Harold and Blodwen Bengree with their daughter Hilda. Mrs Bengree was the daughter of Mr. & Mrs Jones 10 Powell Street. Mr Bengree the brother of Mr William Bengree of Wern House

No 3 Florence Burton (Widow) and daughter of Mr. & Mrs Jones of 10 Powell Street with her children Bert, William and Arthur. Her daughter Blodwen lived with Mrs Burtons sister May in Ivor, Buckinghamshire.

No 4 James William and Margaret Elizabeth Morris with their son David William Leonard and my father s brother Sylvester John Morris (Sim).

Brick Row:-

No. 1. Tom and Bella Francis with their children Rosy, Glen and Desmond. Mr Francis was the brother of Fred and Will Francis living in 3 Butlers Terrace. Mrs Francis was the daughter of Mr. & Mrs. Hardie who lived in The Bell the cottage on the corner where the road to Penwyllt turned off the A4070, the main Swansea to Brecon road.

No 2 William and Polly Ward who had no children.

No 3 Tom and Daisy Morgan with their children Denis and David. Mrs. Morgan was the daughter of Mr. & Mrs Boucher 8 Powell Street. Mr Morgan was the lay preacher for the Mission Hall.

Butlers Terrace:-

No 1 Tom and Lizzie Gwen Bannister with their sons Clifford and John Leonard, their daughter was born after they moved to 10 Powell Street. Mr Bannister was the son of Mrs Bannister who lived in Penypant.

No. 2. Morgan Morgan and Mary Morgan with their 3 sons John Rhys, Raymond, William and daughter Betty. Mrs. Morgan was the daughter of Mr. & Mrs Owen 6 Powell Street. Mr. Morgan was the son of Mrs. Morgan of Penwyllt Cottages.

No 3 Bachelors Fredrick and William Francis, brothers to Tom Francis of 1 Brick Row and brothers to Syd Francis who lived in 4 Kershaw Terrace with his family until January 1933 when they moved to Nantcaerefail.

No 4 Harold and Rachael Wagg who had no family. Mrs Wagg was a sister to Mrs Bengree of Wern House and the daughter of Mrs Evans of Penwyllt Inn.

Penwyllt Cottages:-

The 6 cottages are divided as follows:- Nos. 5 & 6 extends the full width of the street with a front and rear door. The other 4 cottages occupy the southern half in a square divided into 4 equal areas, two face west and two face east each with one entrance door.

No. 1 Unknown

No 2 Mrs. Morgan with son Ianto. Mrs Morgan was the mother of Morgan Morgan of 2 Butlers Terrace. Ianto was a foreman in Penwyllt Silica Brick Works.

No 3 Mrs. James and her son David who was a signalman employed by Great Western Railway (GWR) at Penwyllt Station who was later transferred to Coelbren Station.

No 4 David Rhys and Ciss Jones with Mrs Jones s Brother James Jones. Mrs. Jones maiden name was also Jones.

No 5 Mrs. Preace and her son Reginald

No 6 Garnet and Ctwen Bates with Son Roy and in the 1940s a daughter Ann. Also Mr. Joseph Bates, Garnet s father who had lost an eye, his hearing and had a plate inserted in his scalp after being involved in an explosive accident in a Quarry on Clee Hill, Shropshire.

Tymawr:-

No 1. John and Peggy Lewis with their 3 sons Norman, Phillip and Haydn. Mr. Lewis was the electrical engineer at the Brickworks. Mrs. Lewis was a pianist who taught many people to play.

No 2 Mr. John Williams (Known as Jack the Stump, because he was once the Landlord of Penwyllt Inn) with daughters Murial, Sal, Winnie and Meredith who entered the ministry.

Penypant:-

Mrs Banister Lived alone after the death of her Husband. Mrs. Banister was the mother of Tom Banister 1 Butlers Terrace and of Christy who moved with his family after the death of his mother.

Wern House:-

William and Beatrice Bengree with their 2 Sons Percy and Hubert Charles Fredrick. Mrs Bengree was the daughter of Mrs. Evans the Landlady of Penwyllt Inn attached next door.

Penwyllt Inn:-

Mrs Evans with her 2 sons Ernest and Percy.

Dinas Bungalow:-

The Bungalow was built in 1914 by Mr. Kershaw owner of the then named Dinas Silica Brick Works. It has a large size dinning room, a similar size drawing room, a breakfast room, four bedrooms, a bathroom, a kitchen with a walk in pantry and an utility Room. There is a front lawn the size of a double tennis court. A large garage is sited in the southwest corner of the kitchen garden. Mr. Kershaw did not take up residence

because his wife did not wish to live there, so he invited my grandparents to move from Dinas House there at an agreed rent. My grandparents were David and Harriet Davies who had two sons David John and Thomas Stanley and one daughter Margaret Elizabeth, who became my mother. There was also a lodger living with them named Mr Hughes. Approximately during 1918 my grandmother was ill in bed, in fact she was dying from cancer. My mother was nurse and housemaid to the family and during this period both my grandfather and Uncle Stanley sustained terrific burns caused by black powder blowing up. It had just been brought from the magazine and placed near to a drilled hole that was ready to be charged. Black powder was a lethal and unstable explosive. During the period my grandparents lived in Dinas Bungalow my grandmother died in 1918. Uncle David John had gone to work for The Great Western Railway and took an apprenticeship in engineering at Arsenal London. My Uncle Stanley married Anna Maria Skeats, who from a baby was known as Ethel Skeats. It seems after her parents christened her they did not like the name so called her Ethel. My cousins David Thomas Ronald, Margaret Harriet, (always known as Hetty) and Desmond Stanley were born there. In August 1923 my mother Margaret Elizabeth was married to James William Morris who after serving with the Kings Shropshire Light Infantry (KSLI) during the 1914/18 war read an advert for labourers at Dinas Silica Brick Works. He applied and came to live with Mr. & Mrs Joe Bates and their sons at Quinton House, 6 Penwyllt Cottages. I was born on January 1926. Just after my birth the Brickworks was sold to Kidwelly Brick Works and became Penwyllt Brick Works. The new owners needed the Bungalow for their representative Mr Rees, so Uncle Stanley and family moved to 1 Kershaw Terrace and grandfather and my family moved to 2 Kershaw Terrace in either late 1926 or early 1927. Mr. & Mrs Rees took up residence and lived there until 1953 then I bought the bungalow in 1954. My parents returned to the bungalow and renamed it Hillcrest. My wife, Modder Elma, and I moved in with my parents in 1957 when our son James Martin was born in Morryston Hospital on September 25 1957. We lived there until 1963 when we moved to Ystradgynlais.

Part Two:- Childhood memories

Vernon, Vernon Mrs Butcher s call for her grandson echoed through the village and poor Vernon had to return home immediately even though he was playing 15 or 20 aside football, girls included, but when he left, the height of one of the goal posts was reduced by one cap.

When I wake at night I some times think I can hear Mrs Boucher s call for Vernon, then it starts me remembering about my wonderful happy village and all the adventures we as children carried out from playing kick the can to erecting tents out of any covering we could find. During the 20s and 30s we did not realise how difficult it was for our parents because it was the depression years and we were quite used to having our fathers at home. When they did find work for a short period our football teams were reduced but after play we did have jam instead of dripping in our sandwiches.

To recall life in my village I shall have to start in 1926 the year I was born because I believe the path to the distraction of the village started then, when Sir Alfred Stephens, owner of Kidwelly Silica Brick Works purchased Dinas Silica Brick Works and renamed it Penwyllt Silica Brick Co. Ltd. He purchased the Brickworks to prevent it being in opposition to Kidwelly. This can be proved because when the demand for Silica Bricks was reduced Penwyllt Brick Works was closed to keep Kidwelly in full production even though Penwyllt was reputed to have the higher quality Silica. The lime kilns offered alternative employment but this again was only seasonal, i.e. autumn and spring. Eventually the employers at the lime kiln became financially embarrassed, the employers worked for several weeks without pay, each week they were told by Mr. Jenkins, the employer, that he was

waiting payment from his customers but this proved false. Eventually the workers had to finish without payment of their wages which made life very difficult for my family and others in the village. My mother told me many times of her embarrassment when after Father claiming unemployment for some length of time officials came to our house to take an inventory of our possessions so that they could be sold to finance the unemployment benefit, this was called the means test. Other families were subjected to the same financial pressures, but thank God our parents were people of great strength. My father found work in Glyn Neath making a new road. He used to leave home at approximate 0400 hours on a Monday morning with a pack of food, sufficient for a week, on his back then walk to Glyn Neath to be on time for the start of the working shift. He lived in a shed on the site during the week and had to fend for himself. My Uncle Sim (John Sylvester Morris) who was living with us found work at Onllwyn Washery which meant he had to leave home 1 1/2 hours before beginning of shift to walk the 5 1/2 miles. This he had to do in all kind of weather. I remember him coming home one day covered in frozen snow, even his hair was like icicles.



**Steam railway operated by brickworks workers
*from the collection of Alan Doyle***

Tiger Cave, San Pedro, Belize 28 March 2002

By Martin Hoff

One week before we'd been hurtling along the M4 towards Heathrow in the rain, without too clear an idea exactly where we were going, or what to expect when we got there. One week on, there we were dripping sweat and making frequent use of our platypus drinking systems while trying not to sound too ungrateful for the change to the usual Welsh climate. The walk to Tiger Cave took the better part of two hours, the first on a dusty track, and the second through jungle trails of varying quality and accessibility. In thirty degrees centigrade plus, it's enough to say that stops were frequent, shade was at a premium, and a swim was inevitable.

The only danger in getting in the water was not the crocodiles that live in other rivers in the area but the bits of submerged tree lurking to snag the unwary. The river narrowed just upstream of the river beach where we would catch our breath and change into caving gear, and in the narrows the current was strong enough that only a vigorous effort at swimming flat out was enough to prevent the force of the water washing us downstream. Being caught in the current and washed onto the submerged branches snagging from below was enough to cause a surprised yelp from one hapless member of the party.

We'd already done some acclimatisation to the walk in, and had a good run through the cave the day before. Two objectives awaited, to produce some decent slide material to show we had at least got underground after travelling halfway across the world, and to push a couple of leads. John and Al headed off into the further reaches of the cave to drop a pitch and see what happened. Toby, Gary and Basilicus were left to put up with the temperamental and dubious humour of the photographic kit and its operator. We aimed to work our way in to the cave and see how far we got before the other two came back to meet us.

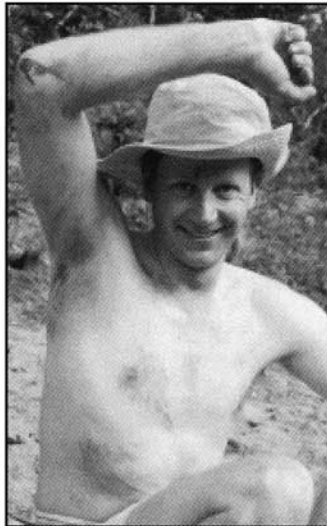
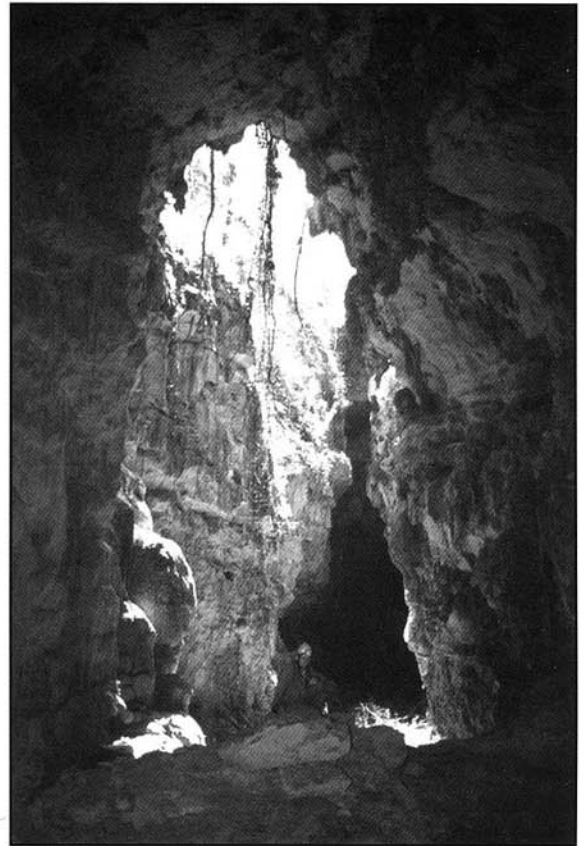
Tiger Cave is a beautiful site, with its location making it relatively unspoilt. Local guides seem

to take visitors to the start of the cave on a fairly frequent basis, but deeper exploration appears to be rare. As the cave is rapidly becoming a gorge, there are plentiful skylights allowing daylight to illuminate the chambers in a way you rarely get to see, and this added to the complexities involved in attempting to take pictures. This wouldn't be an easy job, even for someone that really knew what they were doing and possessed a full set of kit that worked reliably.

I headed into the cave with Basilicus, who was one of the sons of the family we were staying with. The previous day he had shown himself to be more than capable of getting through the cave quicker than us, and I was keen to get a shot or two of him in action. The whole trip would have been substantially more complicated without the assistance of Basilicus' family, and coming back without any photographic record of them would have been a real omission. However, in a culture where photography by overseas visitors was much more an intrusion than a normal part of daily life, a little sensitivity was required. Just as his resignation to being photographed was turning into overt reluctance, the rest of the team caught up with us, relieving him of the burden of modelling.

The vastness of parts of the passage made doing anything sensible in a photographic sense without bulbs incredibly difficult, but people surrounded by huge expanses of black still give some representation of scale, and so we worked our way up towards the point at which we were to meet with John and Al on their return. We pushed our luck climbing up the walls looking for side passages, and eventually headed to the start of the lake, inflated the boat and settled down to wait. And wait.

After a while our patience was becoming exhausted, and so we nipped back up the cave, only to meet John and Al returning from their intrepid exploits elsewhere. Claiming to have



Clockwise from above:
Tiger Cave
River and Jungle
Skylight in Tiger Cave
Crossing the river
Boating in Tiger Cave
Centre:
Martin Hoff - the damage

learned my lesson many times over, at least as far as boats and underground lakes go, my plan was to try and get a couple of interesting action shots of the inflatable boat in action and head for the surface. Some bright spark pointed out the rock bridge over the start of the lake, and I climbed up to take a look at what my options were to get a picture that showed something of the lake, the boat, and the passage. Happy with the security of my stance, I climbed back down to collect the camera and issue instructions to my helpful assistant on what was required of them and the supplementary flashgun, before clambering back up on to the rock bridge..

At about five feet above the water surface, the rock bridge was a great spot for looking down on the lake from the right sort of angle to get a couple of reasonable shots of the boat team in action. I put the camera to my eye to see exactly what I could see.

Shiiiiit I elevated my right arm in the vain hope of keeping the camera dry. No, that didn't work. I carried on sinking. Hold on, I'm down here, the air is up there, and, uh, this probably isn't where I want to be. I headed for the air, breaking the surface like a cross between the lady of the lake and a Polaris missile. If you have trouble conjuring the scene, Paul Quill can tell you exactly what that looks like. The camera was passed out to the nearest pair of hands, and I attempted to climb out of the lake, flailing like an epileptic jellyfish. My brain was sending the signals, but my arms weren't making sense of them.

I was helped from the water, and drained the water so far as I could then sat down to assess the damage. Nothing broken apart from my skin, so far as I could see. After a couple of minutes to catch my breath, I headed for the surface with Basilicus for company, leaving the others to continue as planned. I know the subject of danger comes up every now and then when you mention the sport of caving to non-cavers, but this was just another example of dealing with a situation as it occurred, and hardly epic bravery on the scale of Scott or Simpson. The alternative was to sit and wait for assistance, more than half an hour into a cave, the entrance to which was about an hour's walk from the nearest road. Right!

My adrenalin-assisted exit from the cave was hardly slower than our normal rate of progress through the place, and soon I was gently washing myself down in the river, and leaving my skin to air dry. Changing into dry clothes, I drank some water and probably had something to eat before the rest of the crew emerged from the cave. Gary had a go at covering up the worst of the damage to keep it from getting infected, and we headed back down the path that took us out of the jungle. I settled into a steady stride.

As my legs took on the steady rhythm of walking the uneven track, the effect of the adrenalin started to tail off and with my body safely on its way back toward civilisation, my mind started to work, piecing together what had happened. A good two hours after the event, I realised for the first time that I'd been knocked out. The evidence shows that I had slipped with the camera to my eye, and in catching myself on the wall with my arm and chest, I'd snapped the flashgun's plastic mounting from the body of the camera with the sort of headbutt John Otway would be rightly proud of.

I'm told that while suspended on my arm I offered some kind of profanity — conscious or unconscious, no change there — but I can't say I recall that with any clarity. The coldness of the water brought me around as it reached about the level of my waist, and I instinctively tried to save the camera while taking a second or two to realise where I was and for the self-preservation instinct to kick in. It's safe to say I was lucky the water was fairly static — plummeting as a dead weight and making no attempt to slow my descent, I remember the top of my extended arm being a good three feet down, which would put my feet maybe eleven or twelve feet below the surface by the time I made the necessary couple of strokes to bring me back up.

You don't get that kind of excitement in Ogo of Twyn Tal-Draenan, or thirty degrees centigrade sunshine to dry off in afterwards either.

An Amble in Vallina *By Keith Ball*

The Cueva Vallina has only two pages dedicated to it in the Cantabria Subterranea book. It is described as large with a complicated lay-out. Too complicated to be described in the book, and route-finding was noted as difficult. It is accompanied by a stick plan of little practical use, a great contrast to many of the excellent cave plans for the other caves. The cave essentially has a three tier distribution of passages in beds that dip gently to the NNW at about 10-15°. The tiers are connected by a few shafts of about 30m depth, all of which require tackle.

Last year a SWCC party entered the cave by the top entrance, bailed a duck and descended via a 10m pitch into the upper tier. There they found an extensive network of large dry passages. Having heard that the Matienzo group had found another entrance, we thought it useful to contact them and purely in the interest of exploration we made the onerous trip all the way from Ramalles to Matienzo one evening. Unfortunately the only point of contact was via the pub (Bar German) at Matienzo but someone had to do it. We obtained from a Phil and a Juan very useful directions, a sketch map and GPS co-ordinates; and also invaluable advice such as: if the passages start looking too small go back a bit and turn right. The entrance initially was an archaeological dig (a ceramic beaker had been found) that draughted and went.

The following day after a shortened trip for some of us into Fresca, Iain and I went looking for the new entrance to Vallina and found it without difficulty. The next day was to be the big trip. The cave starts on the southern limb of a roughly ENE-WSW trending syncline. The rock formation is mapped as: alternations of reef-like limestones with banks of sandstones, shales and marls (IGME: Mapa Geologico De España; Villacarriedo 1:50000). They are roughly of the same age (Lower Cretaceous - Aptian) as the somewhat different and more massive mud-mound reef limestones of the Hornijo to San Vicente Massifs.

Eight of us in total assembled at the entrance, two for a photographic trip, the others for real caving. An easy descent of about 10m lead into

low crawling and stooping passages. The dictum: if the passages start looking too small go back a bit and turn right proved most useful. The passages generally and on average increased in dimension as we proceeded. Low passages connected to fairly respectable chambers, including one with a rope ascending into the darkness. Then followed a maze section - to a rectangular plan - without too much difficulty in route finding. Eventually we encountered a narrow high section (crabwalk) with a tight drop into a slightly larger passage. This defeated one of the chronologically challenged on the return journey who had to stand on someone else's head to return. Despite the ignominy this is a lot easier than standing on one's own head.

The passages now started to get much bigger and the Canyon was reached. The Canyon was a slot that extended across the floor of a rather large passage. A fixed rope dangled in a loop down one side, across a two metre slab bridge, and then up the other side back to the same level. The total drop was about 6m. The climbing was fairly straight-forward the rope being really useful more because of the slippery nature of the rock on the climb down than the technical nature of the climb. We speculated that hob-nails and clinkers would have made the climb a doddle. From then on the passage got really large - about the same dimensions as the Main Passage in Agen Allwedd on average and very much larger in places. At a T-junction we initially took the left turn and followed this for several hundred metres to an enormous chamber. Passages went off to the right (not followed beyond about 200m owing to a climb) and straight on another few hundred metres to a choke. Back at the T-junction the right hand route went across another large chamber and ended in a steep boulder pile. Remarkable in this section was the curved stalactites indicating the way out. Route finding on the way was relatively straightforward with but a few wrong turns. General impressions were of a large cave system, largely fossil, but with some small trickles of water. Enough certainly to keep the carbide lamps going. Very large chambers and passages in places. Interesting climbs. Many of the formations were mud covered indicating extensive flooding, but when is another matter.

101 Classic Caving trips No 13: Cwm Dwr to Top via rough waters and high level traverses

By Jules Carter

There are days when you don't think properly about the caving trip you are about to embark on. On this day I was running late. I'd promised Gary Evans I would take some guys caving. They were visiting SWCC to attend a meeting on medical related things in cave rescue, and to make their visit worthwhile Gary has arranged a range of caving trips. I'd volunteered to take a group on a through trip in Ogof Ffynnon Ddu. Although I'm late getting to the club, two of our proposed team had yet to arrive due to a vehicle breakdown. There was thus time to drink tea and soak up some sunshine. Eventually the team is complete. We are a mixed bag of individuals. A couple of guys from Ireland, a Yorkshire man, Pete Hodgson our resident New Zealander, and one or two others. All in all there are seven of us.

Time is getting short so we pile down the concrete tubes of Cwm Dwr and enjoy the easy squirm through to the Cwm Jama. Here a brief pause is had to allow some sweat removal and cave

humoured banter, and soon we are off again. Cwm Dwr is a fine cave, its character regularly changing. After the low crawls of Dim Dwr, the emergence in the fine grandeur of the Jama is a definite contrast. All too soon the choke is met, a regular point of confusion for those new to the cave, and somewhere I always tread with a little respect. I find such routes through boulder chokes a source of wonder, especially when you start looking at the rocks in detail. The way this jumble of boulders forms an intricate jigsaw that somehow stays upright, allowing the passage of these foolish human souls driven to explore their dark world is indeed as worthy as the fine formations. However the very nature of these chokes leads few to want to stop and wonder!

Once through the surveys vdlb and we are greeted by the Big Shacks whose twin chambers act as the entry way to Cwm Dwrs ancient and convoluted series of fine fossil passageways, frequently intersected at the lower levels by the Cwm Dwr streamway. These passageways are a delight. Most visitors will simply storm along the trade route failing to grasp the various levels and intricate network that make this part of the cave. It's their loss, for a days caving spent losing yourself in this part of the cave is well worth the effort. However today we are the trade route tourists and we move through the Smithy and Sand Banks to join the Nether Rawl streamway where Ying and Yang come together to form a delightful stream that cascades gently over flowstone and gravel floors. The energy increases in the passage as the stream is joined by a cascade falling from the Upper Piccadilly area, and leads us to the junction of the main streamway. Here you stand in an immense part of the cave. The passage size is very large and options head off in various directions.

Our journey is into the streamway and up to the even more intricate network of passageway that forms OFD2. It is now I realise I hadn't paid any attention to water levels.. Water is sinking further down the passage than normal, and on hitting the streamway proper I realise it is certainly significantly higher than normal. I quickly relay this note to the rest of the team. I don't know these people (other than Pete) so want to be slightly cautious at least! They seem unfazed, especially Pete and the Irish lads so we push on up streamway. The more we move on,



OFD 2 Main streamway by Giles Barker

the more I think hmmmmm .. The big cascade before entering First River Chamber is awash with water and needs distinct care in getting up. My brain is telling me we don't really want to go back down this and the potholes in the main section are going to be very interesting ! We move on. If the going in the stream remains a bit iffy then the option is to climb out at Marble Showers and do the high level route. This was difficult to decide upon. I didn't really know these people and whilst they were all caving well, the traverses are not everybody's idea of fun!

The caving through Marble Showers is spectacular. The dip in the angle of the floor of the streamway increases and the water is pouring through this part of the cave. The clash of the black limestone laced with white crystal calcite veins is fantastic enough. But add in the high water levels crashing along the passage floor and pouring out of the roof and you feel the heart pumping and genuine awe of the environment you are in. Pete is leaping around ahead of me. He has the bulk to fight through the stream better than me but is also making a better effort at using ledges along the passage walls. We reach the fluorescent marker that marks the point you can climb out of the stream at Marble Showers. Beyond this the stream becomes more technical with numerous potholes and its now make a decision time. Do we continue along the streamway or go high level. I look back and watch half the party working hard to get upstream. We had become quite strung out since the First River Chamber and my choice is made. We go high.

We quickly dash through the cascade of water on the climb into the high level passage in Marble Showers. Soon we are in the calm of big dry cave passage — quite a contrast to the streamway beneath us. A few hundred metres of caving quickly sees us at the start of the traverses. These traverses are superb. You have to be a bit careful to ensure you stay at the right level, but they not too technical and you often get some good views of the stream churning away some 10 — 20 metres below. Before too long you pass Splash inlet, then pass Sandfill Passage and are into the Upper Oxbow Area. This is a magical part of the cave as you move through well decorated passage, across the odd bit of traverse, to gain the climb down to the start of the Midnight Traverses. Here you are greeted with one of the finest fixed aids in the cave — Col. Glennies ladder. The rope has been replaced quite regularly, but the wooden rungs are original and pretty old! The route across the Midnight Traverses then involves a climb up before traversing along, sometimes with both walls for company, other times hugging a ledge on one side. The atmosphere here is superb, as you feel as though you are well above the Great

Oxbow passages below (which you are!). And then suddenly you are in Midnight Passage itself. All that remains is a quick bash out through the complexity of OFD2 — gain Cross Rift, pass through Selenite, gain Salubrious, up into Gnome and out of top entrance.

We surface to a sunny spring day, thoroughly disguising the turbulent stream running somewhere below our feet. All in all an excellent trip despite and erratic start, and certainly a bit of a classic. We've made good time, and the party members have time to get changed and relax a bit before their meeting. And it shows, you can never tell when a standard trip might well suddenly become just a bit more interesting .



Marble Showers by Giles Barker

A Brief History of Time (Gentlemen - Please)

By Dave Edwards

This article came about as the result of a discussion in the back of Allan Richardson's van whilst returning from the Copper Beech at the end of working week 2002. The recollections may not be entirely accurate, even though some details have been checked with other Members.

My first experience of SWCC was one memorable night in 1966 when, having been on a Harrow Moles trip in Agen Allwedd, our guide Mel Davies was in a great hurry to get to a pub called the Gwyn Arms. We did not know why, but joined him anyway. We arrived to an amazing scene; a room absolutely heaving with people and buzzing with expectation. One Mole member promptly excelled himself by threatening to faint from the heat. We had stumbled on the first talk to be given on the first Balinka expedition. Backed by a slide showing Rod Stewart sitting precariously on a scaffold frame over the centre of a large, black hole, and a cutaway model of a vertical shaft, Clive Jones opened the talk by switching on a tape recorder. In mellow Welsh tones, the recorder issued the immortal words, *I am chucking the rock off now.....!* . There then followed a silence that seemed to go on forever. This was followed by a distant, booming crash; more silence, then a final, more distant rumble. The recorder continued, from that, Ladies and Gentlemen, you'll deduce.....It's a big bugger!!! . I sat stunned. I had been caving for 10 years and was thinking of giving it up. I had never even heard of anything like this. The talk continued, a story of clockwork caving on an incredible scale; of heroic deeds, of men the like of whom I had never met, a complete and utter revolution. The rest of the evening was a blur but I knew one thing - I had to have more!

The Moles started caving in Wales, guests of SWCC. (Only OFD1 open at first, but a 7 hour tour was a caving revelation.) Not only was the caving incredible but the people and the atmosphere were too. The evenings in the Gwyn were memorable for the singing; the locals in

one bar and the cavers in the other. The locals would sing Welsh songs in classic Welsh choir tones, the cavers would respond with some of the dirtiest and cleverest songs I had ever heard. Sometimes the cavers would join in with the locals, sometimes vice versa. The atmosphere was incredible.

And we were hard in those days, walking to the Gwyn from the HQ via Ty Mawr and Pwll Coediog farm, and back the same way at closing time!

As a measure of the situation at the time, I remember coming out of Dan-yr-Ogof very near closing time. I walked into the Gwyn in full wetsuit, still leaking water, and was happily served a pint with no-one batting an eyelid.

This happy situation continued until one night when Kitty Hall asked for a light bulb. I couldn't remember what year that was so I asked Kitty for her recollection. This was her response:

I think it was 1974 or possibly 1973 .and there was a new landlord at the Gwyn who had generally taken against the club.

The story as I recall it is this: I asked very politely if we could have a light in the ladies lavatory (it was totally unlit and once inside the cubicle that was a bit of a nightmare) and the landlord just said, No! I was a bit stunned and too shy to argue. The Llanelli Mumbler did a bit of Mumbling, at which the landlord accused him of being a Mumbler, but Jem Rowland said something like Aren't pubs supposed to supply a bloody service? and the landlord just said, Right, that's it, the lot of you go!

.but 1974 is my best guess, winter time.

So SWCC was banned from the Gwyn: and so ended an era!

The next step was a move to the Ancient Briton,

more commonly known as the Shunt . Here, the locals were a younger breed. Many were fervent Welsh Nationalists, not eager to embrace brash young Englishmen. Enduring friendships were made however, although this was largely due to the amusement caused by a young John Davis and myself attempting to drink pint for pint with the locals; us drinking Whitbread Tankard and them drinking Welsh Bitter. Not a pretty sight!

In the early days, most pubs in South wales were closed on Sundays. It was therefore fortuitous that Ashford opened a bar at Dan-yr-Ogof which was open. There, John Davis and I, accompanied by Glyn Jones, Elf Jones and John Paddy Williams, enjoyed many a pleasant lunchtime session before embarking on the drive back to London. As John was driving a left-hand-drive, Flying-Wedge Zephyr at the time, the journey was often a nightmare for the front seat passenger.

One New Year s Eve, Heather and I decided to go to our local , so we drove from London to the Shunt . At closing time, after most of the locals had left, I became the barman and served the remaining friends all night.

The Club was gradually accepted by most. The owner, Will, would close the evenings with pleading calls of gentlemen.....drink your beers! . Eventually, the Club was granted the use of an upstairs room. Not huge, but containing a piano on which Eric Inson would lead the usual range of outrageous songs. There was no upstairs bar so replenishment required a trip down the stairs to the serving hatch. The stairs were usually littered with bodies who could not get into the upstairs room, so carrying several pints back upstairs was often a fraught business. There was the occasional fracas, notably when one SWCC member, not noted for his good manners, elbowed his way to the bar through a crowd of waiting locals. He was rewarded with a thumping on his next visit to the loo.

There were also other attractions (the names Morag, Nerys and Zelma spring to mind) although discretion forces me to draw a veil here!!! Which-is three times a shame! (Those

who were there will get it.)

After a while, Will retired and the pub was taken over by a rugby player named Dave. He was friendly and did his best to accommodate the cavers. This worked well for some time but eventually people began to complain about the beer. This created a difference of opinion between the SWCC members who did not care what they drank, and those who did. The net result of this was that different pubs were tried. For a while, the Prices Arms was popular but, whilst the beer was good, there was not room for SWCC en masse and little opportunity for crude singing. The bar billiards table did, however, receive considerable use.

At the same time, other pubs were being tried. Some Members braved the tortuous back road to Trecastle to drink in the Three Horseshoes. Not a problem on the way there, but a hairy ride back for passengers in the days when drink driving was not persecuted the way it is now. Again, this pub was not suitable for large numbers or raucous song. An even smaller pub was popular with some Members, the White Horse in Dinas. Again, a longish drive away and no singing.

The situation was improved when the Copper Beech became an acceptable centre for most Members. It was at least possible to congregate in large groups, although SWCC style singing was not really possible. By this time, most of the prime singists were no longer around and the knowledge of the words was becoming sketchy. It was for this reason that the Club Songbook was laboriously compiled: an excellent achievement but still containing some notable gaps. On the right night, in the Long Common Room, some flavour of the original atmosphere can be experienced - but nowhere near the same as the Gwyn.

After many years of solid support from Paul Bald Eagle Colman, the Copper Beech has once again changed hands. So far, so good? Or will loud bands cause another split? Only time will tell. Or maybe the Club should apply for a licence.....!!!! Or reinstate the Stump s?

ECLIPSE

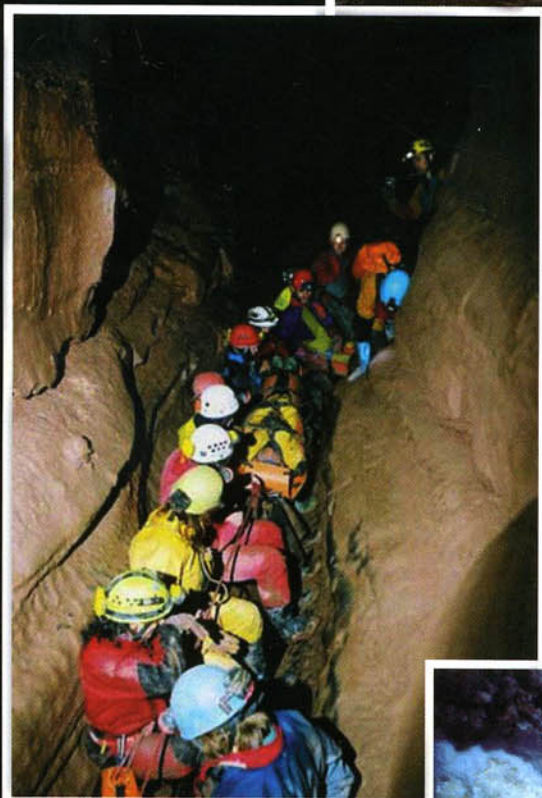
BY CLIVE JONES

MAD DOGS AND ENGLISHMEN
WENT OUT TO THE ECLIPSING SUN.
IN STEED OF STEEL
THEY MADE THE MIDNIGHT RUN
TO ENGLAND'S SOUTHERN TIP
WHERE THE MOON WILL HIDE THE SUN
I AM MADE OF STERNER STUFF
NO MOTORWAY DASH FOR ME.
INSTEAD I WENT TO OGOFFYNNON DDU.
WITH STEADY STRIDE I STRODE THE STREAM
TO A PLACE SO QUIET AND SERENE.
A PLACE WHERE STARS ALWAYS SHINE
IN A SKY BROWN NOT BLACK.
THE ONLY VOICE TO STIR THE AIR, MINE.
I SAT AND SAW THE SHINY TRACK
OF CRYSTAL STARS ACROSS MY SKY
AND HEARD THE DRIPPING WATER SIGH,
LIKE VOICES FROM ANOTHER PLACE
THEY WHISPERED, WHISPERED, WAIT AND SEE.
WAIT AND SEE, WAIT AND SEE.

AND AS THE LUNAR BALL HID SOLAR FIRE
I DIMMED MY LIGHT AND FLOATED HIGHER.
THE STARLIGHT PIT BECAME STRANGELY LIT
WITH A LIGHT SO BLUE AND COLD.
ITS GLOW THEN GLARE NOW TOOK A HOLD
AND FROM THE PIT CAME SIX WHITE BATS,
WITH FLAMING EYES AND STAR TIPPED WINGS.
THEY MADE A SOUND THE SIREN SINGS.
THEN CLOSE BEHIND CAME SHE.
A MOON MAIDEN IN GLEAMING WHITE.
A TRULY AWESOME SIGHT.
SO LITTLE TIME FOR NOW THE MOON,
FAR ABOVE AND SOON TO SLIDE
ACROSS THE RAGING BLAZING SUN
HAD DONE ITS WORK THE SUN TO HIDE.
THE MAIDEN'S TASK HAD NOW BEGUN

IT WAS TO SCATTER MOON MILK HERE AND THERE
SO AROUND THE CAVE SHE SENT THE BATS
TO MAKE THEIR MARK ON PLACES WHITE.
TO REEL AND TWIRL LEFT AND RIGHT
THEN RETURN TO THIS BRIGHT SITE.
WHILST SHE WITH THE SPEED OF LIGHT
MADE TURNS AND TWISTS IN EVERY HELECTITE.
MEANWHILE IN THE CAVE SUBMERGED
HORDES OF CAVE MITES EMERGED.
EACH SCoured AND SCULPTURED A SCALLOP MARK
WITH FIERCE HASTE, NO TIME TO WASTE.
THEY TOILED AND TERMITED IN THE DARK
WHILST BOULDER CHOKES MOVED TO A PARALLEL TIME
FOR MINUTES ONLY THEY REVEALED CAVES SUBLIME.

THE MOON NOW CLEARED THE BLAZING ORB
BATS, MITES AND MAIDENS DISAPPEARED.
DARKNESS NOW, SILENCE TOO.
AND I SAT AND THOUGHT AS I OFTEN DO
ABOUT THE SOULS WHO SAW THE MOON ECLIPSE THE SUN,
BUT KNEW NOTHING OF A GREATER ONE
THAT UNDERGROUND ON THESE OCCASIONS
MADE MARKS TO GIVE GEOLOGISTS FRUSTRATIONS.



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