SWCC CODC

75th Anniversary Publication

Volume 2


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South Wales Caving Club | Clwb Ogofeydd Deheudir Cymru
75th Anniversary Publication
Volume 2

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Digs, Digging & Diggers

Part One

Bob Hall

It is with some considerable relief that I am about to press, 'Send'.

Exhale slowly, wipe tear from eye.

Breathe.

This project has been all-consuming for fully six months and has shrunk in scope but grown in size and complexity as those months have slipped by. I am delighted not only to have finished at long last, but also to know that I am taking away so much that is positive from undertaking this project. I sense a raised eyebrow in the room, so allow me to explain.

I have learned a phenomenal amount about the history of our Club, which has been a very satisfying experience. Having lived through the greater part of it, I was pleased to fill in some gaps and to dig deeper into the distant past. I have learned a great deal about our members; present, past, and passed, as it were. That has been worthwhile and revealing. And I have learned a great deal about caving areas within a day's walk of the HQ which I knew of, had caved in, or dug in, or dived in but never, until now, really immersed myself in. This has reset my personal horizons and I will be ranging far and wide to follow up loose ends as soon as I have the chance. It almost seems as if I have discovered a new country to explore and feel positively thrilled by the possibilities!

But more than this, I have been overwhelmed by the willingness of people to devote time and trouble to helping me. I feel as if I have made new friends: people I have never met or spoken to who I have had email exchanges with, I hope to our mutual benefit. I have been struck by how many people who are not members of SWCC have gone to great lengths to furnish me with information, be that about the history of a dig or how I might contact a reclusive digger from the past. Members, ex-members, and non-members alike have been enormously supportive. This body of work would not have been remotely possible without that engagement. Cave exploration is a collaborative activity – greater than the domain of even a big club like SWCC. The sheer goodwill I have encountered has been an invaluable emotional boost in these challenging times.

To all those who have supported this endeavour: I sincerely hope that you can share my pride in what we have achieved together. Thank you.

Bob Hall

February 2021

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◀ *Waun Fignen Felen, c.1963.*
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Introduction

Newer Members Start Here!

This part of the publication has been prepared quite explicitly with a focus on members who have joined the SWCC quite recently and in many cases taken up caving for the first time.

"*We are through!*" The excited cry should have echoed for poetic effect, but in reality, came as a dull, attenuated sound, barely reaching me down the sand filled bedding plane through which we had been digging. I threw myself into the slot and wriggled at racing pace through to the digging face and up through a squeeze into the passage above. Here I met my digging companions, Gareth Davies and Alan Coase, both sporting the widest grins imaginable. The event was the breakthrough from Hangar Passage in Dan-yr-Ogof into the first of what later became a series of extensions. This was sometime in about 1968 and was my first experience of standing in new cave. It remains one of the most exciting experiences of my life.

As a rule, beginners' trips are in known cave and that leads on to 'tourist trips', with the result that novice cavers may not encounter the idea that caving is, above all, an activity rooted in exploration and discovery. However, our constitution tells us that the primary objective of the SWCC is, '***the discovery, exploration and survey of caves***'.

What follows is an attempt to review some examples of the SWCC's exploratory work through digging in particular. My intention has been to draw attention to 'unfinished business' or 'open opportunities' as well as to highlight some successes.

Discovering Caves

So, dear reader, how does one go about discovering cave? I wish I had a definitive answer!

All I can do here is provide some pointers, beginning by referring you to two issues of the Newsletter, 108 and 109, dating back to 1990. These refer to a major Club initiative of that era: the 'Greensites Project'. This was a serious attempt at some blue-skies thinking about how we identify the existence of unknown cave. It is well worth studying the results of this endeavour.

If one reviews the history of discovery of some of our better-known caves, some answers soon become clear. The primary methods that have yielded results include:

Being lucky; being in the right place at the right time. For example, happening upon an open hole that nobody has descended before, such as Pant Mawr Pot in 1936.

In this context it is worth pointing out that new entrances do appear from time to time, especially as a result of heavy rain and also in active quarries, for example, the initial discoveries of Cwm Dwr 1 and 2 in the 1930s.

- Digging. For example, the discovery of Ogof Dan y Lleuad Wen.
- Diving. For example, the discovery of OFD2.
- Climbing to a higher-level passage. For example, Mick Day's bold climb to discover Fault Aven Series.

- Determined penetration of tight slots and intimidating crawls. For example, Pete Ogden's first passing of the Long Crawl in Dan-yr-Ogof.

Of these, digging is an approach which is open to all cavers, requiring no specific physical attributes or skills that cannot be acquired through experience. It does perhaps require aspects of character or psyche such as determination and bloody-mindedness but that is another story! I urge anybody even remotely inclined to the idea of getting involved in the 'digging scene' to read David Eason's excellent article, 'The Appeal of Digging' in NL136.

Having got thus far, and having your interest further piqued by David's eloquence, you are faced with the question, where shall I dig? Again, I wish I had the answer.

The material to follow includes a survey of some key sites, stories of luck and of success, of persistence and of frustration. This is organised broadly on the basis of the hydrological catchments, starting from the western Mynydd Du and the vast catchments that feed major risings at Llygad Llwchwr, Fryddiau Twrch and Ffrwd Las.

As we move east, we come to the large Dan-yr-Ogof catchment. This was felt to be of such significance that it is the subject of an entire special section compiled by Tony Baker and presented as the final part of this volume. Huge potential remains here.

Also, on the eastern Black Mountain we have a complex catchment associated with Cribarth, much of which drains to the impressive resurgence at Hospital Cave, and a smaller catchment resurging at Tunnel Cave. Both have potential. There is also a hypothesis that in past times the Haffes may have had an underground course and at least one dig exists seeking the posited 'Ogof Haffes'.

Crossing the Tawe, we come upon a significant catchment beneath Allt Rhongyr and Craig y Rhiwarth with an impressive resurgence near the bridleway as it passes the country park. This is a catchment with little more than fragments of fossil cave so far discovered, which begs for further attention.

Then of course we have Ffynnon Ddu, but also an interesting rising south-west of Rhongyr Isaf farm, possibly fed by an active streamway in Ogof yr Ardd.

The Ffynnon Ddu catchment is extensive but its eastern limit is ill defined. That aside, there is a plausible theory that prior to the glacial erosion of the Tawe and Nedd valleys to their present depth, the large, fossil passages of Ogof Ffynnon Ddu formed part of a more extensive cave system extending east toward Pant Mawr Pot, which itself may have its origins in the same system. Exploratory work in the higher levels of OFD3 and surface digs above and beyond Pwll Byfre are partly motivated by this concept, as are the digs in the Lost Valley and the Chasms. There could be a fossil 'master cave' yet to be discovered!

Wherever the present-day subterranean watershed may lie, it is certainly there, and much of Pant Mawr Moor drains south-eastwards to risings in the Nedd Fechan valley. Again, this is an area of considerable potential with a number of sinks all contributing to a complex pattern of drainage.

East of the Nedd Fechan lies Little Neath River Cave and the Mellte, Hepste and Sychryd valleys: a further hydrologically complex area with many missing pieces in the jigsaw yet to be discovered.

And finally, we come to the Cwm Cadlan valley which drains via Ogof Fawr to Llygad Cynon. Here we see an excellent example of how determined digging resulted in significant cave finds. (I say, 'finally' for the simple reason that I must stop somewhere and the A470 is a clear line at which to do so!)

Each of the hydrological areas alluded to above are discussed in separate sections in the following pages.

Summary

We are truly fortunate to be based in an area with such enormous potential for new discovery. We are likewise fortunate to be caving at time when so much remains to be discovered. And, as SWCC members, we are equally fortunate to have access to the support a digging enterprise might need, be it equipment and materials or expert advice from experienced diggers.

Finding new cave is one of the best things you will ever do in life: get out and get digging!

A few practical notes about how what follows is presented.

'Voices'

The material presented below incorporates text from multiple authors. It is a challenge for any editor to make it clear who is 'speaking' at any point on a page. I myself have at least two 'voices': I have an editorial voice, providing explanation, introduction, linking paragraphs etc. and I have the voice of a contributor of longer, substantive pieces. Then we have contributors of longer or shorter articles or segments, and finally we have quotations from other sources.

The editorial team and I hope that our efforts to distinguish between 'speakers' has been successful but apologise, if at times we have not been as successful as we might wish.

Technicalities and Conventions

Abbreviations that are used quite extensively throughout this volume.

asl	above sea level
BCA	British Caving Association
BCRA	British Cave Research Association
BSA	British Speleological Association: forerunner, with CRG or the BCRA
CCC	Cambrian Caving Council (*So, to avoid obvious confusion Croydon CC has been used for the caving club*)
CCR	Cambrian Cave Registry
CDG	Cave Diving Group
CRG	Cave Research Group – forerunner of BCRA
CSS	Chelsea Speleological Society
HCC	Hereford Caving Club
HQ	The SWCC Headquarters: 1-10 Powell Street
NGR	National Grid Reference (omitted when quoting one)
NL	Newsletter, generally the SWCC's, sometimes another club or group's
NNR	National Nature Reserve
NRW	Natural Resources Wales
SSSI	Site of Special Scientific Interest
UBSS	University of Bristol Speleological Society
WSG	Westminster Speleological Group

References are frequent and important. To avoid interrupting the flow of text I have avoided intrusive formalities and have simply used a numeral to relate to a list at the end of each chapter or section.

In the case of references to SWCC Newsletters I have used abbreviations of the form NL65 to mean 'SWCC Newsletter 65'.

On occasion you may find that I have contracted the frequently mentioned reference work, *Limestones and Caves of Wales* (Editor: Trevor Ford, 1989, BRCA) to 'Limestones and Caves'.

Cambrian Cave Registry

As a general rule I have used CCR data as the definitive source. I have only deviated significantly from this policy in the area covered by Gary Evans' very up to date 'OFD Area Catalogue of Cave Sites', see Page 149, where his data has been used. (It is anticipated that CCR data will be harmonised with Gary's in due course.)

Naming of Caves, Digs and Other Sites

In almost every instance I have conformed to the naming used by the CCR and have endeavoured to render Welsh place names correctly. If I have made a mistake, I apologise.

Chapter 1: The Western Black Mountain Catchments

Part 1. Introduction and Llygad Llwchwr

Nig Rogers was one of the SWCC's most dedicated, focused and determined diggers, and never more so than on his home turf: Mynydd Du. Soon after moving to Wales, to the Amman Valley, on the very edge of the mountain, he set to, exploring, poking, digging a bit here and a bit there. Soon afterwards he reported on his early work in NL99[1].

He concluded:

> "*The vast potential of the area remains – between Llwchwr in the west and Frwd Las in the east there are three systems comparable to Ogof Ffynnon Ddu and Dan-yr-Ogof. The hard part is getting into them in the first place; exploration should then be relatively straightforward. We are fortunate in having an almost virgin area within which to work, very like the Swansea Valley in the 1940s. The caves are there to be found and if we do not find them somebody else will, be it in 20, 30, or 40 years' time. Digging is bound to pay dividends eventually and we must persevere despite numerous setbacks. There are literally hundreds of sites, both on the surface and underground, which have not been properly examined. The next shakehole or boulder-choke could easily prove to be the key to a major breakthrough.*"

When Nig wrote those words, he was imbued with the enthusiasm of youth and "*40 years' time*" must have been almost beyond comprehension – but is now just a few summers away – and sadly Nig is no longer with us to reflect on those past years.

Nig exhorted us all to, "*persevere*." He undoubtedly did. He had many and varied helpers. He made significant discoveries. The 'Master Caves' elude us still, but many of Nig's words remain true today. "*The vast potential of the area remains.*"

So, true to this powerful advice, we begin our survey of that potential in the west of the area Nig called 'home': Llygad Llwchwr.

The Llygad Llwchwr Catchment

As you drive from Brynamman over the mountain northwards towards Llangadog you pass through a quarried area near the summit pass: 'Herberts Quarry', as it is generally known. Water sinking hereabouts ultimately resurges some six or seven kilometres to the west. This is a very substantial chunk of limestone, with a lot of water flowing through it.

That water resurges at Llygad Llwchwr, a well-known and pleasant cave with much interest. The story of its early exploration has been told elsewhere. Our story commences soon after the SWCC came into being: 1947.

In that year the newly formed Cave Diving Group mounted 'Operation Acheron' and a team of 'bottom-walking' divers, using oxygen rebreather equipment, made a tentative foray into the terminal sump in Chamber 4.

Despite encouraging signs, the sump was not revisited until 1960 when SWCC divers Charles George and Brian de Graaf made significant progress, again using oxygen. They were forced to turn back when they reached a depth of thirty feet, below which oxygen under pressure becomes toxic. Their explorations are reported in NL33[2]. They conclude that article as follows:

Now it remains to return with mixture breathing apparatus and to attempt to probe still further. It is still possible that a dry system lies further in which could be reached by digging, once its existance is proved and plotted. Those who see a wire leading into 4th. sump are warned against attempting a short duck!

Their sketch survey, which accompanied their article carries the comment, "*water turbulent with force of current.*" A characteristic of the sump mentioned by many subsequent divers.

Charles George (L) and Brian De Graaf wearing equipment of the type used at the time of their dive in Llygad Llwchwr. Pictured here at Pwll Du in the Nedd Fechan at much the same time. (©Dai Hunt SWCC Archive DHUNT1_032)

In fact, the team of George and de Graaf did not return as they proposed, perhaps preoccupied with the progress being made diving in Ogof Ffynnon Ddu and the prize that awaited there.

It was not until 1967 that Terry Moon, John Osborne and Mike Coburn renewed the assault, this time using open-circuit 'aqualung' equipment and breathing air, as had become the norm by this time. After an attempt in the February, aborted due to poor visibility, they returned in March and made good progress, pushing on beyond the earlier limit until stopped by the feature that was to become the infamous 'Slot'. John Osborne's description[3] mirrors exactly that used by many later divers:

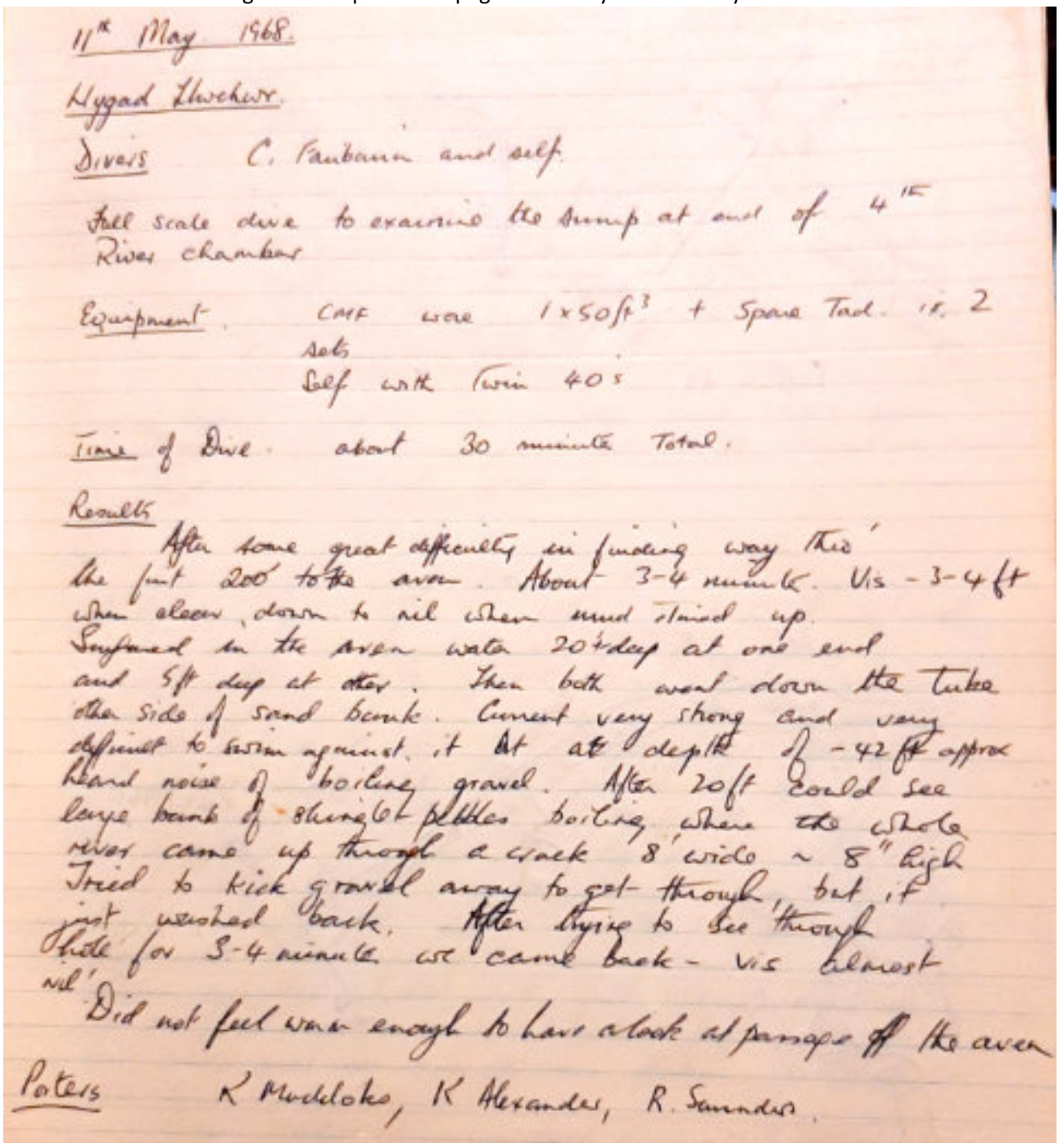
way to shingle. At the end, the gravel slope increased, dipped to the left, and the passage fell away. The gap between the roof and the gravel was 10 inches and the current was "boiling" the gravel up as fast as it slid down. The gap could be increased by kicking at the gravel, but a twin set would be needed for further exploration. The present end is thus about 420 ft. in, and some 50 ft. down.

In May 1968 Terry returned with Colin Fairbairn as is recorded in NL60[4]:

Other sites.

1). Terry Moon and Colin Fairbairn dived in Llygad Llwchwr on 11 May with pretty much the same results as in Newsletter 57. Colin's comment, "A nasty place".

We are fortunate in being able to reproduce a page from Terry Moon's diary from that occasion.



11th May 1968.

Llygad Llwchwr.

Divers C. Fairbairn and self.

Full scale dive to examine the sump at end of 4th River chamber

Equipment CAFE use 1 x 50ft³ + Spare Tank. 1 & 2 sets Self with Twin 40's

Time of Dive about 30 minute Total.

Results After some great difficulty in finding way thro' the first 200 to the aven. About 3-4 minute. Vis - 3-4 ft when clears down to nil when mud stirred up. Surfaced in the aven water 20+deep at one end and 5ft deep at other. Then both went down the tube other side of sand bank. Current very strong and very difficult to swim against it At at depth of -42 ft approx Heard noise of boiling gravel. After 20ft could see large banks of shingle pebbles boiling, where the whole river came up through a crack 8' wide ~ 8" high Tried to kick gravel away to get through, but it just washed back. After trying to see through tube for 3-4 minute we came back - Vis almost nil.

Did not feel warm enough to have a look at passage off the aven

Poters K Maddocks, K Alexander, R. Saunders.

Once again, we read of the 'boiling gravel' but now have a clear description of the dimensions of what was to become called The Slot: 8' wide by 8" high. The 'aven' referred to is what is now termed 'Chamber 6'.

A few years later, Mel Davies[5], writing in NL67, reported on dives by John Parker (Welsh Section CDG) in April 1970 which resulted in the discovery of Chamber 5. (Mel erroneously reports this as the "*passing of the terminal sump*"). John[6] returned a couple of months later and made a bold attempt to pass the Slot but was driven back by the mobility of the gravel. It is notable that on this occasion John went equipped with a bucket

and so began the first of many attempts by subsequent divers to somehow dig through the constriction at the slot.

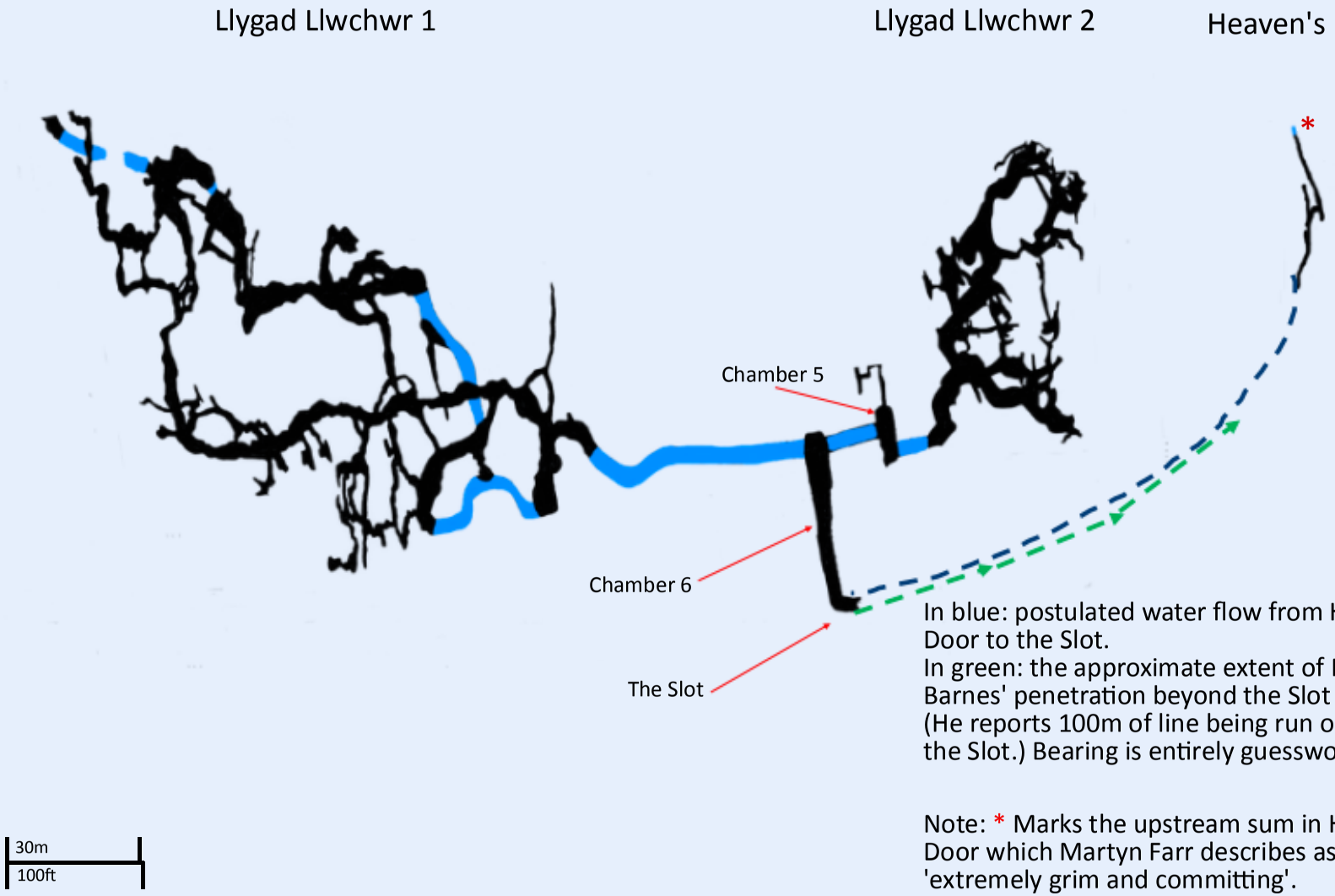
Martyn Farr now picks up the story:

"I first dived in Llygad Llwchwr in November 1972, following John Parker's line into Chamber 5. I recorded the silted origin of the flow as "a most promising site", but instantly assessed it as a place that would require a lot of work. The following year the obstacle terminating the mainstream branch of the cave in Chamber 6 was tackled but, even with streamlined minimal kit, the Slot was a grim place.

At the end, the passage was a little less than 2m wide with a clearance between roof and floor of about 150mm. The gravel was easily pushed aside, but no sooner had I wriggled forward into the flow than the cave struck back. The moment I slid into the hollowed space vision disappeared amid a stream of gravel which rattled alarmingly against my mask and piled up around the rest of my body. It was not a pleasant experience! After the dive I found that the gravel had gone everywhere: under my hood, inside my wetsuit and of greater concern, inside the demand valve. Taking advantage of drought conditions, a further attempt was made in June 1975 but again, the sheer hostility of the sump necessitated a strategic withdrawal. Time for a rethink.

Uncharacteristically fine diving conditions in Llygad Llwchwr. (©Martin Farr)

Schematic plan showing the relationships between key features mentioned in the text
Based on a synthesis of surveys created by Martin Laverty for Cambrian Cave Registry



In blue: postulated water flow from Heaven's Door to the Slot.
In green: the approximate extent of Mike Barnes' penetration beyond the Slot to scale. (He reports 100m of line being run out from the Slot.) Bearing is entirely guesswork.

Note: * Marks the upstream sum in Heaven's Door which Martyn Farr describes as 'extremely grim and committing'.

Digs, Digging & Diggers

The flooded passage beyond the dry cave splits about 50m from the dive base and the passage to the left appeared to be something of a flood overflow. This leads, after another 10m of low muddy passage, to a short 'dry' chamber – Chamber 5. This is basically an airbell where the passage dips once more and is completely filled with gravel. In September 1976 Dave Morris was recruited to dig out the silt in Chamber 5. This was a futile effort as the gravel slumped in from the side of the terminal depression as fast as we tried to dig it out, but from that visit came the idea of using explosives to try to lower the shallow rock floor in Chamber 5. In such a way, the flow might increase of its own accord and perhaps, in times of flood, flush sufficient silt from the sump beyond to allow us to dive through. It was all very wishful thinking.

Three trips were made in December 1977 to lay substantial charges to attempt to modify the constriction. Under the direction of Bob Hall, charges, each of about 2kg, were detonated from a safe distance in Chamber 4. The operations were of necessity undertaken at least several days apart owing to the danger from toxic fumes in the confined chamber. In January and March 1978 another couple of trips succeeded in lowering a channel in the floor the best part of a metre but, sadly, all this had little or no impact upon the silt barrier, which was not in the least reduced. The main ongoing passage lay just short of 2m depth. A fine idea had come to naught.

The lure of undoubtedly large cave somewhere beyond the sumps was irresistible. The next idea was the real possibility of a lead high in the roof of mainstream Chamber 6. From water level a boulder ruckle was visible. So where had those boulders fallen from? Dave Morris assisted me with the initial climb but thereafter a series of six solo mid-week trips witnessed a vertical banging operation. It was more than a little nerve wracking but in 1979 - success! A large void was entered yielding what I was to call Chamber 7. Hmm… no sooner had I broken through than it was clear: a substantial chamber led steeply back down to a pool; as blind a lead as one would ever encounter; there was no way on.

Thoughts quickly returned to the Slot. Perhaps we could apply accrued expertise with a significant charge of explosive and alter the cross-section of the passage at the terminus. Well, as they say, it seemed a good idea at the time. With the assistance of all the leading members of the Derbyshire Section of the Cave Diving Group, 5th July 1980 was a memorable day. Some 50lb (22kg) of the requisite substance was inserted into a heavy-duty plastic pipe; it took two people to manhandle the load through the cave and there was an almost palpable sense of excitement as the divers prepared to set off. Bomb assembly was made in Chamber 6 where the Cordtex was attached, whereupon I swam the thing the final 45m to its resting place whilst trailing a line of explosive Cordtex in my wake. With the bomb pushed as far down the constricted slope as possible I returned to Chamber 6 where, above water level, the detonators were removed from the pressure proof containers and wired safely into position. We returned to dive base.

The dive team at Penwyllt with the 'bomb'. From left Brian Hague (CDG), Roger Bryan, four Derbyshire CDG members, Martyn Farr and Tony Boycott (Somerset CDG). (©Peter Glanvill)

With the charge fully primed, everyone in the Fourth River Chamber moved well clear of the water. Never before had a charge of this magnitude been used, so there were some distinctly anxious looks. The atmosphere was tense. When we were all sitting comfortably, cowering in an alcove, Roger (The Bomber) Bryan cranked the handle of his exploder and a distant WOOMP! gave a sure indication of a successful detonation. There were no disturbing vibrations or falls where we were but observers in the field above reported that stones were displaced from walls and sheep took flight. Inside the cave the most obvious effect was a surge of water which produced a minor tidal wave.

Martyn in Chamber 4 about to depart with the 'bomb'. (©Peter Glanvill)

One month later a cautious diver set out to assess the outcome. A couple of slabs littered the floor and presumably there were a few additional cracks in the roof. Over the following years various other divers tried their luck here, but all to no avail. No matter how we fantasised with hypothetical projects, it was clear that to progress any further in Llygad Llwchwr would require a sustained effort of a different nature."

Here we take a break from Martyn's account and hear from some of the other divers who tried their luck in the years that followed.

Some years after the episode of the 'bomb', Andrew Ward, Nick Geh and others gave thought to the problem of the Slot. Nick, in particular thought he could improve on the approach taken by Martyn and the Derbyshire divers. However, there was a problem. The blasting work in Chamber 5, followed by the placing of the 'bomb' in the Slot, had required cabling to fire the detonators. By my recollection we had used military telephone cable in 1977. This was freely available and very robust, having both steel and copper strands. Over the following years that cable had become displaced and partly buried, becoming a hazard for divers. In 1985 Andrew Ward dived as far as the junction between Chambers 5 and 6 and reported in CDG NL78, as follows[7]:

> "*An exit was made with care to avoid the bang wire protruding from the mudbanks and, at one point, lining the roof.*"

And in a recent email to me, Andrew[8] elaborates further on the matter of the wire:

> "*The initial dives involved relining the sumps and then on to look at the Slot and attempt to dig it although it seemed that as fast as you pulled gravel out it slumped back in and enthusiasm waned. It was a few*

years before I returned. The follow up dives did involve removing a lot of twin core copper cable that had been used by previous divers to initiate a more direct route past the Slot! This cable represented a very real entanglement hazard. I know this first-hand as I became entangled in it with a few worrying minutes cutting myself free and thinking dark thoughts of those who put it in. A lot of my dives involved wire cutters and trips backwards and forwards, cutting the cable into smaller lengths and swimming out with it, and then back for more."

Nick reported on the same dive, which was in June 1988, in CDG NL89 thus[9]:

"*AW dived first with cutters to clear out some of the black wire. He returned twice with armfuls, then went all the way to Chamber 6. Returning with some more wire, one leg got snared and he lost the cutters in the struggle that followed – the comments on his eventual return to base were suitably colourful!*"

In a recent email to me Nick[10], describes the situation and his plan to improve on the 'bomb' approach and how that unfolded:

"*I know you did some work trying to go straight on in Chamber 5, I remember the tangle of bang wires were still there to prove it. I don't know if you ever went to the Slot, but I think it was a tube about 1.5m diameter that came to a dead end and suddenly dived down to the left under a lip. This tube was smaller and floored with boulders and a strong flow pumping out of it. The remains of Martyn's Bomb were a couple of metres in. I think it was a large grey plastic drainpipe or similar. Although a large charge, as it wasn't in contact with anything in particular, it just displaced water and hadn't done any visible damage. I decided to try and remove the lip by fixing a charge hard up against it and recall there was a preparatory dive to measure up etc. On a later dive I fixed a round biscuit tin containing a large amount of plaster gelignite on the lip using screw stemples from the opposite wall. I fired this from Chamber 5 and was very relieved to hear it go off, shortly followed by a tidal wave. A return dive was made, and the lip had gone, but the debris was now down the Slot. I don't remember if I made any follow up, or why it wasn't pursued further.*"

So, yet again, divers turned to other projects and the sumps of Llygad Llwchwr were left undisturbed for a while. But by 1993 the prospects of undiscovered secrets beyond the Slot lured another team of hopeful divers to the site. On this occasion the assault was carried out by Somerset Section CDG members Malcolm Foyle, Robin Brown and Michael Thomas with support from Wessex CC. Their dives are reported in CDG Newsletter 108, 109 and 110 and summarised here by Michael[11] in a recent email to me:

"*I was a trainee diver at the time and kind of got dragged into the project by Malc Foyle and Robin Brown who were training me. The idea was to try and take the roof off the Slot to get past it. Digging the floor out did not work as the cobbles just fell back in every time it flooded. Unfortunately taking the roof off did not work either as when we took the roof off the hole got bigger and the flow dropped ... then the floor fell back in until the flow increased again to normal!*

We used a CP9 air chisel powered off a large 15 litre scuba cylinder. It was all home brew stuff. The regulator was probably a Poseidon 300. They had a low, 8-9 bar, interstage pressure anyway so would still work if wound down to 6/7 bar which was still too high for the CP9. But it worked. My memory was it was a violent and very noisy dive!

We had, I think, around 20mins work at a time with it, and then the remainder of the dive stacking rocks. We tested it in Wookey Hole and got complaints as the show cave guides wondered what the hell the noise was! We had several dives to the Slot doing this and eventually gave up and moved to projects in Goughs cave in Cheddar."

Robin Brown with CP9 air chisel. The large white cylinder is its air supply. (©Michael Thomas)

This episode culminated in Robin passing The Slot as he describes in his Dive Report[12] of the time:

2-5-93
DIVER: R.BROWN
Support: C.Tapley, M.Foyle & at least seven other Wessex C.C. members.

R.A.B. flippered to the slot and started work with the air chisel. A split supply hose shortened the duration of the of the air supply to the machine. The diver also managed to break the wrecking bar, but managed by moving gravel to pass the slot to enter a small chamber (1.5m x 3m). However he encountered another slot smaller than the first.

This team did not persevere and so peace and quiet ruled yet again for a few more years.

Martyn Farr resumes his personal story in 1999:

"There were two options that were floated next. The first was to construct a dam just upstream from Chamber 6 in an attempt to re-route the main water flow, forcing it to reflow out from Chamber 5. The other was to bring a group of committed people together and dig out the underwater blockage in Chamber 5. As it required the least capital investment and plenty of good old hard graft it was the latter which quietly matured in 1999. For sheer hard work and good humour there was Steve Marsh; he was quickly fired up and, funded by a team kitty, purchased the necessary equipment ... a shovel and a large quantity of assorted sandbags. It is a good job that people are rarely encountered in this secluded part of Wales.

Had anyone seen us on the early trips they would hardly have believed what we were up to. We could hardly believe what we were up to ourselves as we stood knee to waist-deep in cold muddy water shovelling gravely slurry into a sack. It was gruelling, backbreaking work that went on, hour after hour with seemingly little evidence of real progress. I think it is true to say that we could start a business supplying just about every fish and aquarium stockist in the British Isles with a supply of clean water-washed gravel.

Trip after trip, it seemed that we were getting nowhere. The water grew deeper, it was harder to fill sacks and all the while more gravel seemed to slump down the slope, replenishing that which we had just hauled up. Thank God Steve is so strong! The wall of sacks became higher, and the chamber began to shrink as they broke surface in a wide arc around the crater. The key tool was a scraper. Made out of steel, by the legendary Tony Donovan, this was constructed along the lines of a chimney sweep's set of rods. Basically, it was taken into the cave in three 1.5m lengths and screwed together on site. It allowed us to scrape gravel from over 2m depth and pull it up to shallow water for bagging.

And so, it went on and on… it was worse than convict labour… it was sad! Enthusiasm was on the wane even before foot-and-mouth disease hit the country in February 2001. So, long after the layoff, any enthusiasm for digging in Llygad Llwchwr was hard to resurrect. Yet, having been denied any tropical experiences abroad, Steve remained happy to subject his body to cold, pain and hardship. As soon as the caves reopened, he bit the bullet, and in late November and December mounted two trips with new recruit, fireman Andy Stewart. The pair filled a lot more bags and Steve was convinced that things were looking positive.

Steve Marsh in Chamber 5 with all the paraphernalia of the dig and many bags of silt from the sump. (©Martyn Farr)

On 27th December I made the journey to the cave with Andy and Tony Donovan. The weather was bad, the water would soon be rising, but everything felt right. It was a relief to bob to the surface in Chamber 5, where my haul sack crammed with a hundred new sandbags was emptied in readiness for the next digging session. Without hesitation I belayed my small finger-spool – a disposable line reel – to the handle of a coal shovel. I had about 15m of line on the

reel, which was more than adequate to make a good assessment of the dig face. By now visibility had dropped to half a metre.

My memories of the dive are vivid: There was, just as Steve related, some room to manoeuvre at the lowest point in the dig. With the finger spool in my right hand and holding the spare regulator close to my mask to make sure it wasn't fouled by grit, I wriggled forward. More gravel was pushed to the side and once more I could worm forward. Several minutes later I looked at the computer and I could hardly believe what it was telling me: I had reached the surface! There was no actual air at all but evidently the passage was shallowing.

The next few minutes were as exciting as it can ever get. The line ran out and feeling certain that "dry" passage was imminent I pushed on for 5m until that did in fact appear. For the sake of brevity in this account I will say that a good reconnaissance was undertaken (see Descent 165) and a hasty return to my companions made. In the weeks to follow Steve, Andy and I surveyed 300m of dry cave which showed clearly that we were tantalisingly close to one of the deep shakeholes passed en-route to the cave entrance."

Andy Stewart, Martyn Farr and Steve Marsh. (©Martyn Farr)

The discovery Martyn describes was to become known as Llygad Llwchwr 2 (or II, if you prefer), but before we follow that thread we must return to the Slot and another story of epic underwater digging, this time by Mike Barnes, a Somerset-based diver. In 2004, fresh from some exploits in Wookey, Mike brought a new form of technology to bear on the problem of the Slot and its endlessly mobile gravel and powerful current: an airlift. Gareth Davies [REF: Volume 2, Part 2, Ch. 7, p205] reports on the use of an airlift in Pwll Dwfn so I won't repeat his explanations here.

What transpired is well described by Mike[13] himself in the following report. (Many thanks to both Mike Barnes and Adrian Hall, CDG Editor, for permission to reproduce this report here. It was first Published in CDG Newsletter 165, October 2007.) What follows is a verbatim reproduction, unedited, save only to correct errors introduced by optical character recognition!

CDG Dive Report

LLYGAD LLWCHWR, Trapp, S. Wales SN 669178:

"The airlift used had been designed for Wookey 25, which has several significant differences to the layout in Sump 4 in Llygad. A 46 mm diameter steel pipe was intended to hang down the vertical wall at -50min Wookey, where the air injected into the bottom would create sufficient power to allow a smaller diameter flexible pipe from the bottom of the steel pipe to the first constriction. Further power, and the need to dump the spoil away from the area, was to be generated by having a flexible pipe, also 46mm, from the top of the lift to a much shallower area in the -30m area. Following experimentation, this would allow a relatively small amount of air, 9 cfm, to operate the lift.

The set-up in Llygad was modified several times because of a huge drop in power caused by the much shallower angled passage. 300m of 19mm air hose ran from the surface, via Sump 1 and 2, then via the dry route to Chamber 4 where it connected to a stop/bleed valve, then to the lift. At first, the 46mm flexible hose from the top end of the lift was connected to a scaffold pole. A rising loop formed once air/water/gravel mix was running through. Attempts to belay this hose to ground or roof proved fruitless as it just produced several smaller loops. A noticeable improvement was made when this pipe was changed to Wickes mini downpipe. Being rigid and smooth bored, a few belays were required to hold it at a steady rising angle, probably no more than 20 degrees. A 15-cfm petrol compressor was hired. This proved to be ideal for the project.

The steel pipe was suspended from a 26-litre float just before the slot where it hung at an angle of about 30 degrees. This gave a significant reduction in power causing the gravel in the initial smaller tube to block. This was further compounded by previous attempts to enlarge the slot by explosives and air chisels. Shards of rock continuously blocked the lift both inside the pipe and at the working end. It soon became apparent the only way to proceed would be to get rid of the smaller pipe altogether and insert the metal pipe into the steeper angled slot where the power did increase. Because of the shards, it also became essential to be on the working end at all times removing the bigger pieces and placing into a tray which was periodically emptied.

Sadly, 2004 turned out to be a very wet summer. After several times almost making the passage visible beyond the slot enterable, the floods returned. Each time the slot refilled with gravel. The project was postponed in October until the following year. However, November was dry, and this continued into the second week of December. Despite the Slot having completely refilled, 1 week of airlifting was sufficient to open the route through. On 13-12-04, after digging for 20 or so minutes, after removing helmet, it was quite easy to force against the current and into the new passage. This is cobble lined and 3m x 1m where thirds stopped play. That afternoon, with 2 full 7's, 40m of line was laid in a continuously shrinking passage, reaching a maximum depth of -18m. The last 10m were rising and here it was found that progress could only be made against the current by back and footing. No belays to hand on thirds, so reel was stowed in shallow alcove and buried with cobbles. On the 14-12-04, with heavy rain forecast later that day, 2 7's at 200 bar were supplemented with a stage 7 at 160 bar. This was dropped off 10m beyond the Slot.

At the reel, the passage continued ascending until at -12m, thirds were reached, having laid another 30m of line. After this dive, winter floods stopped the project until the following May.

The first dive showed that the Slot had refilled far more than had so far been seen. Immediately prior to the Slot, a large bank of gravel had also been deposited. As the previously dug gravel had already started falling back towards the Slot, and with the danger of a potentially large avalanche trapping a diver either in or beyond the Slot, a different approach was required. After identifying suitable niches in the wall of the approach passage and carefully measuring, 2 scaffold poles were braced in tight, after first sliding over the carry loops of 4 x 1 ton gravel bags. This allowed the bags to sit on the sloping floor but not to slide down it. The top end of the now much shortened airlift was fastened over a cone which attached to the down pipe. This allowed each bag to be filled one at a time. It was found possible to fill 1 bag i.e., 1 ton, after approx. 1 hr of airlifting.

With assistance from Joel Corrigan, the slot was re-opened, and the previous point reached. However, 10m further on, at -9.8m what became known as 'Son of Slot' was met. This was a very tight section in bedrock. The floor was fractured which allowed it to be enlarged with a small crowbar. Five dives later, on the 14-06-05, after laying 101m of line from the Slot, the sump was eventually passed. Sadly, a tight, hopelessly boulder choked rift was entered with no hope of further progress. All possible alternative routes forward were also checked, but nothing found. The survey did however show that the end of the sump lay at the edge of a large surface depression. This was subsequently dug to reveal cave and sumps, but that's another story."

Former SWCC member Joel Corrigan now describes his experience supporting Mike in the historic and definitive passing of the Slot:

"Most of my adventures are a bit of a blur and some memories have faded altogether, but I do remember snapshots of the Llygad Llwchwr project. I should make it clear, though, that my involvement paled into

insignificance next to the Herculean labours of Mike Barnes; please don't take my role as anything other than very occasional support for a guy who spent months living in his camper van and pushing the cave multiple times per day.

I believe I received a text message asking me to come to the cave as Mike needed a second opinion. I duly arrived, packed my kit, and went underground. We would have probably dived through the approach sumps rather than bypassing them (far more laborious with heavy dive bottles) and I have a vague memory of Mike warning me of the changes in the final sump since my previous dives (I might have been there a few times over the preceding few months). I think that he'd finally passed the Slot the previous day and my job was to see if a fresh set of eyes could spot something that he'd missed.

The water in the final sump wasn't very clear due to the engineering operations and I recall squeezing past one or two Gabion cages that were full of rocks. Under normal circumstances, these are great for storing digging debris but when they're perched on pebble ramps just above a very committing underwater squeeze, they can be a cause for concern!!

Many years before, as a baby cave diver, I remember trying to pass the Slot and what stands out in my mind is that the force of water was forcing pebbles into my regulator which led to a free-flow (i.e., the gas was venting without my permission!) and then when I turned my head to one side it ripped the gag out of my mouth. Mike had done such a fantastic job of clearing the rocks and pebbles out that the flow was drastically diminished, though still considerable, and I was able to squeeze through. I did have to remove my helmet and at least one of my side-mounted cylinders so it was still snug, but once on the other side it opened up from a very tight squeeze into something that I seem to remember was high enough so as not to hinder the expansion of my chest. Had there been no water it is probably the sort of passage that a normal sized caver would be able to thrutch along on his side and occasionally on hands and knees rather than the brutally restrictive few metres of the approach. I remember crawling upstream in this very underwhelming tunnel with my helmet and dive reel ahead of me in one hand and a cylinder in the other so I must have had one bottle attached at this point. The water-flow was that strong that I lost my helmet and it disappeared behind me which was rather unfortunate as I had stripped down and didn't have any spare lights on my person. Reversing in restricted passage in total darkness isn't high on my list of favourite activities but I believe that the helmet had got wedged in the bedding before it got shot out through The Slot so I must have found it again relatively painlessly.

The distance wouldn't have been too far, and I recall looking at the impenetrable rifts that the entire river came through and thinking that sometimes life really doesn't give you a break. Mike had put such absurd amounts of effort into this that I fully expected him to have broken past one of the most infamous obstacles in Wales to discover a massive, continental-style tunnel that headed up into the mountain. But no, it wasn't meant to be and instead he'd found immature fissures and he must have been heartbroken. I seem to think that he joined me and the two of us looked for alternative routes that didn't appear to exist."

And thus ends our story of diving and digging in Llygad Llwchwr. But the quest to reveal the Master Cave that lies beyond these sumps is far from over and there are more tales of digs and discoveries on the following pages.

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Chapter 1: The Western Black Mountain Catchments

Part 2. Beyond Llygad Llwchwr: From the Slot to Foel Fawr

What follows is a synthesis of contributions from Rhys Williams, Joel Corrigan, Duncan Hornby, Simon Lacey and Pete Francis, together with quotations from a range of published sources.

The diligent reader may wish to refer to the map on Page 25 to fully appreciate the positioning of the sites described below in relation to the Llwchwr Master Cave.

Rhys kicks us off:

Recent developments in the Llygad Llwchwr catchment

"In SWCC Newsletter 127[1], I reported on the work carried out from 1997-2001 at Pwll Cwm Sych, a significant sink and dig around 2km from Llygad Llwchwr. Quite a few other things of interest have happened in the catchment area during the intervening 20 years. Many of these finds have been published in newsletters, magazines and on the internet but nothing has made it into an updated guidebook – because there is no book. I will attempt a brief round up here, but this is based on my knowledge and what I have picked up, so there may be vital details missing. Diggers can be a secretive bunch."

Rhys continues with a description of Llygad Llwchwr 2. I make no apology for including this in a section on digging: it is a fine example of the reward that awaits the determined digger!

Llygad Llwchwr 2 SN 67075 17750 248m asl (CCR entry 14)

"This cave is situated at the base of a deep shakehole on the left of the footpath that leads to Llygad Llwchwr from the usual parking lay-by.

In 2001, Martyn Farr and others first entered an area of cave via an underwater dig off Chamber 5 in Llygad Llwchwr. The dig subsequently silted up, barring access. In 2010[2], Tony Donovan and others broke through from the shakehole which had been periodically worked over the years and regained Llygad Llwchwr 2 via a dry route. There are over 300m of passage here including a pleasant section of streamway and some well-decorated oxbows and chambers. The cave lies off to the side of the main river flow and 'The Slot', and most leads seem to trend upwards. However, there is always a chance that something might lead off into the mountain and beyond the sumps. I visited the cave on a solo trip in 2011 – it is well worth a quick diversion on the way to the main cave.

The Entrance to Llygad Llwchwr 2 in 2011 (©Rhys Williams)

In the summer of 2020, a landslide blocked the entrance to the cave. This was cleared fairly easily, but there is a potential for more debris to fall here, so care is advised. A survey of the cave was published in a Chelsea SS Newsletter[3] in 2011."

And to whet the appetite of would-be-diggers still further, here is a wonderful group of photographs of this fine cave taken by Jem Rowland FRPS. The caver in all three images is Adrian Brown.

Three very fine photographs taken Llygad Llychwr 2 (©Jem Rowland)

We now move to the adjacent shakehole and Heaven's Door. Rhys Williams kindly supplies us with the following snapshot of this cave:

The shakehole wherein lies Heaven's Door. (©Rhys Williams)

Heaven's Door / Drws Nef SN 67144 17794 252m asl (CCR entry 1424)

"This cave is located in the shake-hole on the right of the footpath that leads to Llygad Llwchwr and is very close to Llygad Llwchwr 2. The cave was dug open by Mike Barnes in 2005 and is located near the upstream end of Llygad Llwchwr. A tight entrance leads to the head of a short pitch. After a short section of dry cave, there are sumps in both upstream and downstream directions. These have been dived, but no way into the Llwchwr master system has yet been found. There is only around 30m of dry passages to follow here. There does seem to be significant underwater development apparently extending back underneath the nearby road. In wet weather the water level backs up, flooding most of the passages. Consequently, the whole cave is slippery and unpleasantly coated with silt. The cave is completely different in character to Llygad Llwchwr 2 but is a quick trip to tick off while in the area. I visited in 2009 and 2011. On my first trip, the water level came right up to the foot of the pitch. On the second trip I went in solo with a dodgy improvised handline. It is worth taking 15m or so of rope to safely get up and down the slippery and potentially loose climb."

I have summarised the background to the discovery and exploration of Heaven's Door as follows:

Mike Barnes concluded his report on diving operations in Llygad Llwchwr with the words, "*The survey did however show that the end of the sump lay at the edge of a large surface depression. This was subsequently dug to reveal cave and sumps, but that's another story.*" And here is that story. Descent[4] reported that Mike teamed up with another diver, Bob Batty, and together they started a dig in the 'large surface depression' mentioned above. They soon detected a draught and in October 2005 broke into a descending cave passage. This required further digging but eventually they were able to access the top of a partly choked pothole, Kerplunk Pot, so named because of its unstable nature. During November 2005 they finally entered some 60m of 'dry' cave terminating in upstream and downstream sumps. The name, Heaven's Door, was coined in optimism, hoping that the upstream sump would finally prove to be the key to the Llwchwr Master Cave.

Over the following weeks in late 2005 into early 2006 Mike[5] dived repeatedly in the upstream sump, on one occasion supported by Joel Corrigan. Initially the sump required digging to remove boulders, ultimately giving access to a 'tight silty area' followed by a larger rift passage descending to 10m depth. This was ultimately blocked by boulders which were bypassed by a squeeze, "*after which the passage size increased dramatically.*" Joel then dived to this point and continued to a depth of 27m, still in large passage. Mike made several further dives before finding the way on blocked by boulders. His final words on the matter being: "*All attention has now focused on trying to open up the dry route from where the draught originates.*"

Here Joel gives a personal account of his experiences diving in Heaven's Door:

"I've more gaps in my memory but I know Mike had spent many months digging into what became known as Heaven's Door. I helped him on a few occasions, and he asked me to give him a second opinion on the underwater sections. Again, nothing was easy, and the initial part of the sump required that I hold my fins in one hand, dive line in the other, and descend feet-first down quite a snug bedding pitch that opened up dramatically at the bottom. At this point I put my fins where they belonged and swam down a very impressive tunnel with distinct sand ripples along the floor. This really was more like it and it was proof-positive that there really is a big cave beneath the Black Mountain. I don't remember the specifics, but Mike had reached a final chamber previously, and when I got there, I came to the same conclusion: we'd missed the main way on. The exhaust bubbles from my regulator caused almost instant blackout when they reached the silt on the ceiling which suggested that there was barely any water flow through here. I think it was probably a boulder choke and it turned a pleasant dive into something best avoided on the return.

I forget whether I did other dives there (none are logged in the CDG dive reports) but I know we discussed options that included digging out the choke and team-tactics on exploring the bedding along either side of the main tunnel in case we'd missed something. Whatever we did or didn't do, my overriding recollection is that Mike Barnes' contribution to exploration in Wales went above and beyond the call of duty as it might have taken the rest of us decades to achieve the same results…"

And so, from the hardcore exploratory perspective to the 'tourist' experience recounted by Duncan Hornby, first published on the SWCC Blog[6]:

"This is a very short cave that none of us had visited before and is found in a deep shakehole. The entrance is a grim backwards crawl down a muddy tube full of mosquitoes. Highly advisable to put in a 15m handline. Adrian and Claire had entered first, then it was my turn. After a few metres crawling backwards I sensed that I could kneel up but felt no floor. Turning around I had one of those OMG-WTF am I doing moments as I found I was reversing out over a pitch! There is a scaffold bar in the roof with a rope in situ to provide a handline down this pitch. I eventually joined the others who had moved on to what turned out to be the bitter end of the cave which was a sump. I took a couple of photos as I wanted to experiment with a 'Firefly' slave unit that had been lent to me. We then exited the cave, first Adrian then Claire.

As I was climbing up, I got to a restricted part and stood on a boulder so I could shift into a better position; the boulder moved ever so slightly. No big deal, boulders move all the time. With my left foot on solid wall, me shuffling around in an attempt to pass the awkward climb up, I stood on the boulder again. A second later my right foot was in air and the very pitch face I was climbing up crumbled away, with the boulder landing below with an almighty thud! If anyone had been below, they would have surely been seriously hurt or worse.

I found myself anchored with my left foot on solid wall swinging desperately on the hand line. Somewhat concerned for my immediate continuing existence, my thoughts turned to my caving comrades; at least one of them will come and investigate, as how could anyone *not* hear that almighty thud? None came, and eventually I established a new foothold and was able to climb up and out.

Reaching the surface, I found the others happily talking, completely unaware of my 'adventure'. Interestingly they would not have been more than 15m away from me.

With Heaven's Door, a new cave to me, tucked under my belt, *never* to be visited again, we headed off to Pal-y-Cwrt."

Claire Vivian and Adrian Brown in Heaven's Door. (©Duncan Hornby)

Opening the entrance to Pal-y-Cwrt. Brondai farm in the middle-ground with Carreg Cennan castle looming in the mist beyond. (©Rhys Williams)

And right on cue, we will do the same, once more ably guided by Rhys Williams. The reader should note that this description also reports on yet another successful dig!

Pal-y-Cwrt SN 67330 18170 274m asl (CCR entry 15)

"The cave generally known to cavers as Pal-y-Cwrt should strictly, it would appear, be called Pal-y-Cwrt number 2. Pal-y-Cwrt number 1 is a minor site nearby. In fact, the general enclosed area of the Black Mountain here is known as Pal-y-Cwrt, so things can get a bit confusing. The cave was recorded from early times, having been visited in 1843 by Thomas Jenkins – he referred to the name 'Palebryna', but let us not dwell on names any further.

The cave lies around 500m from Llygad Llwchwr on enclosed farmland directly overlooking Brondai farmhouse. From around 1995, access was denied by the landowner, but it has been allowed since 2013 with permission required to be sought at the farm.

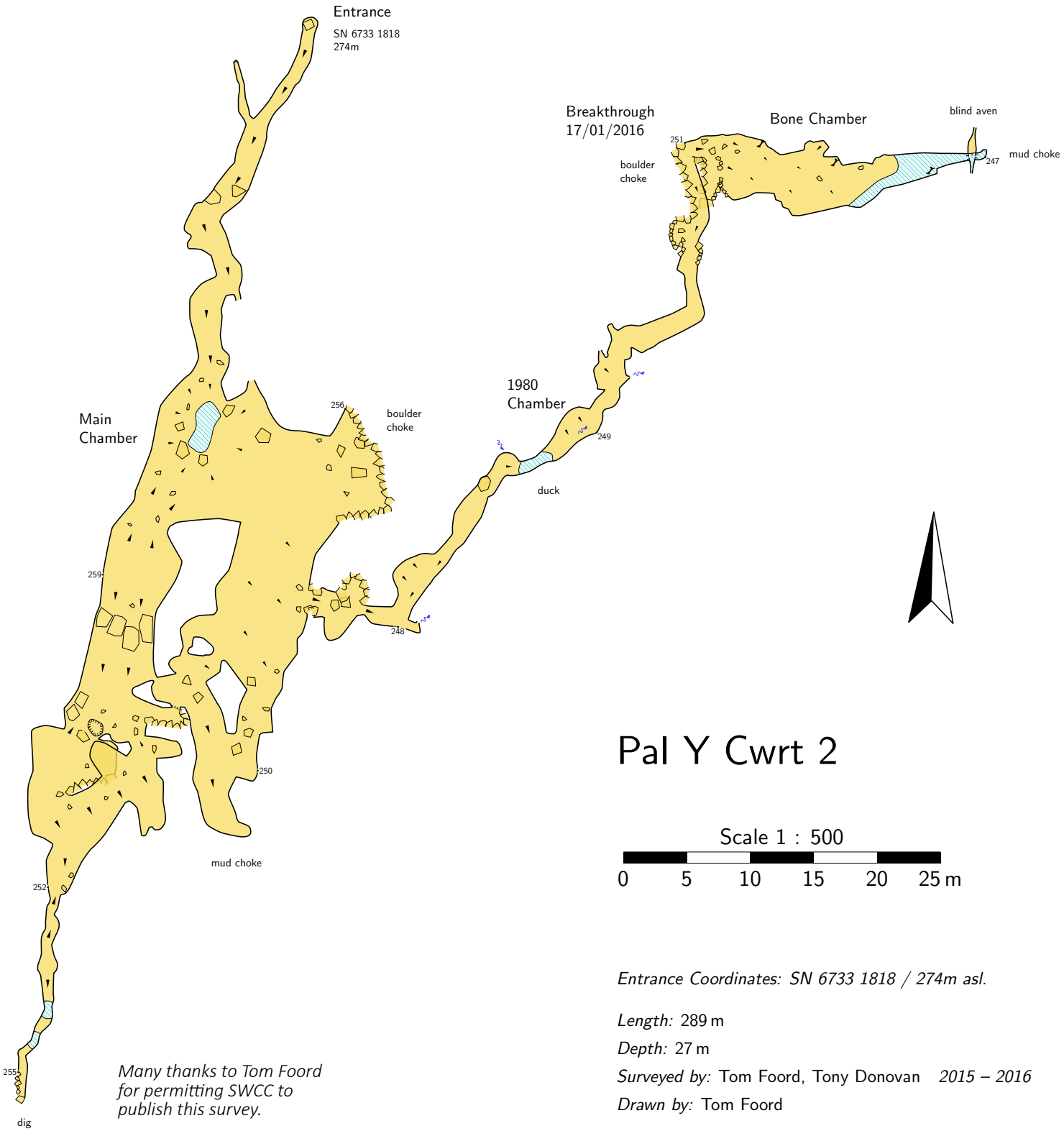
The cave consists of a small descending entrance passage leading to a large chamber and is characterised by glutinous red mud. A few routes lead off from this chamber. In 2015 and 2016, a significant extension was made heading off from a crawl to the east of the chamber through an enlarged squeeze and duck. This was dug by Adrian Brown, Tony Donovan and others. I was lucky enough to visit the duck at the beginning of this extension with Toby Dryden in December 2015. Although, ultimately, no way into the master system was found, the significance of the passages trending eastwards into the blank mountain should not be understated. The cave now approaches 300m in length. The story and background to this breakthrough was well reported in Descent issue 250 by Tony Donovan[7]. A survey and dye trace details were included."

Rhys continues his Cook's Tour with a visit to another couple of promising sites, ripe for renewed digging endeavour:

Ogof Uwch y Ffordd SN 68373 18463 340m asl (CCR entry 23)

"This is a minor cave remnant just above the road from Llygad Llwchwr to Herbert's Quarry. It is around 2km from the resurgence. I started digging here in 2002 after having moved on from digging at the nearby Pwll Cwm Sych. It is so to close the road that you can almost fall out of the cave into your car. The site was previously dug by Hereford CC and I sporadically worked here, often with help, until 2011, putting in 20 trips. The Cambrian Cave Registry lists it as 33m long, but this is a mistake which seems to have stemmed from Tony Oldham's guidebook stating the length as 33ft and this value being transferred across without conversion. It is now about 13m long. The cave consists of a crawling-and-stooping size tube descending into the hill along the steep bedding dip. The sandy choked passage was excavated, and a roof rift enlarged with caps. Unfortunately, due to the descending nature of the cave, water always pooled at the dig face and it became a bit of a pain to drain on most trips before digging could progress. Various pumping and syphoning strategies were attempted, but it needed

Looking up at the entrance. (©Brendan Marris)



Pal Y Cwrt 2

Scale 1 : 500

0 5 10 15 20 25 m

Entrance Coordinates: SN 6733 1818 / 274m asl.

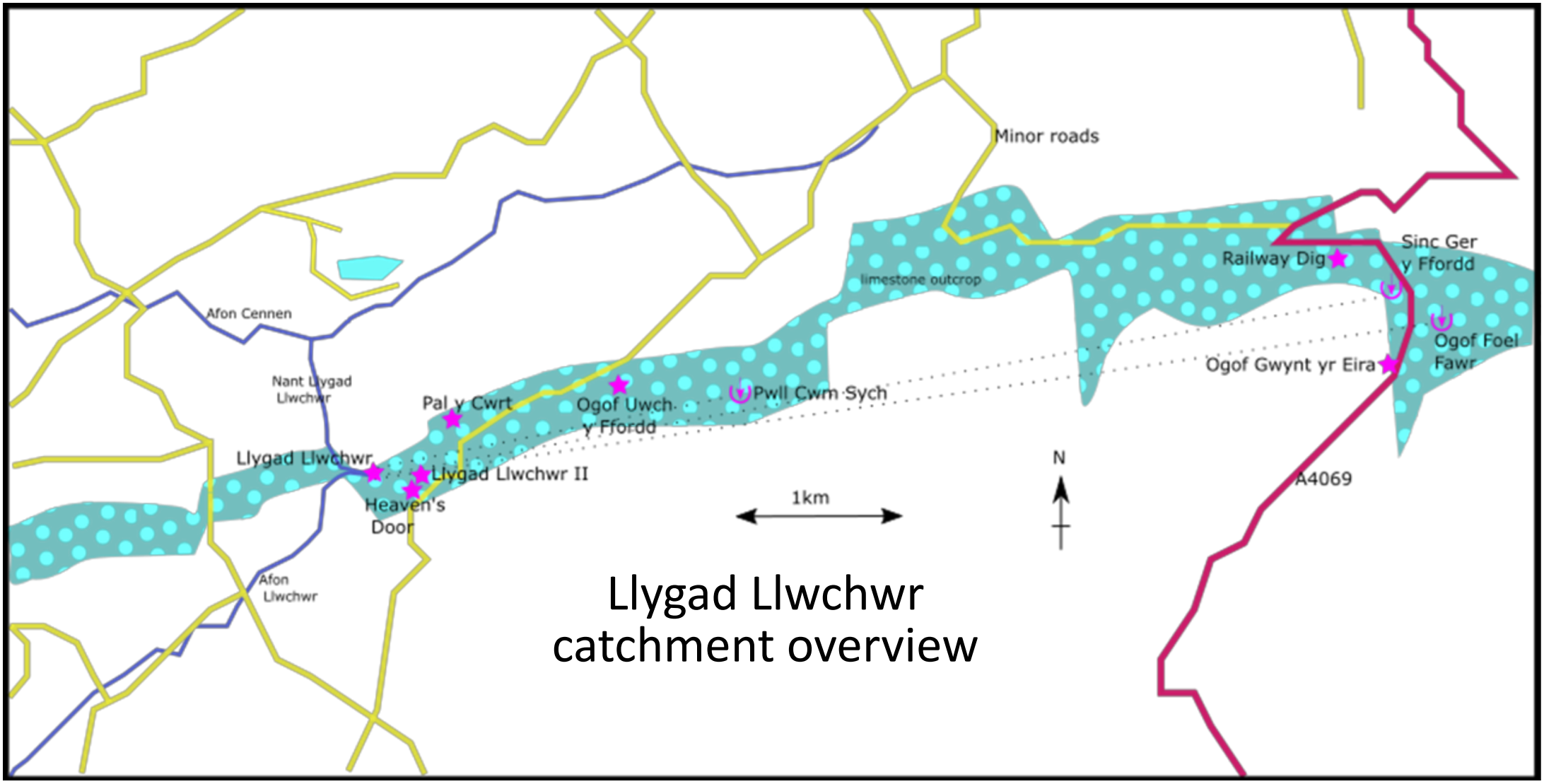
Length: 289 m

Depth: 27 m

Surveyed by: Tom Foord, Tony Donovan *2015 – 2016*

Drawn by: Tom Foord

Many thanks to Tom Foord for permitting SWCC to publish this survey.



In Limestones and Caves of Wales, Bill Gascoine reports the following water tracing results dating back to the early 1980s. These are shown as dotted traces on the map above.*
From Pwll Cwm Sych to Llygad Llwchwr a positive result after 4 days using Lycopodium spores. From Sinc Ger y Fordd to Llygad Llwchwr a positive result after 7 days using Lycopodium spores. From Ogof Fawr to Llygad Llwchwr a positive result (timing not given) using fluorescein dye.

**Limestones and Caves of Wales, Ford (Ed.), CUP 1989 Many thanks to Rhys Williams for providing this map.*

some investment in proper hardware. We also had digging buckets and hoses removed from the site by someone unknown. On another occasion, a grumpy grazier let us know he was not happy with us being there and he claimed to have lost three sheep down the cave. This was unlikely given that we always securely covered the crawl entrance and saw no evidence of sheep within. He said he would report us to the National Park who either own or manage the open area of the Black Mountain; but they were already aware that we were working there.

The cave is still a reasonably good prospect, but a long-term effort is required. Water does drain away slowly from the end and there is a faint draught (though this could be surface related). There are also numerous other small cave remnants and shake-holes in the immediate area which might yield to bit of work.

Digging Team on-site in 2007. Witness the very neat water-diversion works, bottom left.

Pwll Cwm Sych SN 69039 18272 356m asl (CCR entry 29)

Pwll Cwm Sych (meaning pool or pit of the dry valley) was, and still is, an impressive site. It lies 2.2km to the east of Llygad Llwchwr and about 130m higher. A stream flows out of a peat bog to sink into a depression some 7m deep and 15m across. A large portion of cliff has peeled away from the far wall of the shakehole to form a rift about 8m wide and 4m deep. The stream flows for most of the year, only drying up during prolonged spells without rain. It is the largest and most active sink in the Llygad catchment. I'm no geologist, but I reckon the shakehole is towards the top of the limestone sequence, above the honeycomb sandstone marker bed, which is visible on the hillside nearby. I believe that Llygad, however, is in the lower, Cil-yr-ychen limestone (equivalent to the Dowlais limestone beds of the Swansea Valley that contain the majority of the known bits of Ogof Ffynnon Ddu and Dan-yr-ogof). The water sinking at Pwll Cwm Sych was traced by Lycopodium spores to Llygad Llwchwr in 1982 with a flow through time of 4-7 days[8]."

And now, ascending, as we must, towards the sinks that feed into the Llwchwr Master Cave, we return to the area close to Herbert's Quarry and the numerous dig sites and caves to be found nearby.

To learn of the first of these we must be grateful to Simon Lacey for the ensuing account of tenacity and single-mindedness in Railway Dig.

Ogof Pant y Dref Newydd Mawr / Railway Dig SN 72758 19226 441m asl (CCR entry 51)

(*For the purposes of 'disambiguation', as a well-respected encyclopedia would have it, this 'Railway Dig' is not the site so labelled on the Ogof Ffynnon Ddu survey. (Ogof Gweath Brics)*)

"Park on the left (approaching from Brynamman) in a lay-by or up a short track; the entrance is at the top of a short steep slope.

Railway Dig is a high-level fossil passage exposed by quarrying and completely filled with compacted glacial silts and clays: in other words, there's no enticing draught. Instead, it's a blind descending passage, currently about 50m long, entirely dug out (though Tony Baker kindly applied chemical linctus to an obdurate corner of rock). It's another potential entry point to the major system that must underlie Mynydd Du, resurging at Llygad Llwchwr, approximately 6km to the west and about 130m lower. The advantage of this site is that it avoids the major north-south Cwmllynfell faults, just to its east, that hampered efforts at other digs close by. The next

The entrance to Railway Dig in 2009. (©Brendan Marris)

fault to the west, the Cwm Llwyd fault, is over a kilometre away – you would hope to find open passage long before that…

Originally dug in the 1950s and onwards as a shallow crawl in the hope of an early break-through, it was eventually abandoned at approximately 15m long and rarely more than 50cm or so high. In late 1996, Gary Vaughan and Iain Miller restarted the dig and I joined in shortly after. The idea was to start from the entrance with the aim of digging out a proper working face about a metre high. Spoil tubs were initially hauled to the entrance and sent downslope on a zip-line which was quite exciting. Pretty soon, though, hauling 50+kg loads up the incline to daylight became a problem – not least when Gary Nevitt, attempting to move a Very Large Boulder upslope, audibly did his back in very badly and Rescue had to be called to get him out (thanks to Toby Dryden and Dr Lisa Williams).

However, since the dig was following a solid wall wherever one could be found, the actual cavity was quite large in places ('large' being a relative term…) We didn't need all that space just to get to the dig face, so I came up with the idea of sandbagging spoil and backfilling every nook, cranny, and alcove, not to mention building up the floor. I bought sandbags in packs of a hundred, so I can confidently say that there are approximately 800 stacked in there at the last count. Using sandbags sped up progress considerably and, as the numbers gradually dwindled to mostly just me and either Brian Parkin or Gary Nevitt, also kept the dig viable for a small team.

Because the passage descends relatively steeply and because it has been sandbagged almost out of existence, we did encounter bad air occasionally (nothing to do with the gargantuan pre-dig breakfasts). Not that bad air deterred the local wildlife – on one solo visit, I squirmed around the final corner to the dig face only to find my head lamp reflecting in two very large eyes. A very surprised fox stared back until I beat a hasty retreat… as a rapid weight-loss regime it was great, but it took a while for my heart rate to settle.

There's no survey, despite me optimistically giving Suunto rather a lot of money for a clinometer and sighting compass, but then you're not exactly going to get lost. Sadly, activity stopped in March 2006 when I was foolish enough to take a job in the US and no-one has taken it on since. But someone should. It's still the best, highest prospect for a breakthrough – *audaces fortuna iuvat*, as any 'fule kno'. And whoever it is can have my Suunto for nowt to make the survey.

Finally, thanks to Bob Hall for obtaining (I was going to say 'digging out' – *groannn*) some of the team's entries from the Club logbook to illustrate the sort of mind games diggers play to persuade themselves, more than fifty trips in, that another weekend's digging will be worth it… or not…

February 27, 2002: *Progress. Of sorts. Depends how you define progress really.*

December 13, 2003: *It goes on and on and on and on and on… Visited several other interesting sites – water everywhere.*

January 1, 2005: *Another fruitless day's digging. Further fruitless days digging required.*

February 12, 2005: *Some poking about. More poking required. (Not sure that both of these statements referred to the dig, but anyway…).*

February 19, 2005: *New limit of exploration. More new limits of exploration required.*

January 21, 2006: *Nietzsche said life is a choice between suffering and boredom. Why not enjoy both at Railway?*

The Railway Children 1996-2006 were (with apologies to anyone I've forgotten): Tony Baker, Bill Buxton, Tim Clark, Eileen Collins, Steve Hackett, Elaine Hall, Natasha Lock, Paul Meredith, Ian Miller, Gary Nevitt, Brian Parkin, Alison & Chris Payne, Bob Radcliffe, Gary Vaughan."

Notwithstanding the fine effort devoted to Railway Dig, the following site – Ogof Gwynt yr Eira - has become the most significant find in this area. Once again, Rhys brings us up to date.

Ogof Gwynt yr Eira SN 73155 18522 487m asl (CCR entry 60)

"The history and development of this cave at the upper end of the Llygad Llwchwr catchment near Herbert's Quarry has

The entrance as it was in 2007. (©Rhys Williams)

been written up by Pete Francis[9] and is revisited by Ian Alderman in this publication. [Volume 2, Part 1, Ch. 11, p159] However, since the major breakthroughs of 1995 and 1996, some extra bits and pieces have been added.

The Poo Extension

In 2012 I joined Steve West and Ian Alderman, who had been soldiering on unnoticed and following leads and digs off The Road to Nowhere passage for some years. Ian claimed to have spotted black space on his previous trip, but it had been some time before. We re-excavated a bit of a U-tube which had filled in and shortly I found myself at the previous end. Sure enough, there was black space visible and after only 10 minutes of excited digging, I slithered feet first through into a new chamber. We subsequently explored around 50m of passage which we surveyed and a 10m aven was found and later climbed with Martin Groves. In the end it was only a relatively small gain, and everything trended upwards away from the resurgence. However, this breakthrough did serve to show that this bit of mountain really is like Swiss cheese. There is passage everywhere and every lead might go somewhere – they all might re-pay further thorough checking.

The Above the Sump Series

This part of the cave does not have a proper name. Also in 2012, Martin Groves was diving and excavating silt from the sumps at the bottom of the cave. On a dive-kit-carrying trip I took the opportunity to re-investigate the passages at the top of an aven above the sumps. This area really is strategically well-located for finding a route over the sumps and onwards downstream. With Ian Alderman, a short prospecting dig in an upward sloping crawl paid off with another small breakthrough. A further trip with tackle saw us drop a small pot that we had not wished to risk unaided. Altogether, probably around 30m or so was found in this confusing area.

The Future

A priority for the future needs to be completing the survey in the sump area and above. At present it is not clear in which direction things are heading and a proper survey should help focus forward efforts downstream. There are also several other odd passages in the cave that have never been surveyed and other passages which have been surveyed but which never made it on to Iain Miller's survey. That was out of date soon after it was published, if not before!"

What follows are a few short descriptions of the known active sinks that have been traced to Llygad Llwchwr which I have written and included for the sake of completeness. The text below is largely taken from descriptions of these sites given in the Cambrian Cave Registry.

Sinc Ger y Ffordd in the foreground with Ogof y Nant (covered by timbers) behind. (©Brendan Marris)

Sinc Ger y Ffordd 73163 18940 475m asl (CCR entry 64)

This sink is closely associated with the nearby Ogof y Nant. The sink takes a large flow of water during periods of wet weather. The water sinks just before the Ogof Y Nant dig which it feeds.

The sink is found alongside the western edge of the main Brynamman to Llangadog road some 115m north-west of the entrance track to Herbert's Quarry. Water sinking here has been proved to resurge at Llygad Llwchwr. It is possible that the water travels via the Ogof Gwynt yr Eira streamway some 400m away to the south (down-dip), but this has not been tested[10].

Ogof y Nant SN 73156 18936 468m asl (CCR entry 62)

Hole amongst rocks and small cliff near sink and road. The cave consists of a single passage of some 24m in length containing a small stream only active during wet weather. A low entrance gives access to a very tight rift some 5m in depth, followed by a letter box shaped constriction which leads to a short descent through very loose boulders into a crawl under a low arch followed by a very tight rift leading to a small terminal chamber and finally ending in a gravel-filled choke. A

handline or ladder is essential for the entrance rift. Great care is needed in exploring this cave due to unstable loose boulders.

Ogof Foel Fawr NGR SN 73523 18744 543m asl (CCR entry 82)

The cave is on common land, near the crest of Foel Fawr, about a quarter of a mile from Herbert's Quarry. The entrance leads through boulders to the large main passage which has several side passages. All passages end in boulders. Connected to Ogof Pasg by a tight squeeze at the end of the cave. Unlike the other sites with proven hydrological connections to Llygad Llwchwr this is not a surface sink. Gascoine[11] refers to, 'fluorescein dye placed in a stream in the cave'. Which stream or where in the cave is not made clear.

Afterword

Rhys Williams has contributed greatly to the development of this section of work, and it is entirely appropriate for him to conclude it as he does below.

Master Survey

"I have long had an ambition to gather all known survey data from the Llygad Llwchwr catchment and compile a master survey. However, this has never really developed beyond initial stages and scoping out data sources. With modern surveying techniques and devices, collecting missing data becomes easier by the year. So maybe this will come to fruition at some point. However, if anyone reading this has relevant data to hand, please let me know. With the current extent of known cave passage under the 7km of mountain between Herbert's Quarry and Llygad Llwchwr, the master survey is mostly blank space! Unlike parts of the Black Mountain further east, none of the limestone outcrop in this catchment is more than a 15-minute walk from the roadside (although it may be a long drive for many).

So, diggers; get out there and find some cave!"

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Chapter 1: The Western Black Mountain Catchments

Part 3. The Twrch Catchments

Digs lying to the west of the A4069 that are likely to lie in the known catchment of Llygad Llwchwr have already been dealt with, as has Ogof Foel Fawr which is also known to fall in that catchment. No accurate information yet exists to determine where the eastern limit of the Llygad Llwchwr catchment may be. There are numerous digs, sinks and small caves in and around the quarried area and a little to the east of Foel Fawr. However, the prospects of finding significant cave may well be limited by the presence of a group of largely N-S faults that complicate the geological picture.

But for the aspiring digger the area has the great virtue of being easily accessed!

Moving beyond Foel Fawr we begin our exploration of the Twrch catchments. Yes, dear reader, 'catchments' plural! The Twrch is a surface river but is fed by two very substantial resurgences. Each has its own catchment.

There is no better introduction to this area than that given by Bill Gascoine[1]:

> "*7km to the west of the River Tawe, the Afon Twrch has cut a shallow valley into the Black Mountain uplands (See map below). It begins as two streams near the summit of Carreg yr Ogof (585 m altitude) and flows southwards, cutting through the limestone outcrop, to join the Afon Tawe near Ystradgynlais. The Twrch Valley is sub-parallel to two major faults which have displaced the limestone outcrop 1km to the north. On one of these faults, at a point where the overlying Millstone Grit appears, lie two substantial resurgences. On the east bank of the Afon Twrch is Ffrwd Las, a multiple resurgence issuing from gravel and sand-filled depressions and from a small cave passage which is totally flooded. Above the west bank of the Afon Twrch, 60m higher, lies Ffrydiau Twrch, a large resurgence flowing from the top of a high boulder scree. Ffrwd Las is at SN 7739 1638 (290m altitude) and the water issues from the Penwyllt Limestones. Ffrydiau Twrch is at SN 7704 1623 (351 m altitude) with water draining from the Upper Limestone Shales.*"

In fact, there is a third resurgence on the east bank of the river a little south of Ffrwd Las, so there is potentially a third catchment, but this has yet to be established.

By way of a reminder and encouragement I return to a fragment of my earlier quotation from Nig Rogers, "*The vast potential of the area remains – between Llwchwr in the west and Ffrwd Las in the east there are three systems comparable to Ogof Ffynnon Ddu and Dan-yr-Ogof.*"

We have reviewed the Llwchwr catchment in some detail. Now we turn to the remaining two systems, each with "*vast potential*."

The Ffrydiau Twrch Resurgence and its Hinterland

Introduction: Histories and Hydrologies

The SWCC has taken an interest in Ffrydiau Twrch from the very beginning. Writing in our very first Newsletter, Bill Little[2] reported that, "*About 1947, Messers Harvey and Nixon carried out several excavations a few feet above the rising at Ffrydiau Twrch.*" Bill then goes on to report on two weeks spent camping in the Twrch valley in the summer of 1951, during which time he and his companions were able to drive a tunnel

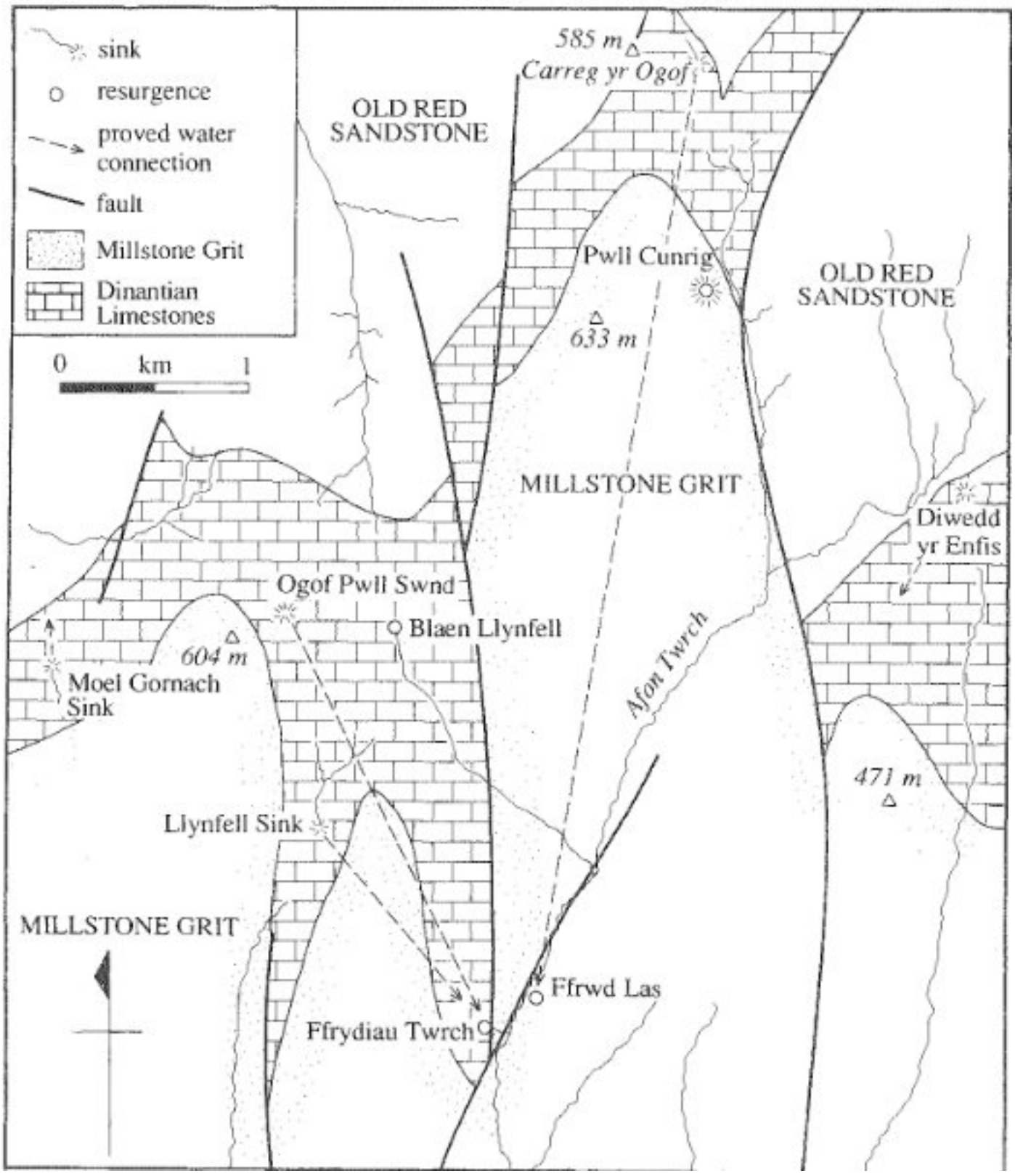

Diagram taken from Limestones and Caves of Wales, Page 54.

some 10ft into the debris before encountering water. They persevered, progressing for another 5ft or so before water and lack of time brought their activities to a halt.

During the same camp they also gave consideration to the source of the water, and Bill speculated that both Pwll Swnd and Llynfell Sink might be candidates. Indeed, the team spent some time digging at the latter site but ultimately decided that the rising was the better prospect.

There was a renewed assault over the August Bank Holiday of 1954, described by Dai Hunt[3] in NL10. During the course of this the diggers had to contend with some spectacular flooding with the rising in full spate. (Such was the rainfall over that weekend that the old HQ had 3 inches of water on the kitchen floor and the Nant Llynfell was "*running merrily through the front garden*"!)

Both Bill's and Dai's accounts make interesting reading and certainly take one back to a very different time.

An impressive early photograph of Ffrydiau Twrch in spate. Note the figures top left for scale. Possibly the occasion referred to above. Jem Rowland notes "Interesting to see the smallish flow emerging at the left of the corrugated sheet. There's a very tempting bedding plane there that would need enlarging but in normal flow it's dry and appears to be in solid beds and could provide a way into the stream passage..." (©Lional Dingle, from the SWCC archive, serial APM38_ETC_17)

As mentioned above, as early as 1951 speculation on the possible sources of the substantial output of the resurgence was well developed but was not followed up until the early 1970s when Hereford Caving Club[4] conducted a dye test using fluorescein, proving a connection between Pwll Swnd and Ffrydiau Twrch. This was followed up about ten years later when Bill Gascoine[5] conducted a very thorough and well-documented programme of water-tracing across the whole of Mynydd Du. During the course of this investigation Bill used lycopodium to test several sites in the presumed catchment and successfully demonstrated the expected connection from Llynfell Sink.

He also placed spores in a site he described as 'Moel Gornach Sink' at SN 7480 1820 492m asl. The grid reference given for this site corresponds to a site recorded in the Cambrian Cave Registry (Entry 102) as 'Moel Gornach Resurgence' which leaves some uncertainty in the air, but in any event no positive trace was recorded and it would seem that Bill never repeated the test. There are a number of other sinks in the same area and a further programme of testing is most desirable, not least because the concealed watershed

between the Ffrydiau Twrch and Llygad Llwchwr catchments is ill-defined, and there is a possibility of a minor catchment feeding springs in the headwaters of the Afon Clydach which drains to the north[6].

The geomorphology of the area and its contribution to cave development has seemingly received relatively little attention compared to areas further east. However, an article by Gareth Jones in NL72[7] offers an interesting theory concerning the possible past development of a 'master cave' in the catchment.

> The probable origin of the underground system was Afon Clydach, draining south from Cefn y Cylchau. Evidence for this is afforded by several tubes in the rock face of Blaen y Cylchau. Several of them contain a slight draught, and just above the face is a promising collapse shakehole.
>
> It is possible that there may be a communication between Ogof Pwll Swnd, probably formed by glacial melt water, and this postulated system.

The features around Blaen y Cylchau lie about 3km north of the resurgence, not far from Pwll Swnd, and may be sites worth re-examination. They are recorded in the Registry as 'Blaen Y Cilchau Caves' and are numbered from west to east, 1 to 7. It is also worth noting that discoveries made since that article was published, including Ogof Dan y Lleuad Wen (DYLW), may, like Pwll Swnd, be associated with such a 'postulated system'.

Blaen y Clychau Cave No. 5. (©Brendan Marris)

Historically, the Hereford Caving Club were very active in this area, having had a cottage not far away for some years. HCC were responsible for a great many surface digs and discovered significant extensions to Pwll Swnd by digging.

Sites in the Ffrydiau Twrch Catchment

The whole catchment, and indeed the wider limestone area between the Twrch and the Brynamman – Llangadog road, became a focus of much attention from Nig Rogers and his associates from the early 1980s onwards. A number of significant discoveries were made, and many sites investigated that may yet reveal new finds. Some of these are described below, for the most part working from north to south.

Dolphin's Hole SN 76215 18522 555m asl (CCR entry 133)

This cave was historically a dig begun by SWCC member Paul Dolphin (who also gave his name to 'Dolphin's Folly', better known as Waun Fignen Felen dig). There was a breakthrough in 1956[8] and it was subsequently extended to over 100m length by ICI Fibres SS in 1966[9].

It must rate as having significant potential, not least because it has a reputation for draughting strongly, but also because of its position between the Blaen y Clychau caves and Pwll Swnd.

Ogof Pwll Swnd SN 76239 18341 579m asl (CCR entry 136)

It is worth noting that Ogof Pwll Swnd is not located at the point marked 'Pwll Swnd' on the OS Map: the latter is a small pool.

Although an open hole when first discovered in 1939 by SWCC Founder Member Arthur Hill together with Miss G Taylor, much of the cave was discovered in later years by digging activity, largely by HCC. Mary Rogers[10] adds that: "*In 2004 we re-surveyed the entrance series and I think Nig thought of doing more of the cave, presumably with a view to checking the accuracy of the original survey after the extension was made in DYLW, to see how close a connection might be?*" Now THAT is an interesting project!

Ogof Serra Pelada SN 76187 17838 533m asl (CCR entry 129)

Martin Laverty[11] describes this dig as, "*A hole excavated through boulders at the bottom of the shakehole leads to a small chamber and more excavated passage down to a crawl to a high chamber and a pitch to a choked floor where a small stream sinks.*"

Mary Rogers[12] adds: "*Nig dug through boulders in the bottom of this shakehole north of Llynfell Quarry a couple of times in autumn 1988. He enlisted others for eight further trips November and December, a feat in itself, up there at that time of year! Diggers included Martins Hicks and Laverty, Gareth Jones, Richard Jenkins,*

Stuart France, Liam Kealy, Steve West and me. Further trips continued in summer 1989 down a pitch and along a bit, and it was surveyed. It was 20m deep, 30m long and not at all pleasant or solid. It's been looked at many times over the years and even re-opened in 2008, with Les Welch going down a little way, and getting more timbers put in I think. He was probably the last person there."

Ogof Serra Pelada. (©Brendan Marris)

This cave lies in a strategic position on the line from Pwll Swnd to Ffrydiau Twrch so must always be considered an option for further investigation.

Llynfell Quarry Rift SN 76264 17731 at 495m asl (CCR entry 2020-83)

The quarry is quite a landmark, as is the tramroad which linked it to the valley below.

Mary Rogers[13] reports that, "*One of the rifts in the quarry was opened up in the late 1990s, with a lot of digging downwards in 2008.*" It is described in the Registry as being situated, "*At the back of ledge near top of quarry.*" And as being a, "*Tight rift dropping into dig.*"

There is also a small cave in the same quarry:

Llynfell Quarry Cave SN 76270 17710 490m asl (CCR entry 140)

Blaen Llynfell Sink SN 76843 18582 502m asl (CCR entry 150)

This site should not be confused with 'Llynfell Sink' which lies 1.5km to the south – see below.

Both the sink and three nearby small caves have been dug[14]. The water sinking here has not yet been traced to a resurgence. It could simply feed the headwaters of the Nant y Llyn, as Gascoine[15] marks a resurgence at the head of this rivulet, probably meaning the intermittent pool marked on the OS map at SN 76602 18367. Or, given that the sink is very close to a col, water sinking here could drain northwards and feed one of the small resurgences at the head of the Sawdde Fechan. Alternatively, it could pass beneath the Nant y Llyn and feed Ffrydiau Twrch, over 2km away and 170m lower in altitude.

Llynfell Sink has been a focus of interest since Bill Little noted its importance in the early 1950s. (©Brendan Marris)

Llynfell Sink SN 76224 17229 464m asl (CCR entry 134)

One of only two sites with a proven hydrological connection to the resurgence (the other being Pwll Swnd). This sink has already been mentioned as a site that attracted the attention of Bill Little and his team in 1951. Some years later, Mel Davies[16] opined that, "*this could be a promising dig unlike other swallets in South Wales, because exposed in the wall of the swallet is the remnant of a pothole, probably formed when the swallet floor was 20ft or so higher than at present.*"

This and several nearby sites (see below) received "*copious attention*" from Nig Rogers and friends in the 1980s according to Mary Rogers[17].

Llynfell Pot SN 76163 17172 465m asl (CCR entry 127)

Situated a little south of the sink itself, this was one of Nig's sites from the 80s as he reported[18] in NL99:

Llynfell Pot (761.172)

Six trips have resulted in a thirty foot shaft accessible only to midgets. A very narrow rift has been widened by blasting and it is hoped to make it larger in the near future. Boulders block the way on at the bottom and it will be necessary to get more than one person down the shaft in order to move these. The entrance lies just beneath the Honeycomb Sandstone and it is in a good position to meet up with the water from the main sink.

Whether it was ever enlarged is not recorded but this is clearly a dig worth a renewed assault.

Other sites in the Pwll Swnd area

This area has seen a great deal of 'prospecting' over many years, certainly from the 1930s onward. Naming, re-naming and confusion abounds; unsurprisingly, given the difficulties of pinpointing a location in the pre-GPS era and the reluctance of some explorers to publish their work.

Some sites logged in the Registry and mentioned in Nig Rogers' diaries include:

Scud Pot SN 76338 18311 538m asl (CCR entry 1253)

Razor Pot SN 76140 18169 555m asl (CCR entry 123)

Rocket Tube Hole SN 76062 18782 526m asl (CCR entry 2020-84)

Arthur's Pot SN 76164 1819 561m asl (CCR entry 128)

Ogof Foel Fraith SN 76125 18657 565m asl (CCR entry 120)

Forgotten Cave SN 76318 18394 544m asl (CCR entry 143)

Pwll Gilliam SN 76144 18092 553m asl (CCR entry (2019-19)

With the discovery of Ogof Dan y Lleuad Wen opening up new possibilities, research and investigation with a fresh pair of eyes and perhaps different digging techniques might pay dividends – who knows? In short: a prime area for fresh investigation!

Ogof Dan y Lleuad Wen SN 75794 18665 572m asl (CCR entry 146)

Paul Tarrant first introduced the SWCC reader to this dig-that-became-a-cave in SWCC Newsletter 115 in 1995 and then all fell quiet. Here, we are most grateful to Mary Rogers for picking up the story and bringing us up to date.

"After N (Nig) passed away in 2018, those that knew about this extension decided that it should be publicised, as potential for more discoveries must exist. This led to my article in the Cambrian Caving Council Newsletter (No. 61, Dec 2019). This article is an updated version of that.

When Mark Withers found DYLW by opening up a small shakehole on the north side of Foel Ffraith in 1991, it proved to be the longest cave discovery on the Black Mountain since Pwll Swnd. Hence, local cavers were very interested, and many trips were made over the next few years by various groups, including Liam Kealy and Amman Valley CC members as well as Grwp Ogofydd Garimpeiros. All explored possible leads and climbs in differing areas, so that by mid-1993 450m had been surveyed.

By then N had decided to look in a different part of Mark's discovery along with his two Garimpeiro mates Dai Hopkin and Jeff Bain. In time they detected a good draught at a very bouldery area of breakdown off the large Canyon Passage. This choke proved impenetrable to digging and banging, so eventually a very large dose of persuasion was fired and left to stabilise itself over time.

By spring 2004, 11 years later, N had met up again with Les Welch whom he persuaded to start caving again, as a Garimpeiro. I returned with them both to that DYLW choke in early May where we found that an opening, of sorts, had been exposed. Several boulders were moved, and a couple of bigger ones banged so as to open it further if possible. Three weeks later, N and I returned with Paul Tarrant and dug a bigger opening between the boulders that it proved possible to wriggle through at a very specific angle to follow the draught. Paul declined this tempting experience, so I followed N through gingerly. We found an unpleasant awkward drop down through a damp, narrow, draughting rift, the floor of which comprised debris, rocks and water in a state of constant motion. We eventually descended into good clean cave passage and explored about 200m that day. N would probably have carried on longer but was no doubt a little concerned about reversing the breakthrough rift and wriggle upwards, as well as my capabilities. (Over the following months, that rift continued to degenerate, boulders moving, the floor falling away as you stepped on it and the sides moving, propped up by yet more timbers! Not good for health and safety.)

Frenetic activity ensued over the next 18 months, exploring this new extension. N was totally consumed by this, finding it hard to believe that he had finally been enabled to find this large cave passage under the Black Mountain. He went in 17 times in that time, Les and I managed 11 each, all ably assisted at various times by Paul, who braved the breakthrough point 6 days after that first look, and after following a crash diet, advancing another 100m, as well as by the few remaining Garimpeiros - Chris Duroe, Richard Jenkins, Martin Hicks and Martin Laverty. Trips averaged 7-10 hours with most revealing something new and no banging required. Les' climbing expertise and long reach proved invaluable in safely exploring numerous pitches and climbs.

At the bottom of that breakthrough rift, turning right leads to Omaha Rift, a traverse leading in the direction of the Lower Series. Turning left winds along, passing various side passages, past Crowbar Junction to the top of the first pitch in the extension, self explanatorily named Absent Friends. After a few trips, a fairly tight crawling bypass to this pitch going off on the left was pushed by Chris and emerged at a balcony above the bottom of the pitch. By carefully crawling through boulders up behind this, progress onward can be made to emerge into a fine, massive upward sloping chamber that is beautifully decorated with pristine white calcite, later called Arthur's Table. Retracing one's steps over boulders towards the bottom of the pitch, you pass a loose bouldery descending passage on the left, the partial descent of which in 2010 could have led to a fatality following a very memorably loud megacollapse, possibly heard in Brynamman. N felt this area has great potential for further exploration, seriously.

The main line of the cave continued southwards from Absent Friends, with various side passages and climbs to explore, creating a Peaceful Easy Feeling. Eventually we reached the base of a pitch that required scaling, as little further progress had been made elsewhere. N slowly started bolting up on the first trip in Les' absence, almost causing hypothermia in Richard, and I was fortunate to be with him on the second trip when the climb was completed. (Incidentally this pitch can now be bypassed along a traverse around to the left which Ed made more accessible in 2010 by Hilti-capping.) Once at the top of the pitch we tentatively traversed southwards and crawled up a sandy slope to the top, where N thought he felt a strong draught coming through the sandy infill. He soon dug through this sand with our only available digging tool, a bolting spanner, hence Spanner Dig memorably gave access to the continuation of more large fine passage heading south that we again carefully descended over the bouldery floor until reaching another 20m pitch down. An unforgettable experience!

Subsequently, many leads throughout the cave were explored and pitches scaled within side passages. Good formations were found in various parts of the extension and tape was laid to protect these as well as pre-digital photos taken. A good line survey within a year of most but not all of the finds up to then gave a length of 1144m and depth of 58m. This could probably be added to by other finds in the intervening years.

Within a couple of years activity waned due to life's problems and other caving distractions, although various sites had been identified with possible potential. Interest was re-ignited in 2010 by re-connection with Mat, a younger caving friend, and his mates who were soon told about these discoveries. Several trips were made over the next few years, re-bolting pitches and concentrating on certain areas. By 2014 Mat and Frazer had modified the unpleasant breakthrough passage to a certain extent as it had never been popular and dug/climbed down the smaller, often wet pitch beyond the 20m pitch, thought to be full of potential. However, activity again diminished due to life's vagaries. Varying amounts of water are found in parts of the extension, obviously dependent on the time of year, but it has not yet been traced to a resurgence. This will most likely be Ffrydiau Twrch, 333m to the east, like Pwll Swnd.

From the beginning, N decided to keep quiet about these finds and all visiting cavers, who up till then had numbered 16 at most, were persuaded to remain silent and they did so. Initially he had just hoped to explore whatever was possible first prior to talking, but, over the years, many other factors came into play, such as personal disagreements and differing caving attitudes, fuelled by his experiences at Carno and Draenen especially. These all served to exacerbate feelings and heighten his general disillusionment. Thus, the silence

ODYLW: Exploration Era: From Left: Mary Rogers, Les Welch, Chris Duroe, Paul Tarrant. (©Paul Tarrant)

remained virtually intact right up until he passed away. I believe he was content in the knowledge of what had been found, so close to home, and still with good potential for further extensions at some time by others.

Although the cave entrance has always been wide open to all, with no gate, DYLW is very obviously rarely frequented. It seems incredible that, apparently, no one had just stumbled across the extension in over 15 years. It should be pointed out that these bouldery passages should be treated with great respect, as caver activity has been sparse in spite of the timescale involved. It is quite an undertaking to do a worthwhile trip to DYLW, set as it is in a beautiful but remote area. Visits would not be recommended in the shorter days of winter or bad weather. Those early discoveries were long, arduous and exhausting, but they gave me the most exhilarating experiences of my fairly limited caving life. These memories were enhanced by surreal hikes back over the mountain lit up by a white moon rising over Foel Ffraith, or even heaving tired limbs and wet sacks back through thick mists, howling winds, heavy drizzle and bogs galore - all part of the adventure, I guess.

Tony Donovan was eventually told about the extension, as he had long held suspicions, and he made several trips into the new passages after Sept '19. Suffice to say that, from what he has told me, tighter passages in the cave have been 'Donovanised', (sorry Tony). The breakthrough passage by then was even more unstable (back to rotten timbers!) and I have it on good authority that that experience is now completely altered and safe. Tony enlarged considerably, the bypass passage to the Absent Friends pitch and possibly other places, as well as looking at most parts of the cave looking for further digging opportunities.

Not surprisingly, in view of winter weather after the initial publication and the hiatus in any caving activities inevitably caused by COVID-19 in 2020, there has been little interest in exploring this extension. I am 99% certain that only two trips have been in since then, both in September and involving SWCC members, I believe, and no doubt digital photos will have been taken. I have been forwarded a description of one trip made, in which there are various glaring errors apparent with names, obviously caused by misinterpretation of places mentioned in the original article, which was not intended as a guide to the finds, just acknowledging their existence with the line survey as a guide for anyone interested.

This will obviously be rectified by survey material being co-ordinated, with appropriate names being given to passages as N wished on a Grade 5 survey freely available. John Stevens has started this in 2019 and fully intends to complete it in time just as soon as COVID-19 movement restrictions are eased, with appropriate help. Hopefully in time other diggers will enjoy looking to extend the limits of the cave further as more potential must exist in this beautiful area.

As I wrote previously, everything that has been found up to now would probably have remained undetected were it not for Mark Withers' original exploits in 1991. There are literally hundreds of similar depressions over the Black Mountain worth looking at. Sadly, we've still been unable to renew contact with Mark to let him know what has developed since - any help with this will be much appreciated."

ODYLW: Not a small cave! (©Brendan Marris)

ODYLW: Claire Vivian on Pitch 2. (©Paul Tarrant)

Ffrwd Las, its Catchment and Hinterland.

Ffrwd Las is the second of the two substantial risings mentioned in the introduction and lies on the east bank of the Twrch. It has received less attention as a digging site than Ffrydiau Twrch, perhaps because it was used as a public water supply in the early years.

Martyn Farr[19] and Bomber Beaumont brought diving gear to the site in July 1981, reporting that, "*Nigel Rogers had removed several boulders which apparently prevented access to open sump, so on a fine sunny day M.J.F. (*Martin*) and R.F.B. (*Bomber*) went to take a look. The result was extremely disappointing. An extremely tight rift is encountered immediately, rather less than 0.3m wide. Without a lot more work the site is impossible*."

Defining the Catchment

Attempts to identify the origin of the considerable flow resurging at Ffrwd Las continued over several decades. The results of a number of tracing efforts are summarised in the table presented on the facing page. The very rapid throughflow from Ogof y Garimpeiros to Ffrwd Las is especially noteworthy and is interpreted to imply significant open cave passage.

To the east, the watershed between the Dan-yr-Ogof catchment and Ffrwd Las has yet to be determined. The single attempt by Bill Gascoine[20] in 1982 to discover the destination of water sinking at Banwen Gwys Sink was inconclusive but has never been repeated. A further sink in this area, Twll Glan Twrch (see below), lies some 800m SW of Ogof yr Enfys and a similar distance north-west of the Banwen Gwys Sink. It too could be important in defining the watershed.

It is also noteworthy that water from both the surface sink on Carreg yr Ogof and from the adjacent Ogof y Garimpeiros crosses under the Twrch to rise at Ffrwd Las.

This leaves an undefined watershed somewhere to the west of the Carreg Las / Carreg yr Ogof ridge. As discussed above in relation to Blaen Llynfell Sink, the situation here is complicated by both the Nant y Llyn stream on the surface and the possibility of a small underground catchment feeding the Sawdde Fechan. A site which might be relevant in this regard is an intermittent sink, high on the southern brow of Carreg Las at SN 77314 18854, situated in grit and 539m in altitude (CCR entry 1810).

Towards a Master Cave?

The Twrch valley and the surrounding hills feature some significant geological faults, as shown in a simplified form in the sketch map reproduced in the introduction to this section, on page 31.

In his conclusion to an important article in SWCC Newsletter 118, Nig Rogers[21] interprets these structural controls to present his view of the form that an 'East Twrch Master Cave' might take, suggesting that "*This is almost certainly situated under the cliffs on the east side of the Twrch, a complex structure that is probably an overthrust fault. The water from Carreg yr Ogof probably comes down the Twrch Fechan Fault (there are several large shakeholes, some taking water) and crosses under the surface River Twrch at the northern end of the gorge, some 90m vertically above the level of the rising*."

In the same article, writing about Ogof y Garimpeiros, Nig opines that, "*The end of the existing cave draughts strongly and the hydrological evidence suggests a rapid junction with the water from the eastern sink, with a probable enlargement of passage size and further massive potential all the way towards the rising.*" (The 'eastern sink' Nig refers to is that tested by Jones[22] in 1973 and recorded in the Registry as 'Sink 3 or Wet Sink 1'. It is no more than 200m away from Ogof y Garimpeiros.)

The Journey to Work!

The considerable spread of the Ffrwd Las catchment encompasses some of the most remote, inaccessible and wild countryside anywhere in Wales, which makes the challenge of any speleological work considerable, if only in terms of the 'time on site' / 'time trudging the moorland' ratio. There are perhaps four main points of access. For Carreg yr Ogof, approaching from Llandeusant in the north is favoured, whilst for the eastern area around Diwedd yr Enfys, starting from Dan-yr-Ogof and walking on westward past Waun Fignen Felen is an option; Enfys is little more than a mile beyond the Giedd. The area around the Ffrwd Las itself can be reached by various paths starting in Cwmllynfell and the western flanks of Carreg Las may be approached from Herbert's quarry. Much depends on where you drive from, the weather and the payload you must deliver!

Key Sites: Carreg yr Ogof Area

In the article 'Somewhere Under the Black Mountain' Nig Rogers[23], describes in some detail the dogged campaign of digging and exploration he conducted with many different companions over a period of almost twenty years in many sites dotted on, around and under Carreg yr Ogof. Some of these sites are catalogued below. They fall into two groups. A higher-level group of fossil caves mostly along the western flank of the

Summary of Water Tracing to Ffrwd Las Resurgence							
Date of Test	**Tester**	**Method**	**Site Tested**	**NGR if given**	**+/-**	**Time**	**Source Reference**
24/03/1973	Gareth Jones	Fluorescein	Carreg yr Ogof (Sink 3 / Wet Sink 1, in Registry terms.)	SN 781 216	+ve	8 days lapsed before sampling.	SWCC NL73
Prior to 1989	Bill Gascoine	Lycopodium	Carreg yr Ogof (Sink 3 / Wet Sink 1.)	SN 782 213 at 551m asl	+ve	4 days lapsed before sampling.	Limestones and Caves of Wales, Ford, 1989, page 53
14/08/1982	Bill Gascoine	Lycopodium	Ogof yr Enfys	SN 796 191	-ve		SWCC NL97
14/08/1982	Bill Gascoine	Lycopodium	Banwen Gwys	SN 798 184	-ve		SWCC NL97
Mid-1980s	Nig Rogers	Fluorescein	Ogof yr Enfys	N/R	+ve	N/R	Reported by Bill Gascoine (May 1989) in SWCC Newsletter 106 page 7.
Mid-1980s	Nig Rogers	Fluorescein	Bwlch y Ddeuwynt	N/R	+ve	N/R	
1995 or 96	Nig Rogers	Fluorescein	Ogof y Garimpeiros (Water from Sink 4 / Wet Sink 2 in Registry terms.)	N/R	+ve	<95 hours	SWCC Newsletter 118 page 206
1996	Nig Rogers	Fluorescein	Ogof y Garimpeiros	N/R	+ve	<24 hours	SWCC Newsletter 118 page 207
Notes: NGR details are given exactly as reported by the original author. Where no NGR is given, none was reported. Accurate NGR data is available in Cambrian Cave Registry for all sites listed. Where there is uncertainty regarding the date a best estimate has been deduced from publication dates and other sources.							

hilltop and the sinks, of which there are at least six, somewhat lower and mostly to the east or north-east of the ridge proper.

A fine view giving the scale of Ogof y Garimpeiros. (©Brendan Marris)

Ogof y Garimpeiros SN 78015 21750 540m asl (CCR entry 162)

Nig's article[23] gives an excellent account of the discovery and exploration of Ogof y Garimpeiros and includes a survey of this significant cave. Impressive evidence of what can be achieved by digging! A small surface stream that sinks close the entrance (in 'Sink 4 / Wet Sink 2' to follow the Registry naming system) is encountered at various points in the cave. This stream has been tested to Ffrwd Las, 5.5km away with a through-time of under 24hours.

Ogof Carreg yr Ogof SN 77831 21572 572m asl (CCR entry 157)

The cave that put the 'Ogof' in Carreg yr Ogof!

This cave has been known for a long time but remains an interesting and important site, lying as it does above but close to Ogof y Garimpeiros. A calcited choke at the end of the historic cave was successfully dug by Nig and his friends in 1983, gaining access to a short length of passage and a perched sump. This was duly dived, and in the words of Martyn Farr[24], "*The sump was crystal clear, about 1.2 – 1.4m in diameter but ended abruptly less than 10m from the surface at a depth of approx. 3m. Absolutely no prospects.*"

White Death Sink SN 78190 21544 545m asl (CCR entry 169)

Ogof Carreg yr Ogof – This long-known, open cave is remarkably well preserved thanks to its remoteness. (©Brendan Marris)

Nig[25] dug here in the winter of 1980 and describes progress as follows, "*After securing a large loose boulder to a crowbar jammed in the snow, Nelson was able to squeeze over it into 2m or so of sharp, tight passage developed in shale before being stopped by an acute bend. Reversing this manoeuvre was problematical, at one stage looking decidedly doubtful, hence the name – White Death Sink.*" The site was later dug by Liam Kealy and HCC, revealing some 20m of passage.

(This is designated 'Sink 2' in the Registry naming system. Not to be confused with 'Wet Sink 2', which is actually 'Sink 4'; come ON now, keep up, it's not THAT complicated!)

Sink 1 SN 78167 21539 548m asl (CCR entry 168)

Nig[26] describes digging here in 1984 in a fashion that hardly encourages, "*…at times it was hard to tell whether it was the walls or the floor which were moving…*" and, "*…some fair progress made down a desperate boulder funnel…*" But Nig didn't employ scaffolding, so with a different approach, who knows what could be achieved?

(Again, 'Sink 1' should not be confused with 'Wet Sink 1' which is actually 'Sink 3'. Well DONE, you're really getting the hang of this now, aren't you?! But you aren't out of the woods yet, there is a twist in the tail. This sink, 'Sink 1', is also described in the Registry as 'East Sink', although it's not as far east as 'Sink 2'. But worse is to come; several authors refer to 'Sink 3' as the 'eastern' sink and 'Sink 4' as the 'western' sink. Well, having got that off my chest I need a drink, and I expect you do too!)

The Slot SN 77862 21351 582m asl (CCR entry 159)

Described[27] as a "*6m deep vertical rift*" which gives access to a passage going in two directions. Nig Rogers and Paul Tarrant worked here together in 1984 pushing the northern branch, but despite successfully blasting their way through a solid calcite blockage with some difficulty, they only found a small blind chamber with a trickle of water sinking in the floor. They had judged the boulder choke in the southern branch too unstable – but who knows what an expert scaffolder might make of this lead?

Shepherd's Hole SN 77738 21319 579m asl (CCR entry 156)

Once again, we turn to Nig Rogers[28] for an account of exploring this cave, this time in the company of Liam Kealy. By Nig's account, after removing some stone slabs at the entrance, they, "*dropped down a 4m pitch into 13m of well-decorated passage, chokes at either end. Exciting at the time but ultimately disappointing…*" He does not say if either choke was poked, prodded, or blasted to kingdom-come, but all three are quite probable!

Ogof y Gigfran SN 77698 21291 575m asl (CCR entry 155)

This cave was apparently known by SWCC members prior to 1965 but was first reported and described by Mel Davies[29] in NL52. He describes digging out the false floor of a crawl, extending the cave from 20ft to 60ft in length. This brought his party to a modest chamber with a calcited boulder choke at one end. Mel reports that an inward draught could be detected on a warm August day, but this could not be traced further in the cave. Nig dismisses this draft as, "*probably surface related*" and he seems not to have attacked this particular boulder choke!

Key Sites: East of the Twrch

Despite Nig Rogers' proposition that the postulated 'East Twrch Master Cave' lies beneath the cliffs marking the eastern flank of the Twrch gorge, the area sports little by way of known cave. There are four sites of interest, all of them sinks. Only one, Ogof yr Enfys, is a cave, and only two have been confirmed as draining to Ffrwd Las. (Anything further east lies within the confirmed Dan-yr-Ogof catchment.)

Ogof yr Enfys SN 79741 19233 430m asl (CCR entry 173)

The epic story of the initial dig and subsequent discoveries in this highly significant cave are told by Nig Rogers[30] in some detail in NL98. When that was written the connection to Ffwrd Las had yet to be proved but with that knowledge since secured, the potential of pushing this cave still further must be considerable. The expected confluence between the Carreg yr Ogof and Enfys branches of the 'Master Cave' cannot be far away!

Twll Glan Twrch SN 79300 18700 approx. 420m asl (CCR entry 2017-121)

First recorded[31] in 1963 and described in NL45 as a "*very promising solution hole*", it has seemingly had no attention since. (To judge from the lack of a modern GPS fix in the Registry entry one suspects that it has not been located or inspected for some time!)

Its position makes it a candidate as a 'back door' into the Enfys branch of the 'Master Cave' and as previously noted, it may be a significant site in defining the Ffrwd Las catchment.

Banwen Gwys Sink SN 79831 18254 420m asl (CCR entry 177)

A second site of significance in defining the Ffrwd Las catchment. One test in 1982[32] using Lycopodium was negative at all sampled resurgences.

Bwlch Y Ddeuwynt Sink SN 78400 17300 420m asl (CCR entry !72)

Significant as a proven feeder to Ffrwd Las[33].

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Chapter 2: The Western Tawe Valley

Excluding Dan-yr-Ogof

Overview

The western side of the Tawe between Pen y Cae and the Gwyn Arms is dominated by Dan-yr-Ogof, both in a purely visual sense and also in the minds of many cavers. From an exploratory perspective that is a shame: there are two significant risings and associated blocks of limestone not directly associated with the Dan-yr-Ogof resurgence and cave system as far as we know.

One of these risings is the stream coming out of a small circular tube or 'tunnel' that gave Tunnel Cave its name. (The 'old entrance' to what is now 'Cathedral Cave'.) Tunnel Cave stretches into a block of limestone lying north of Dan-yr-Ogof which extends almost 2km north-west.

The second rising is Hospital Cave, located behind the 'Coach House' at Craig y Nos, which clearly drains a substantial part of Cribarth. These two areas are examined below.

Ogof Haffes – A Treasure Yet to be Discovered?

As one walks along the footpath towards Waun Fignen Felen and the Giedd valley, having left Tunnel Cave top entrance behind and heading north-eastwards, one is walking on limestone and will witness limestone exposures to the right, decorated with occasional erratic sandstone boulders. In fact, there is a very substantial band of lovely Dowlais limestone stretching from the path most of the way to the crest of the steeply incised gully of the lower Haffes. At this point the most northerly part of Dan-yr-Ogof is half a kilometre or more to the west and Tunnel Cave top entrance a similar distance away.

This is a significant chunk of rock with no known cave beyond a few digs and superficial crevices.

What follows is a re-working of a proposition floated by Bill Little[1] in the early 1950s.

Consider the following facts and possible conclusions:

1. The present floor of the upper Tawe is at a significantly lower level than it was before the last glaciation.
2. The River Haffes has very clearly cut it present course in quite recent times; indeed, its aggressive action has produced visible changes in the last fifty years. The delta at the Gwyn Arms is further evidence of this.
3. The Haffes follows the boundary between limestone and older rocks quite closely.
4. It is perfectly plausible to suppose that the headwaters of the Haffes have been captured as a consequence of the lowered level of the Tawe Valley.
5. It follows that prior to being captured, the pre-glacial, proto-Haffes may well have gone underground somewhere in the vicinity of Waun Fignen Felen or somewhat to the east.

Bill was seeking to explain the development of the large passages in Tunnel Cave, which now only carries small-scale streams originating from percolation. But the same argument leads to the possibility that there was once an Ogof Haffes, carrying the Haffes through the big chunk of 'lovely limestone' alluded to above. Perhaps it resurged at Tunnel Cave, perhaps elsewhere? But we ought to try to find it!

The concept of an 'Ogof Haffes' has been in circulation since the earliest days of the SWCC but surprisingly little effort has been expended seeking it out. Certainly, the most significant push was an enterprise prosecuted by our sometime President, Edward 'Blokes' Aslett. His dig has several names, but 'Bloke's Dig' is my preferred choice. In 1967, *Blokes and Derek Webley[2] described it as follows*:

"The cave lies 200 yards north of the Tunnel Cave entrance shaft, at the bottom of a swallet is a small chamber which is entered by straddling its water-fretted sides. On its floor, a near vertical tube descends to a narrow rift and after traversing to the left through an awkward vertical passage, one emerges at the top of a smooth-walled chimney. Chimneying down this one lands on a steep boulder slope which descends, on the left, to a terminal chamber and, on the right, to a crawl into another chamber with a boulder floor and some formations. The entrance of the latter is now partly blocked with boulders from the floor where we dig and its roof is unsafe.

To date, the cave is about 130ft deep. The left-hand terminal chamber has been dug out to a depth of 6-7ft and the disposal of the excavated boulders is the main difficulty as the rock slope encroaches on to the cramped digging space, and, indeed, it is possible (one of us is sure), that the way on lies under this ruckle. At the present it is impossible to bring boulders to the surface since they cannot be passed with ease through the rift traverse; only with sufficient labour could material be hoiked from the floor and chain-ganged above to fill the rift. Another difficulty (why make more?) is the filling up of the dig with mud carried down from the surface - a foot or so must be dug out each time before serious digging begins. All the walls are solid and are fretted with downward solution and at our last visit (last June) four of us commented on a cold upward draught coming from the right-hand terminus, even allowing for the warm bodies in a cold closed tube causing convection currents."

So, more pothole than cave or dig, but clearly something going somewhere.

This dig site is recorded in the Cambrian Cave Registry as follows:

Blokes Dig SN 83767 16740 382m asl (CCR entry 286)

Blokes and Derek, referring back to Bill's theory and contrasting local projects with the huge Balinka effort, concluded their article by writing:

> "*If Ogof Haffes was 1,300 miles away, the shaft would have been bottomed with rockcrushers and muscles, and yet it hasn't……., there's a lesson here somewhere, perhaps in Ogof Haffes.*"

So, for an accessible and genuinely worthwhile digging project how about discovering the long-famed Ogof Haffes?

Note

There is a much more detailed and thorough analysis of the evolution of the drainage of this area of Mynydd Du written by Alan Coase[3]. The interested reader is directed to Chapter V, Section F: Surface Drainage, together with the diagrams on Page 316.

Cribarth – A small selection of interesting sites

This is an extensive, complex block of limestone, much modified by quarrying. The hydrology is not well understood and is probably significantly influenced by faulting. Whilst Hospital Cave is a large and important resurgence, there are other springs dotted around the southern and southwestern sides of the hill. More important is the aptly named 'Cribarth Inlet' in Dan-yr-Ogof. This is the most southerly part of the known cave – accessible only to divers, in the Mazeways 2 part of the system. Some water drains from Cribarth into Dan-yr-Ogof.

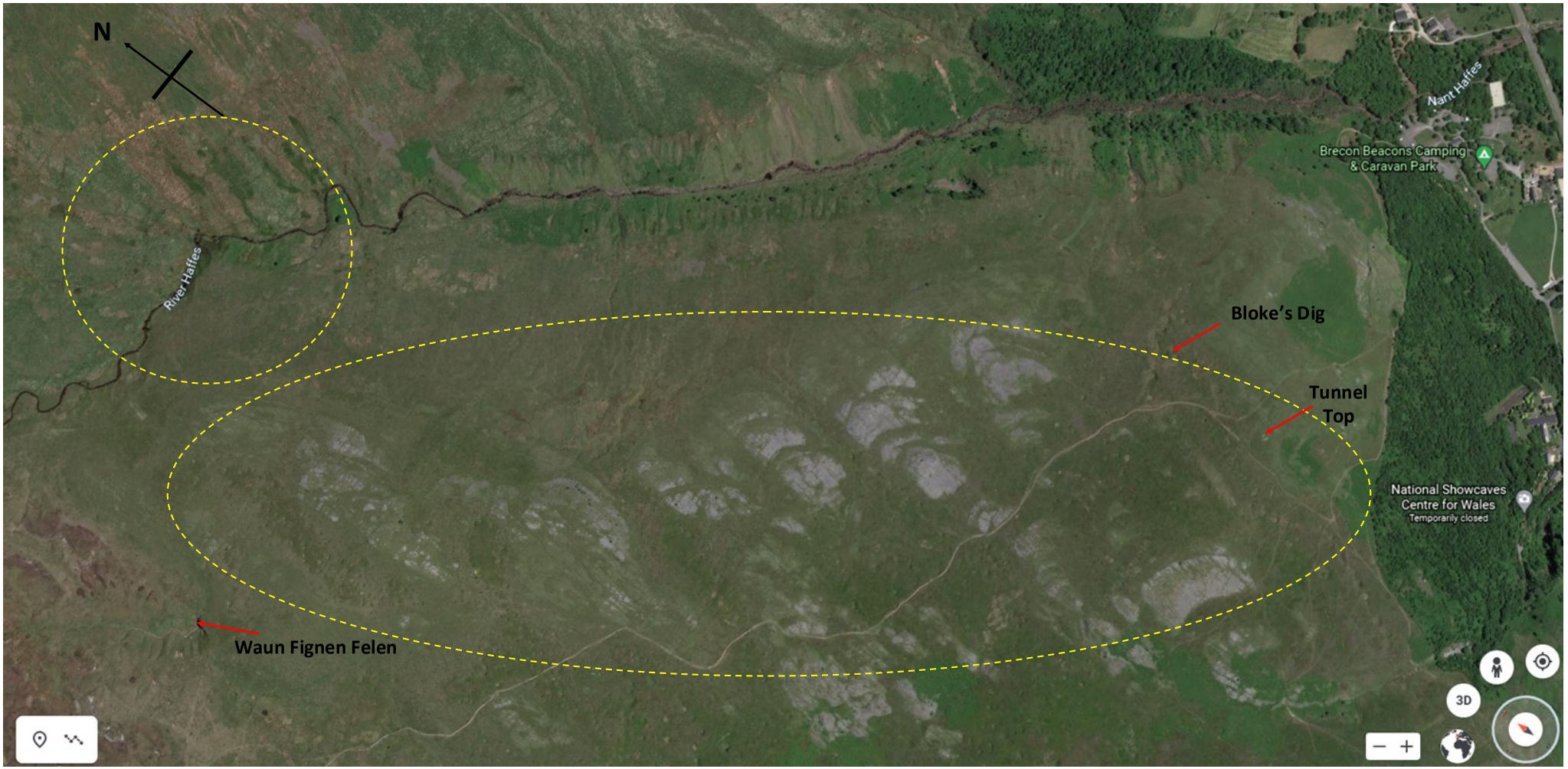
Numerous sites have been investigated and excavated over the years with some success but no big finds as yet. Nevertheless, with a major rising in the valley, the prospects of a 'Cribarth Master Cave' must be significant. The digs listed are a selection only. There are a good many others which are recorded in the Registry and may repay a fresh assault by keen newcomers!

Cribarth Sinc SN 83170 14668 367m asl (CCR entry 240)

A positive connection between this sink and Hospital Cave was established in 1999 using optical brightener as the tracing agent[4].

This sink in the bottom of a shakehole had been dug in the 1970s by Steve West and Bob Radcliffe but was abandoned when the shaft collapsed after a couple of metres.

In 1998 a fresh assault by Tony Donovan, Bernie Woodley and Martin Groves was more successful. *Here Martin Groves describes his experience of being involved in this significant discovery*:



Google Earth view of the area discussed in this section. Note the rotated North point. The large yellow ellipse outlines the approximate block of 'lovely limestone' discussed. The yellow circle indicates the area where the rapidly down-cutting lower Haffes might have captured the older headwaters which perhaps once sank nearby. The steep, gullied flanks of the lower Haffes are clearly visible. The most northerly point of Dan-yr-Ogof lies off the edge of this image somewhere behind this caption!

Digs, Digging & Diggers

"It is with great fondness that I try to recall the details of the passages we discovered at Cribarth Sinc back in 1998. It was the first significant caving find I was involved in and as such the first 'hit' that got me addicted to cave exploration for the next twenty years. The dig had been subject to sporadic attempts over the years and was resurrected by Tony Donovan and Bernie Woodley in 1998, and it has all the factors one would look for in a promising site; it takes water, drafts and there is a 'solid' wall to follow. Several weeks of slogging up the steep initial incline of Cribarth with scaffold bars ensured steady progress and a breakthrough at the bottom of the shaft looked imminent. I missed the initial break through trip, which I believe the late Clive Jones was a part of, but a lovely dipping passage was found to a sharp dogleg which led, via a low bedding, to what appeared to be an impenetrable immature streamway. The standout feature of the short section of cave was the sparkling ceiling of yellow glitter, which Clive was hoping was some sulphur-based life form! (See footnote below).

I visited the new section of cave with Tony the following weekend, having been disappointed to have missed out on the breakthrough. The way on did not look too hopeful in my, inexperienced, eyes. I was in awe with how Tony postulated that there was a mud-choked bypass to the obvious immature passage. It looked like a solid wall to me; did the guy have x-ray vision? We hacked with a crowbar and he was right, as we hacked our way into a mud wall; hence the legendary Cribarth mud was born. (No one who has had the pleasure of visiting Cribarth Sinc will forget this, suit cleaning often takes longer than the caving trips!) We metamorphosed into half-worm, half-human beings and steadily bored our way forward. We returned the next day and after several hours of arm-wrenching effort, the magical feeling of a crowbar breaking into empty space followed by the ensuing draft of fresh air signified, even to a novice, that we had broken through. Despite the constricted conditions we bored away like crazy moles, with the blackness ahead becoming more and more evident, and within an hour we were crawling down a beautiful hands-and-knees-sized passage. The passage ended in a rift which was scattered with dark, black, chert ledges. Upwards we climbed, with every other hold breaking off. We traversed a short distance along before dropping down to a continuation of the original passage. 'Upstream' soon choked in all directions and downstream led to a horrendous choked chamber and immature streamway. Many trips ensued to force a way on; most were coupled with scary boulder experiences in the choke and no new passages of significance were found.

The cave was surveyed by Jules Carter and me, and Tony Donovan and Roy Morgan conducted a dye trace to Hospital Cave. Interest was gradually lost as we seemed to have hit an impasse and the dream of finding a link through the Cribarth Disurbance and a route into Mazeways seemed more and more distant and this was the big dream for the site, though a through-trip from the top of the hill to Hospital Cave would have been one for the connoisseur!"

(A more detailed history of the work at Cribarth Sinc can be found in NL121[5] which included a survey, republished below, and some very thorough geological notes by Keith Ball that would be of value to anybody contemplating a dig on Cribarth.)

A footnote regarding bacteria mentioned above

When Martin submitted this article for publication, he suggested that I consult Gary Evans about the sparkly yellow bacteria as Gary and Martin had discussed them previously. *Jules Carter was soon involved too, and an interesting exchange of emails ensued, the conclusion of which was the following summary from Jules*:

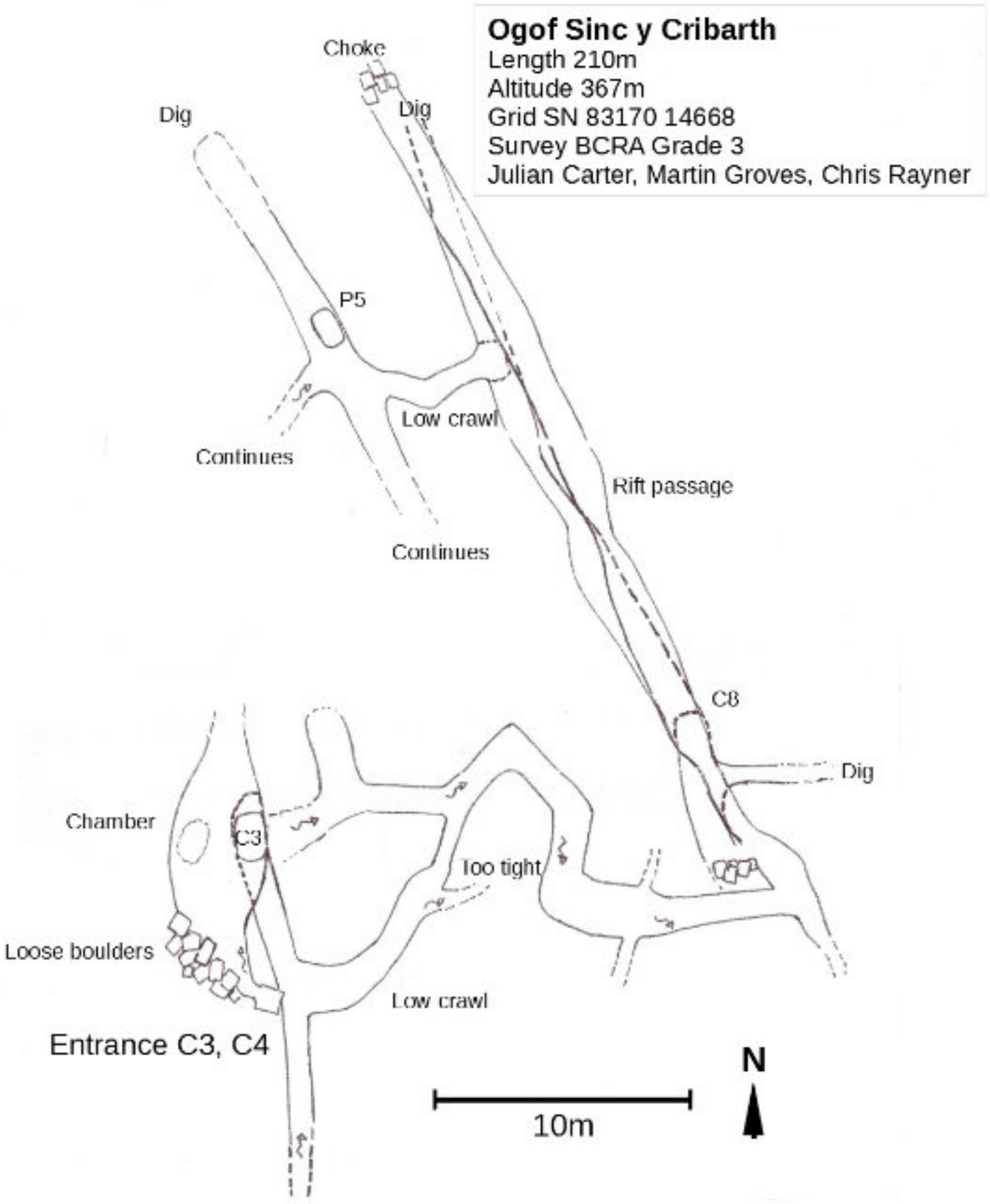
"As to the yellow bacteria I have finally managed to find some published peer reviewed research on these primarily from a Slovenian researcher, Janez Mulec. The white and yellow pigmented forms are a form of subaerial biofilms and comprise of a mix of bacteria, with forms such Pseudomonas spp giving the fluorescence we are seeing, although another Slovenian researcher has found Streptomyces as the more abundant group e.g. https://scholarcommons.usf.edu/ijs/vol43/iss1/5/. This is a complex area to study which explains the limited research (it needs a lot of resource and lab time) but essentially these little balls of colour are forming their own diverse micro-biomes which is rather cool! Also most drivers into biomolecular work in caves is looking at unique metabolic systems associated with low nutrient and autotrophic systems, whilst the bacterial complexes forming these yellow and white colonies are generally much better understood (though not necessarily as biofilms in cave ecology).

So, reading through some of the previous email conversation:

- It's not a sulphur bacterial system as Clive Jones was hoping! (Though Clive was right in his hypothesis that such sulphide reducing systems play a role in cave formation).
- Funnily enough, lighting may well affect how we notice these colonies as modern LEDs can induce fluorescence in different ways.
- Is there a change from one colour form to the other? And is it affected by human activity in the cave? No idea! This was my musing about the 'citizen science' project with Gary. One of the images does show the yellow form when Sinc y Cribarth was found, and interestingly I was in Carreg Lem recently where the initial chamber roof is an amazing example of the white form, and this was noted by the first discoverers as well. Thus, I think it is it safe to say they are a natural part of cave ecology, but it is something we could be affecting..."

(Above, Left, Below Left) All four photos © Jules Carter. Cribarth Sinc Entrance, Sparkly yellow stuff, the lovely mud, happy explorer!

(Below Right) Cribarth Sinc's 'dark, black, chert ledges'. (©Brendan Marris)


Ogof Sinc y Cribarth
Length 210m
Altitude 367m
Grid SN 83170 14668
Survey BCRA Grade 3
Julian Carter, Martin Groves, Chris Rayner
Choke
Dig
Dig
P5
Low crawl
Continues
Continues
Rift passage
C8
Dig
Chamber
C3
Too tight
Loose boulders
Low crawl
Entrance C3, C4
N
10m

Ogof Ddyn Gryf SN 83260 14564 391m asl (CCR entry 1734)

This was a dig begun by Glyn Jones and 'The Valley Boys', as we knew them back in the early 1970s. With several colliers amongst them, they were indeed strong men, 'Strong Man's Cave' being the English translation of the name.

Its present status is unknown, but it may repay a fresh campaign!

Dig on Cribarth SN 83669 15196 320m asl (CCR entry 1605)

Described briefly as, "*a wet weather sink that has been dug to 3m ending in rubble fill.*" It is situated high above Hospital Cave, about 800m north-east of Cribarth Sinc. There is no record of any dye-tracing.

Cautionary Note

A number of sites on Cribarth lie within the area designated as Scheduled Monument BR237 'Cribarth Limestone Quarries and Tramroads' and are consequently subject to special protection, Cadw being the responsible authority. Refer to the Cambrian Caving Council[6] website for a complete list.

References

1. Little, Bill (1954), *SWCC Newsletter* 1.
2. Aslett, Edward, & Derek Webley (1967) "A Backyard Balinka", *SWCC Newsletter* 55, pp.12-13.
3. Coase, Alan (1977) [multiple articles], *BCRA Transactions* 4(1&2).
4. Donovan, Tony (2000) "*Cribarth Sink*", *SWCC Newsletter* 121, pp.34-36.
5. Donovan, Tony (2000) "*Cribarth Sink*", *SWCC Newsletter* 121, pp.34-36.
6. "Scheduled Monuments", *Cambrian Caving Council* via cambriancavingcouncil.org.uk

Chapter 3: The Eastern Tawe Valley

Mysteries, Minor Risings, and Hazel

As with Dan-yr-Ogof on the west bank, a caver's thoughts are unsurprisingly drawn to Ffynnon Ddu when looking east. This focus has created a form of collective tunnel vision with the result that the potential of much of the east bank has been overlooked in recent decades.

First and foremost, there is Craig y Rhiwarth, the large body of limestone that looms high above Craig y Nos with Allt Rhongyr behind it, stretching up towards Penwyllt. And then there are the risings. At least three in number; the first on the east bank of the Tawe opposite the more southerly branch of the Haffes. The second just inside the country park, close to the bridle way coming from Y Grithig, and the third close to the track leading to Pen-tŵyn Farm near the bottom of Penwyllt hill.

The Lower Byfre and Pwll Coediog

Whilst the upper Nant Byfre or Byfre Fechan goes underground and becomes the OFD main stream, the Nant Byfre proper becomes a tributary of the Tawe. Shortly before reaching the river, it passes through a small gorge and encounters a tongue of limestone where interesting things happen! This was recognised back in the early years; a sink was identified, and a dye test conducted which was reported as below[1].

Fluorescein Test.

The following test was carried out on Friday/Saturday, June 15/16th.

8ozs. of fluorescein was placed in the sink at Nant Byfre which is situated on the opposite bank just below the farm near Pwll Coediog. This was done at about 7.p.m. on Friday. The colour was seen coming out of the 1st. rising in the Tawe below the Gwyn Arms at about 10.30.a.m. on the Saturday.

It seems likely that the stream flows under or near Pwll Coediog.

D.W.Jenkins.

The Area of the Nant Byfre Sink. (©Gary Evans)

Fast-forward 65 years and enquiries by Gary Evans, speaking to Colin, who farms at Pwll Coediog Farm, adds the following useful information, "*Colin told us that in dry weather, the water sinks into the ground close to his farm. He showed us roughly where it disappears at around SN 85002 16485. He says that no water carries on downstream beyond the sink point in drier weather and that it sinks in the middle of the river – photos of the area attached. Some old formations in the wall of the Gorge there too!*"

A little way downstream, just before the bridge, is Ogof Glan Byfre, also reported by D. W. Jenkins[2]:

The hole which is situated near the bridge crossing the Byfre near the council houses was first noticed by D.W.Jenkins and P.I.W.Harvey after the fluorescein had been put in the Byfre sink.

The following week Jean and Gordon Clissold and Clive Jones also "discovered" it and they started to remove some of the clay. A week after that it was attacked by D.Hunt,Roy Williams, Alun Howells, and myself. A large amount of clay was removed and large boulders were encountered.

On July the 7/8th more material was removed and on the 8th.I was joined by Bill Clarke, Clive Jones,Roger Smith, David Walters and a fair number of the local population who turned up on hearing Bill's persuasive friend in action. The passage was a wonderful mud bath after the rain but the boulders were quickly pulverised and an entry was made into the passage beyond only to find that it closed down after a few feet. This was followed by a rapid departure of muddy and disappointed cavers and clean and disappointed 'locals'.

Total length of passage about 25 feet.

(Top Left) Ogof Glan Byfre. (©Gary Evans)

This is presumably a fossil remnant but could provide an interesting clue to the evolution of the other karst features nearby.

The nearby farm, Pwll Coediog takes its name from the wooded shakehole in the field between farm and river. This has been dug intermittently over many years, most recently by Sue and Keith Goodhead, Jon Jones, Mike McCoombe and Bernie Woodley. Gary Evans reports that there are two dig sites in the shakehole, on the southeast side where there is a limestone wall.

(Bottom Right & Bottom Left) Pwll Coediog Sinks 1 and 2. (Both in the same large wooded shakehole). (©Gary Evans)

The rising referred to in relation to the dye test is known as 'Gwyn Arms Rising' and its position has been unreliably reported many times, some authors even placing it on the opposite bank! Thanks to some diligent internet research and equally diligent fieldwork, Gary Evans located it and we now have both a reliable GPS fix and photographs!

For completeness, the Cambrian Cave Registry Data for the sites mentioned above are as follows:

Gwyn Arms Rising. The name is a misnomer; it is on the opposite bank of the Tawe to the pub and 500m down river! (©Gary Evans)

Nant Byfre Sink SN 84972 16500 228m asl (CCR entry 2020-86)

Ogof Glan Byfre SN 84920 16550 218m asl (CCR entry 1257)

Pwll Coediog SN 84802 16337 223m asl (CCR entry 201)

Gwyn Arms Rising SN 84518 16108 198m asl (CCR entry 299)

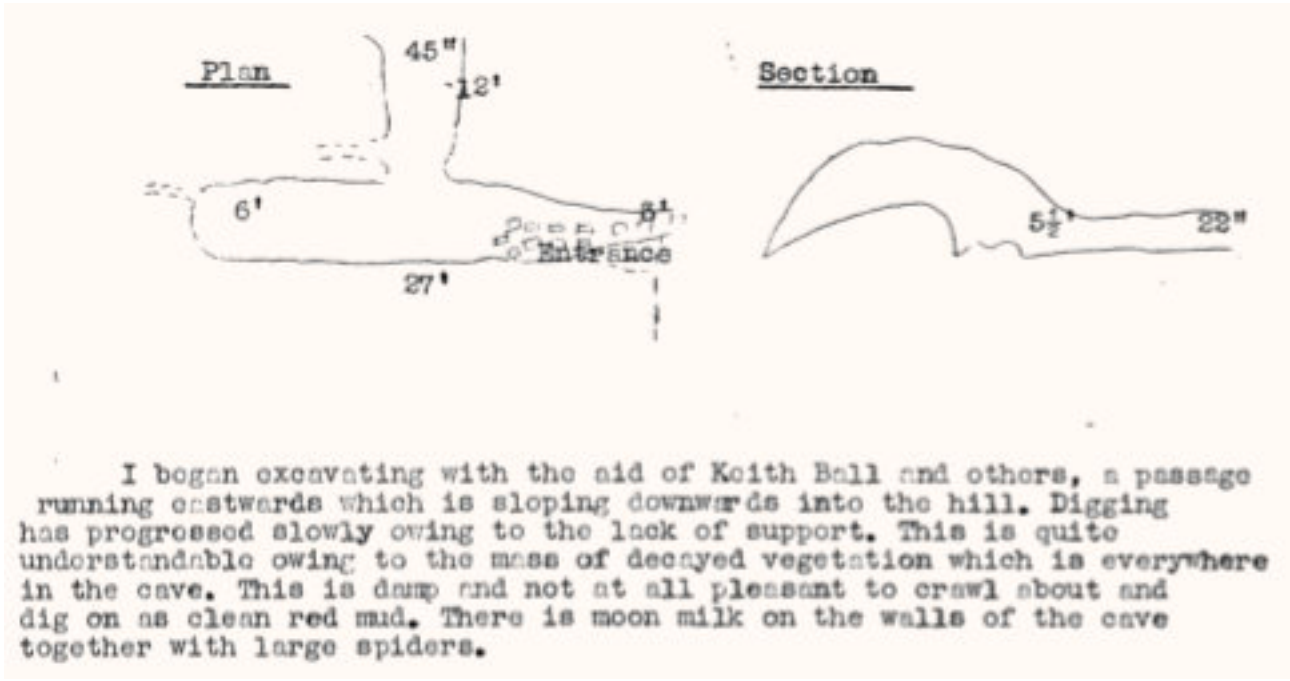
Clearly the 'Nant Byfre Master Cave', if it exists, is never going to break any speleological records, but this minor hydrological system is not without interest, not least because there is always the possibility that in some way or another it is associated with the hydrology of Allt Rhongyr.

Cartref Cadno SN 84700 16100 240m asl (CCR entry 2017-124)

A small, recorded feature that might prove relevant in any such link is a small cave-cum-dig, a few hundred metres south west of Pwll Coediog Farm. It is reported by Roger Smith[3] who dug there with Keith Ball in 1955, and Roger names it 'Carreg Cadno' – which is the name of a high point south of Pwll Byfre. I queried this with Keith Ball who responded, "*Because of the smelly nature we decided at the time to call the cave 'Cartref Cadno' (Home of the fox)*."

At the time of writing (during COVID-19 restrictions on movement) attempts to find this cave have proved unsuccessful, but with fresh information from Keith we hope to locate it once visits to the area become possible (the coordinates given above are approximate). This extract from Roger's report gives an idea of what he and Keith found in 1955.

Craig y Rhiwarth and Allt Rhongyr



I began excavating with the aid of Keith Ball and others, a passage running eastwards which is sloping downwards into the hill. Digging has progressed slowly owing to the lack of support. This is quite understandable owing to the mass of decayed vegetation which is everywhere in the cave. This is damp and not at all pleasant to crawl about and dig on as clean red mud. There is moon milk on the walls of the cave together with large spiders.

The Cribarth anticline doesn't end abruptly at the A4067. This significant structure continues north-eastwards on the other side of the valley; indeed, the folding of the strata can be clearly seen in the crags facing the road. This complicates the geological picture somewhat, but rest assured, there is still plenty of quality (Dowlais) limestone to find cave in!

There are a small number of minor caves and small digs dotted around this area and it is undoubtedly long overdue for some serious prospecting. Much of this area is a nature reserve with the obvious sensitivities that brings with it and access may not be possible (as of 2020) in the area of derelict quarry known as Twyn y Ffald, at the north-east extremity of this area, and around the dwelling known as Ty Mawr, effectively in Penwyllt

A view taken using Google Earth from above Cribarth, looking north-east, along the axis of the Cribarth anticline. Craig y Rhiwarth is in the upper centre of the frame and the fact that it is a prolongation of the Cribarth structure can be clearly seen

village. Apart from the sheer volume of limestone, the most compelling argument for hunting cave here has to be the rising at its base.

Hospital Rising. (©Gary Evans)

Hospital Rising SN 84325 15698 205m asl (CCR entry 1255)

The volume of water resurging here is considerable, but the site is at the base of an extensive scree slope and any hope of digging to expose solid rock must be considered a very, very long shot – even if permissions could be obtained to attempt such an enterprise. The Allt Rhongyr Master Cave is likely to be found only via some back door!

And right on cue *Ian Alderman presents a refreshingly whimsical account of his dowsing activities on Allt Rhongyr which ultimately led him to pursue his present dig in OFD1. A 'back door' under construction perhaps?*

Hazel or Nuts? – *Ian Alderman*

I'm going over there for a look-see…

"Strewth, that's a strong response! I stay with it, all the way; I'm now a willing party to a fascinating invisible force, one that has just led me across the complete length of Allt Rhongyr. From the small quarry at its top, to the escarpment overlooking the valley below; whatever I was picking up stayed with me. But there's more, another response, and then another. Located 100m or so back from the escarpment's edge; this time the response is taking me south. A few random twists and turns, a drop of some 30m or so in altitude, and the unbroken, still-strong response takes me directly to the original - now back-filled - entrance to OFD1. Now that's interesting, that's very interesting.

It's 1946, shortly after the war's end, and a small group enter Ogof Ffynnon Ddu for the very first time. 21 years later, the cave was greatly extended with the subsequent discoveries of Cwm Dwr, OFD2 and OFD3 respectively. Several worthy additions have been made in the years since - Northern Lights being a fine example - but then there's a conundrum. Allt Rhongyr, a large limestone outcrop situated directly to the north of the road up to Penwyllt, and on which horses graze. Peppered with surface cave features, and a not-insignificant resurgence in the country park below. Approximately 0.7 miles of pristine limestone, yet for 75 years, blissfully ignored by cavers. If OFD was a human body, the Allt Rhongyr extension would qualify not as a pimple, an ear, or a digit, but an entire new limb; I believe it to be the last, entirely complete, undiscovered section of OFD.

A Seed Is Sown

I've never understood how such a glaring opportunity to increase the cave's length - whilst simultaneously messing up a very conveniently shaped Common Room wall cave survey - has been overlooked for more than seven decades. Considering the site, a 'gift-horse', over numerous quiet moments I prospected the hill. Occasional evidence of past, 'light' digging activities are there for sure, but they most likely reflected little more than a single, sunny, surface-day's effort. By now, convinced of the hill's potential, I unwrapped my trusted tool - a beautiful pair of hazel twigs, and to the hill's grassy slopes I went.

My twigs are natural engineering at its finest. A grubby boot lace - sourced from the changing room bin, ties the far ends together. The two near ends are held by me; each end is resplendent in a glistening patina; evidence of much past, fevered use. The unwrapping of my tool ignites a chaotic response in the SWCC car park. Around me, leaping into every available open cottage door, SWCC's scientists and other doubter types are running screaming for cover, the hazel-truth being just too uncomfortable to contemplate.

Over many years since, I've dowsed Allt Rhongyr from North to South, East to West. Whatever my hazel-heaven is telling me, it's undeniably fascinating; the response has shown complete continuity over two decades of wanderings on the mountain. If the responses do indeed reflect cave passage, then a bonafide caving treat lies within.

***Meta menardi* - and other delightful, if unwanted things**

Located at the hill's most south-westerly point, a small uninviting cave entrance. A few metres to its north, another but significantly larger entrance, itself leading to a low, sizeable chamber. Heading inwards from its furthest point, a stooping passage which soon surfaces via yet another entrance, and proof of the mountain's inner potential, a through-trip, in real, natural cave. Alongside Ash Burrows, we dig the smaller entrance; not just an exercise in an attempt to access the cave beyond, but more; Hazel (now an entity in her own right) had led me directly to it, by following a long and unbroken, strong reaction from the small quarry located behind the cottage named Ty Mawr. The dig is tight and progress tough; and, from the ash trees above, its floor a tied mass of large established roots, roots and more roots. Frustratingly, the dig was also home to far too many overly inquisitive *Meta menardi* - cave spiders - big, shiny, eight legged whoppers, each - I'm sure - wholly intent on leaping down on my exposed neck. In principle, I don't have a problem with them, but I do wish they'd vacate the place at weekends.

The dig petered out. It was too ambitious for just two people and the way on looked like an epic task; time, then, to re-engage with Hazel. By this point, and more convinced than ever of the hill's cave-bearing potential, I utilised the Club's heavies; step in Alan Richardson, Graham Christian and others (you know I mean this in a purely dowsing context you naughty readers). Unaware as to my and Hazel's own-brand science results, they undertake their own dowsing survey. In my own smug satisfaction, but shared delight, their results matched mine. Owain Harvey then has a go; he brings with him the largest dowsing sticks I've ever seen; they surely qualified as deforestation. O's instinctive nature solved an observation I'd already made but was not at liberty to explain; that mature ash trees routinely appeared square-central to many of the dowsing paths across Allt Rhongyr. "*Ash trees,*" as O then explained, "a*re thirsty, their roots will seek out maximum moisture, possibly shallow cave passage too.*" The dig with Ash sprang to mind.

From a Seed to a Root

One day, a good day, and a giant 'dawned' fell upon me. There - so I realised - and within my grasp, a potential opportunity to confound both the scientisters and sceptilators in a giant single BIFF-BOFF-BIFF! of a hit. An opportunity which would not just cast geological sense into the wind but begin a new digging project based solely on Hazel's advice. But what if the plan worked out, what if my new dig actually did take me into Allt Rhongyr? Who would believe my later pleas of "*I suspected a connection to the cave from that dig site because dowsing suggested it 20 years ago.*" It was time to take out an insurance policy, time to really stick my head above the parapet, time to lay the defence of my radical forward-thinking claim.

On a damp Penwyllt day (there was little else to choose from), Hazel and I once again headed to Allt Rhongyr. On this occasion, we were accompanied by Brian Clipstone and the Dobson brothers (it must have been an afternoon then…). My plan: that Brian would walk precisely in the path of my dowsing reaction, taking GPS coordinates as he went. It was time then, to generate electronic data which I knew to be acceptable to the sceptilators. Our survey complete, we return to the SWCC library, where Brian overlaid his GPS track onto a digital OS map. There, set in stone, beyond dispute with the tracking's time and date embedded within the GPS metadata, across the map lay new, beautifully coloured lines. They were Hazel's and my insurance, our statement of intent, and potentially our mighty downfall. However, and the upside, should the dig break-through to new cave, and its surveyed new passage resemble Brian's GPS track, scientisters everywhere would have no choice but to eat my delicious, mountain-made, humble pie. In short, my message to them, already written, my speech prepared, "*much like a molecule, an atom, or a protein, just because something can't be seen, doesn't mean it isn't there. Oh, and I ought just to ask, are you enjoying your meal?*"

They Went Down, I'll Head Up

Back to 1946, and Peter Harvey and team enter OFD. Dropping down through boulders, they land in a sizeable sloping phreatic tube. Downslope, scalloped walls and plenty of good black air. Upslope, a boulder choke. 70km of accessible cave now lies downslope; upslope, only the all now too-familiar hard work. However, it also had Hazel's strong suggestion that a way into Allt Rhongyr might just lie beyond the boulders stacked before me. It all proved too much to ignore, not just a chance to discover a way into OFD's long-ignored missing limb, but also to thrust dowsing into the bright-lights of a scientisters laboratory where it always belonged. Imagine it, the peer review of Hazel's results, its conclusion, an admittance that the new cave's discovery was made possible through the employment of two long skinny appendages, cut-off a wild, woody plant, growing in abundance on hills surrounding the cave. No witches brew could ever get more appetising; the dig was on. Oh… and there's more, wouldn't it be hilarious if the final, great section of OFD was discovered from the very point in the cave where it all began so many years ago!

Onwards and Onwards and Onwards

So yeah, okay, it's proving a tough project, but easy things pass so quickly you barely notice the fun involved. But we're making progress for sure. 10-12m of tube - often muddy - has since been excavated through the upslope choke. Of course I'm going to maintain "it's been fun", but I admit, even Hazel hasn't worked out how to make diggers come back for a second time. But things are far from bad; in fact, despite being just 10m below the surface, we're following a very solid scalloped wall of a 3m tall passage. A scaffold cage, timbered on its outside, the expertise of our own Gareth Davies, provides the security in an insecure environment. Still no draught, but then, everyone wants one of those, it feels good to be different. The dig-face is made-up of small blocks, themselves set in highly-compacted rubble. Digging is straightforward; progress can be swift but can only be done within the limits of the scaffold cage.

It's the Future, Stupid!

I'm still at the parapet; I'm all too exposed to back-down now, so I'm going for it; sticking to my philosophy, this dig will go - somewhere…

Dowsing, it really does work. How, what and why, well, I have no answer to that at all. But that doesn't mean I shouldn't give it this unmissable chance for it to prove its long-doubted credentials to a majority, cynical world. A final but exciting thought, consider this; Orville Wright used carefully shaped bits of canvass-covered tree to make man's first ever powered flight. So, let's see, who knows what Hazel and her grubby boot lace are indeed capable of."

The Pen-tŵyn Catchment

(©Brendan Marris)

This is a small, local affair with little prospect of connecting to anything more extensive but nevertheless holds the promise of an interesting through trip if explored to its likely conclusion. The description below starts from the bottom, working uphill.

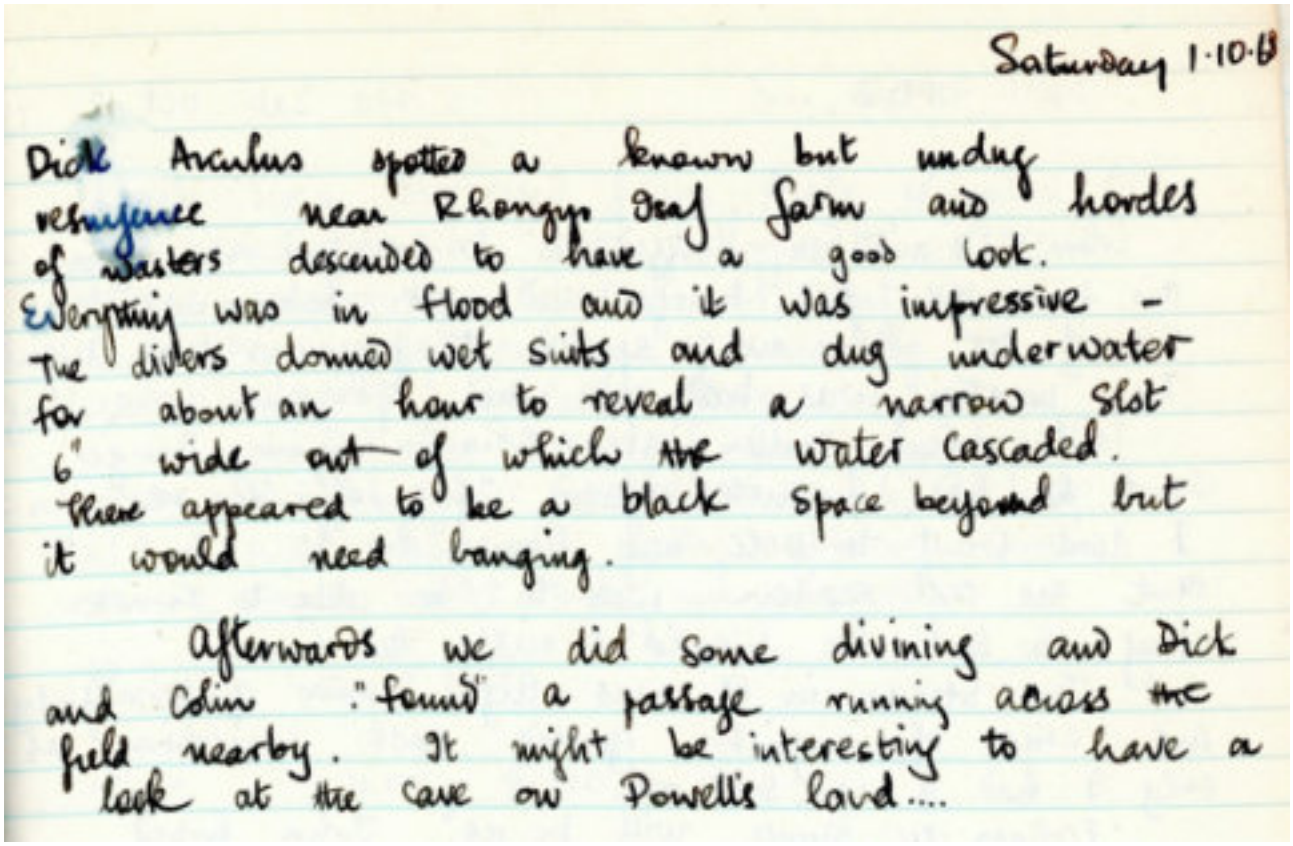
Pen-tŵyn Farm Resurgence SN 84745 14412 189m asl (CCR entry 303)

After turning off the A4067 to make one's way to Penwyllt, the road swings to the left to begin the ascent up the hill. On that bend, heading south, is a farm track and public footpath. Walking down that track, the rising is soon encountered just over the fence.

The Registry entry mentions water temperature without giving a source of that data, "*The temperature of its water (in summer) is usually 2 degrees C° above that of Ogof Ffynnon Ddu and Dan-yr-Ogof, indicating a short underground flow path.*" Paddy O'Reilly[4] mentions this site briefly in the 1969 Ogof Ffynnon Ddu publication:

> Rising (84741440): Situated just off the lane leading towards Pen-twyn farm this rising is about one fifth the normal size of Ogof Ffynnon Ddu and has been dived without success. The land immediately beyond is very level, but rises sharply near the grit escapement. It is not known where the water comes from but it may be the resurgence of Ogof-yr-Ardd, and the many small sinks that occur occasionally at the edge of the grit.

The diving Paddy refers to is best described by this extract from Paddy's personal logbook:



Saturday 1·10·6

Dick Arculus spotted a known but unduly resurgence near Rhongyr Isaf farm and hordes of wasters descended to have a good look. Everything was in flood and it was impressive - Two divers donned wet suits and dug underwater for about an hour to reveal a narrow slot 6" wide out of which the water cascaded. There appeared to be a black space beyond but it would need banging.

Afterwards we did some divining and Dick and Colin "found" a passage running across the field nearby. It might be interesting to have a look at the cave on Powells land....

The, 'cave on Powell's land' which Paddy refers to is Ogof-yr-Ardd which is just behind Rhongyr Isaf which was Cyril Powell's farm. It would be interesting to establish the postulated connection to Ogof yr Ardd, and if

proven, to try to estimate whether the stream in the cave is equivalent to the entire discharge at the rising. If not, then the hydrology becomes even more interesting!

Ogof-yr-Ardd SN 85014 14634 216m asl (CCR entry 309)

Situated just behind Rhongyr Isaf farm and only about 300m north-east of the rising this cave was known to SWCC in the 1960s. Indeed, in the same reference as above, Paddy said of it that, "*…there are no hopes of extending this short uninteresting cave.*" Nevertheless, in the 1980s, staff at what was then the Minerva Adventure Centre DID extend it, and Ogof-yr-Ardd is now a significant cave, being over 1km in length and including a 13m pitch for good measure! It is, however, described as a 'collector's piece', in the entry on www.ogof.org.uk – Brendan Marris' website[5]. The outstanding challenge, as illustrated below is to discover the source of the water in the streamway – and to join the dots…

Three features of interest that may well be connected. Ogof-yr-Ardd carries a small stream.

A caver traversing a cascade in the upper section of streamway in Ogof Yr Ardd. (©Brendan Marris)

Shakehole Dig / Sink SN 85352 14565 289m asl (CCR entry 1808)

This is the most promising of the sites described by Paddy[6] as, "*…the many small sinks that occur occasionally at the edge of the grit.*" It is located west of the old railway line about 500m south of the Brickworks bridge immediately above Rhongyr Isaf Farm. Keith Edwards[7] reports that, "*…in November 1980 Roger Bryan and John Smith started a dig in the big shake-hole that is located some way down the old railway track below the bridge, from South Wales Caving Club,*" and, "*It has always been felt that this dig has great potential.*" It seems probable that Keith refers to this site as there are no other candidate shakeholes in the area.

So, for the rooky digger without transport, what better site? A recommendation from two seasoned diggers, an easy walk from the HQ, indeed an easy wheelbarrow push once heavy kit is required, and a tidy little through trip to be discovered into the bargain. The perfect 'starter project'.

And Finally, the Mystery

The photograph below by Dai Hunt (SWCC Archive DHUNT1_042) shows (from L) Unknown, Les Hawes, Clive Jones and an unknown 4th person. The date is probably mid-1950s. They are clearly in a field not far from the rising, which is somewhere behind them in the hedge-line. But what is this hole, and why are they there? Les seems to be optimistically sporting a rope! Perhaps this is a recent sinkhole? Certainly, the absence of any spoil suggests the hole has not been excavated recently. Could the boards be there to prevent the edges collapsing? Some careful triangulation using the alignment of field boundaries on the flank of Cribarth allows a pretty good fix on its location - perhaps SN 84870 14300 would be a starting point. Perhaps a resistivity survey would be in order? Does this historical gem offer any clue to the drainage system just discussed?

Mystery Photo © Dai Hunt (SWCC Archive DHUNT1_42)

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1. Jenkins, David (1956) "*Fluorescein Test*", *SWCC Newsletter* 16, p.5.
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4. O'Reilly, Paddy, et al. (1969) *Ogof Ffynnon Ddu*, p.16.
5. Marris, Brendan, "*Ogof Yr Ardd*", *Caves of South Wales* via www.ogof.org.uk/
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7. Edwards, Keith (2020) Personal Communication by email dated 22/08/2020

Chapter 4: Penwyllt and the Cwm Dwr Catchment

Digs in and around the Brickworks

There are a few minor sites in Brickworks quarry and the somewhat larger Wheelbarrow Dig.

Wheelbarrow Dig SN 85605 15320 353m asl (CCR entry 326)

The origin of the name is explained in this quote from Roger Smith[1] writing in 1967:

> This Dig was started in the quarry nearest the brickworks by Bill Little and Les Hawes a few years ago. The passage which was dug out is well shaped and was found easy to dig. A wheel barrow could easily be trundled into it as excavation progressed.

This was a going concern in the mid-1960s prior to the opening up of OFD2. Roger Smith, Dennis Clarke and John Aldridge were the principal diggers at that time. (They had met whilst working at Pye Instruments in Cambridge.) Initially the dig was roughly level, going into the bank and then turning sharp left. Later the team decided to go down and the remains of their shaft is still evident. I helped there once or twice and remember Eric Inson being roped in to do some blasting on one occasion. As the Smithy area became accessible there seemed little point and the dig was abandoned soon after.

Digging as a family activity! One of John Aldridge's daughters assisting at Wheelbarrow Dig in its later phase of shaft sinking, circa 1967

Ogof Gweath Brics SN 85518 15263 331m (CCR entry 322)

Of more contemporary interest is a dig adopted by the Dudley Caving Club[2] variously known as 'Railway Dig' (on the OFD survey), 'Brickworks Dig', or in Welsh as 'Ogof Gweath Brics'. Many of the Dudley cavers involved are of course also SWCC members.

*Below, **Keith Edwards** tells the story of this long-running project.*

"The Brickworks Dig was started in the summer of 1986 by two members of the Dudley Caving Club, Bill and Ray Foxall, when they removed the top of a small embankment to expose the roof of what appeared to be a down-dipping passage. By September of 1986 Bill and Ray were some six feet or so down from the entrance when other Dudley Caving Club members joined in. This dig was officially reported by Roger Bryan to the caving registrar in 1987. It was accepted as a new Cave.

In 1987 Bill Foxall decided to make a 4-wheel truck for us to use in the Brickworks Dig. Following the construction of this truck, he then proceeded to dismantle some of the Club benches; this was because the angle iron they were made from was ideal for the track rails. This was fine for the dig but not very comfortable when visiting our Club on a Thursday evening as there was nowhere to sit! The entrance

passage eventually levelled out and a small side passage was discovered on the left. This was only pushed for a short distance at the time.

By 1990 the roof of the main passage was found to be going up. As it was dug, sand kept cascading down. We speculated that we had found an aven, but it was in fact a tall cross passage - completely filled with sand. Every time we returned, we had to dig back into the 'aven'.

By August 1994 we had secured access to the 'aven' and team members spent four days at the Dig erecting a scaffold frame inside the 'aven' to keep the sand banks from collapsing further. The scaffold tower was also partly roofed over to protect the diggers from the possibility of further collapses. As sand was removed from the base of the 'aven', a narrow passage was discovered on the left. This led to a very unstable right-hand corner where the passage which was not pushed earlier joined. This corner needed stabilising with more scaffolding. Since then, we have been following a small phreatic passage down-dip for over 100ft.

Air quality has always been good as we have passed a number of surface connected inlets, but as well as providing fresh air the inlets also channel surface water into the cave.

Since passing the 'aven', the major obstacle to digging has always been pumping out water. The most successful method used over the years was a 3-stage system. A pump was placed as low down in the dig as possible. This pumped up to a shallow pool situated below the 'aven'. A second pump in this pool raised water up to a tank half-way down the entrance passage and the third pump lifted the water out to surface.

Being as close as it is to the SWCC cottages, it has been very good for public relations, as when we are at the dig, we occasionally get volunteers from other clubs who are spending the weekend at Penwyllt, and we can always pop back to the Club for a tea break at lunch time. Often tea has been brought to the dig entrance for us!

A video of the dig made in 2013 is on YouTube at "*Cave Digging: The Brickworks' Dig*" by Keith Edwards.

Conclusion

The actual digging in this cave is and always has been relatively easy, consisting mainly of sand; however, the big issue has been that in heavy rain periods it can flood back up to the lower end of the entrance dip, and cannot be accessed very often during winter periods. This, of course, means it has to be pumped out on most visits before the lower end can be reached. (This lies something like 50ft or so below the surface and about 260ft or more in from the entrance.)

The dig is situated above the Piccadilly area in OFD but is probably about 200ft or so up above it. Due to the flooding issues and the need to replace the worn-out pumps, the dig has not been worked for at least three years. To push further would require a large investment in pumping equipment and a team of at least 8 people to operate it. Anyone interested in resurrecting the dig should contact Keith Edwards.

The entrance. (©John Smith, 1986)

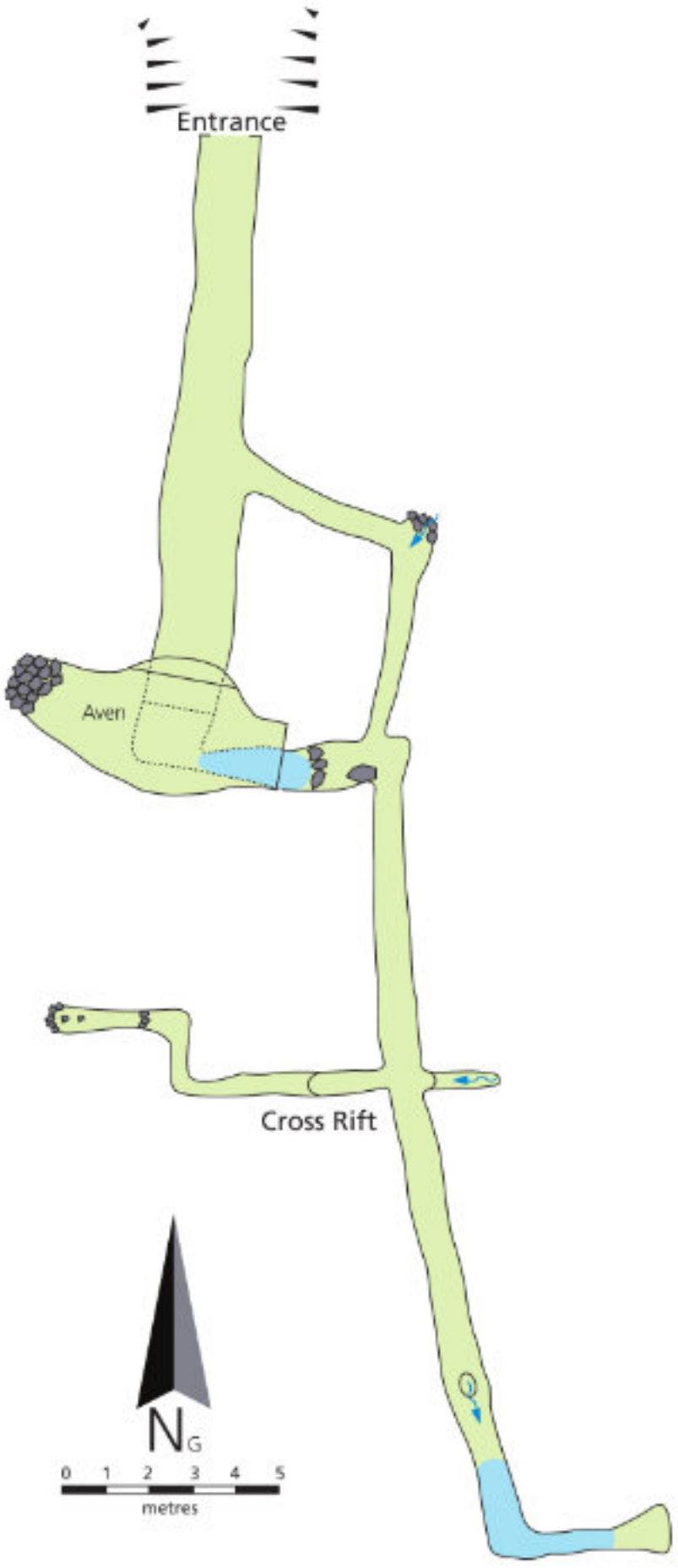
Before the railway was installed. (©John Smith, 1987)

The entrance and railway track. (©John Smith, 2011)

The top of the 'aven'. (©John Smith, 1995)

Ogof Gweath Brics

Survey © SWCC / DCC 2014



The Story of the Cwm Dwr Caves

A preliminary note: whilst instances exist of the name being rendered as 'Cwmdwr' in the literature, the use of Cwm Dwr is by far the more common and is the usage adopted here.

The story of Cwm Dwr Quarry caves has been over 80 years in the making and much of that story is one of sheer graft, and of digging enterprises that tested both the cavers and the technologies of each era as the story unfolds. Nowhere has the true metal of SWCC digging been put to a greater test.

Quarrying in what we now refer to as 'Cwm Dwr Quarry' progressed during the inter-war years and, at some point in the 1930s, quarrying operations broke into natural cave. Les Hawes[3] reports on the 1937 discoveries in an article in NL21.

Quarrying activities in the 1930's brought to light the existence of a cave systen on the eastern side of the railway line at Penwllyt. In May, 1937, Flatten, Roberts, and others made the first descent into Cwmdwr Cave (later called Cwmdwr 1) and the following description was given in Y.R.C.Journal No.23 - "Entrance 20ft. above quarry floor. Ladder down 20ft. rotten rock, steep slope of scree, three connected chambers and a short but interesting stream passage". Notes kept by E.E.Roberts add in July, 1938. - "Short part 68° true, long descending part 248° i.e., runs out under quarry floor".

Access to this cave was soon lost due to active quarrying operations both destroying part of it, and the resulting pit being filled with quarry waste. However, continued quarrying operations revealed a second cave that was to become known as Cwm Dwr 2. That historic discovery is summarised by Malcolm Herbert and Helen Langford[4] in their article in NL109

In the summer of 1938 a 20ft rift discovered during active operations in the Cwmdwr Quarry was briefly examined by Arthur Hill, Bill Doyle, Mr. E.E.Roberts, and others. The discovery was further investigated by Arthur Price, P. Raynes, Arthur Hill, and Bill Weaver. They followed the rift down to a boulder floor, through a small passage and descended a 20ft ladder pitch into a large 40ft long passage, this they entitled "The Master Passage".

As before, continued quarrying soon obliterated the entrance to this cave and that too was lost. The re-opening or rediscovery of these two caves began in the 1950s and continued for over forty years. All in all, the story is a fascinating account of determination, ingenuity and at times extraordinary tolerance for vile digging conditions! The first phase commenced in about 1955 with attempts to excavate the quarry floor and gain access to the original Cwm Dwr 1, which was finally achieved in Easter 1960[5].

The next three years, phase two, were spent digging and blasting, (a great deal of the latter) until, in spring 1963[6] the diggers finally popped out in what was christened Cwm Dwr Jama in recognition of its continental scale. This was based on the explorers' experience of caving in Slovenia where 'Jame' abound! (Jame is the Slovenian plural of Jama: Cave).

The terminal choke into which the stream sinks at the end of the Jama received a certain amount of desultory attention, but with diving in OFD inspiring attempts to bypass Dip Sump, the reopening of Dan-yr-Ogof and two Balinka expeditions, the Club's finest and keenest were pretty busy. So, it was not until Easter 1967 that Cwm Dwr was finally connected with OFD by John Osbourne[7] pioneering a route through the terminal choke from the OFD side. I can picture it now, Oz standing in the HQ lobby, dripping, filthy, but grinning as he filled in the logbook before returning to Cwm Dwr to meet his party near the Big Shacks and dive back out of Dip Sump. Thus, ended phase three.

In the years immediately following this event, a significant threat to the future of OFD emerged. At that time quarrying operations were at their peak, with the railway still operational and whole trainloads of crushed limestone being taken off to the steel works several times a week. Hobbs, the quarry company, had expressed an interest in quarrying north-east in the general direction of the tramway and the old engine house. Roger Smith became highly engaged in a range of initiatives to combat this threat. One of these was to lead to the

Excavating Cwm Dwr 1 entrance circa 1958. (©Peter Harvey: Club Archive PIWH3-106)

establishment of the National Nature Reserve. Another initiative was to establish an evidence base to underpin environmental arguments.

In 1976 a research programme was undertaken with the cooperation of Pete Smart from Bristol University. I was involved in some of this work, and in particular the process of injecting large volumes of water and tracing agents into several shakeholes in the dry valley that runs sub-parallel to the present quarry face, this being in the February. This work is reported in detail in NL85 (Dec 1976)[8]. The key result for our current story was that dye was soon detected at the upstream choke in Cwm Dwr, proving the significance of that area of land as a catchment for Cwm Dwr and thus OFD.

I had already spent some time digging the Upstream Choke[9], inspired by some theoretical suggestions from Clive Jones, but that project had lapsed. The dye test results rekindled interest and a good many Club diggers, including Sam, Bruce, Eric and John Lister, had had a hand in a long campaign throughout 1976, often involving several cycles of 'clear rubble – bang - return to HQ' each day. But I was later moved to write:

However, the discovery of Twll Gwynt Oer in 1979 added an element of competition to the enterprise and some of us started digging again in earnest[10]. But it wasn't pretty, Phil Rust being moved to write, "*Mortification Rules OK*" in the logbook! Summer 1980 saw continued progress, after which it all fizzled out as digs have a habit of doing.

> By the Spring of 1977, women, exams, sailing, increasing danger and the unutterable tedium of repeated trips through the crawl had sapped interest to the extent that I abandoned the venture.

However, interest in the potential missing cave had not abated, and, as luck would have it, Messrs Hobbs had recently drilled an exploratory borehole in the floor of Cwm Dwr Quarry towards its northern end. *Anne Bell now explains how she and Andy Bell had been prospecting and found a hole of interest, which prompted them to seek a way of looking round corners.*

"The 'Ogofscope' was conceived, designed, built and tested on New Year's Day, 1983 as something that would enable us to see down a narrow passage and reveal the caverns measureless to man that might be lurking around the corner. The Ogofscope was constructed from a 4ft length of 2" diameter grey plastic drainpipe. A slot was cut at one end to accommodate a small mirror, mounted diagonally. Below this on the end of the

drainpipe we set a torch head in plastic padding. A length of cable was attached to the contacts on the torch bulb-holder in order that we could power it with a 6-volt battery on the surface.

In September 1984, we learned of the existence of a 40ft bore hole in the Cwm Dwr Quarry. Some ten years previously the local quarries had drilled several such holes in the course of prospecting. One in particular was of speleological interest because it was draughting and the sound of running water could be heard quite plainly at the bottom. When we first investigated the site, the South Wales Caving Club had excavated an area three feet square around the drill hole down to solid rock. Led by Bob Radcliffe, we went to look at all the bore holes left by the quarry company, and the one that was draughting was clearly an exciting prospect with the possibility of cave passage at the bottom of it. This was clearly a job for the Ogofscope. We rescued it from the corner of the garage to which it had been consigned eighteen months previously with numerous other pieces of junk and found it to be in perfect working order once the cobwebs had been removed and the spiders evicted. The only modification required was to extend the cable to enable us to lower the Ogofscope to the bottom of the drill hole. As it descended the intensity of light shed by the Ogofscope against the sides of the bore hole seemed to change when it reached the last few feet. This did suggest to us that there might be a cave passage but for the moment we could learn no more.

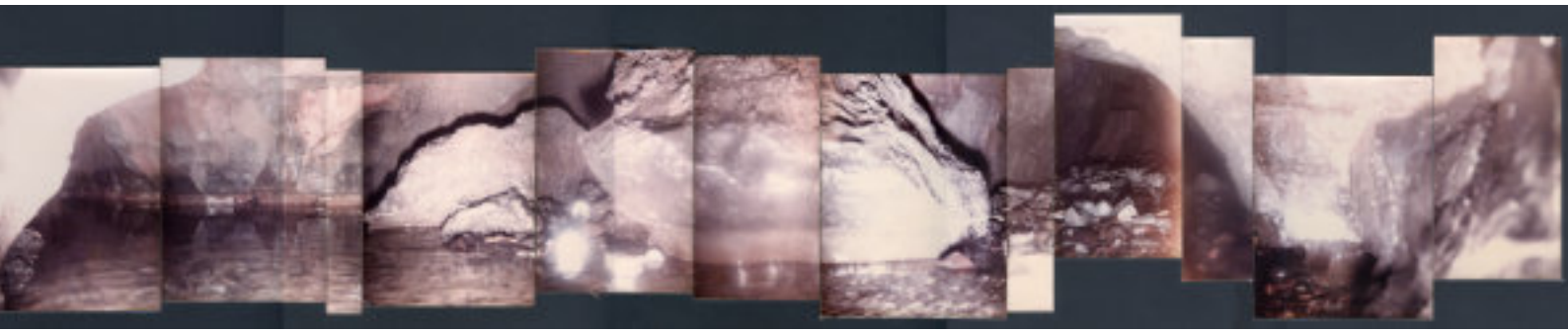
Andy now began to wonder whether we could lower a camera down the drill hole and take photographs - the 'Ogofphotoscope' was already on the drawing board. We purchased a cheap 110 format camera with integral flash. Obtaining black and white film (cheaper and easier to develop at home) was unexpectedly difficult. The camera was mounted in another 5ft length of plastic drainpipe. An ingenious arrangement consisting of two wedges, a spring and 40ft of string enabled us to take pictures remotely. A length of plastic covered washing line was used to lower and raise the Ogofphotoscope in the hole. At the drill hole, the plastic washing line was laid out in one direction and the string in another. Out of our ammo box came camera, film, compass, notebook and pencil, insulating tape, polythene bags, knife, spare batteries, Mars bars and other necessities. We took twelve photos (an entire film) - it seemed pointless to attempt more until we knew whether we were achieving anything - before packing up our equipment and cramming it into the car. Then we dashed off to Chris Howes' house to get our film developed. When the first film was developed it revealed poorly focused pictures whose most characteristic features could only be described as blobs.

We called the new cave Blob Hall."

(The above is an edited extract from Anne's original article in Descent, reproduced here with her permission)

Never having previously commented on the invention of 'Blob Hall' as a name for this feature I will now take this opportunity to do so. First, I suppose I should be flattered that I have a cave feature more-or-less named after me. But 'Blob' was a bit harsh – I was pretty slender back in those days. I was Club Chairman for a couple of years around then and had ruffled a few feathers, so I suspect somebody, not Anne or Andy, was having a dig!

This was by no means the end of the story and the Ogofphotoscope went through several iterations of development and refinement, ultimately resulting in the colour panorama that has long graced the wall of the small common room at the HQ. It features the ingenious use of ping pong balls that were introduced into the hole to provide scale and is reproduced below together with another Ogofphotoscope image showing clearly the 'real cave' that lay below.



The confirmed existence of 'Blob Hall' soon got the clockwork cavers thinking about a shaft. A shaft in solid rock to be sure, but a shaft with a borehole to guide it. And so, a project evolved. A date was set: the weekend of 18/21st October 1985 and arrangements made to borrow a lot of heavy-duty mining equipment. I happened to be in position to supply 25kg of 80% gelignite in 1¼" cartridges for the project, but although at the HQ, I could not be involved, being a single parent for the weekend.

Ogofphotoscope image

One of the key diggers was Paul Taylor of GSS and another was John Harvey, who was living in the Forest of Dean at the time. Paul recalled some highlights of the weekend in an email to John[11]:

"*Yes, I was involved with the Cwm Dwr shaft. From my memory, you and I travelled over to SWCC on the Friday afternoon. We used the compressor so I must have still been driving my Land Rover. John Lister brought lots of equipment up from Cornwall but we probably took over some bagging (compressed air hose, Ed.) and additional Drills and Steels.*"

Simon Amatt was also involved and recalls how work began:

"*Work started on the Friday evening with an initial round of blasting, but things didn't go quite according to plan." Although accounts vary at this point the outcome was pretty clear as Simon Amatt describes, "…. so when all the equipment was taken to the end of the quarry for safety I left my LR by Cwm Dwr Cave entrance. It was out of line of sight so theoretically it should be OK. Wrong. The blast sent a large amount of gravel skywards over the cliff face between us and descended on the audience. One fist sized rock landed on my LR on the curved section of the roof, leaving a fist sized dent. Land Rovers look better with dents with stories attached!*"

Paul picks up the story the following morning:

"*Work started in earnest on the Saturday morning with the three of us, you, John Lister and myself, working the drills and loading up. Then retreating for firing and then others did the mucking out. Many holes were drilled, and delay detonators used so that the explosion worked from the middle out. The collier Haydn did a lot of the bumper pick work, handling it like it was just an extension of his arms. We got a drill steel stuck and despite a Tirfor winch being applied it would not come out and was left in and eventually blown out.*

On one occasion when some were in the bottom of the shaft and, from memory, Jopo tried to start the blue dumper truck with the starting handle not realising it was in gear, and in turning the handle this was driving the wheels forward and the dumper came very close to going down the shaft.

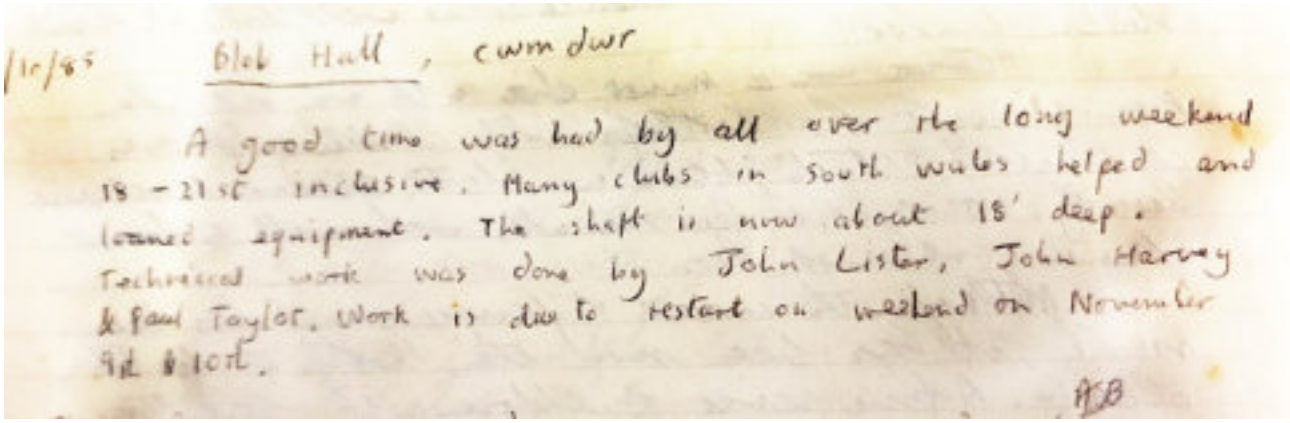
Saturday was extremely productive. I returned to Gloucester for the evening as it was my mother's either 60th Birthday or retirement do. It was held at my sisters as a surprise. My mum was certainly surprised as I had literally driven straight there from getting out of the shaft and was still plastered in grime. I returned to SWCC in the morning and the work continued throughout Sunday. I returned to Gloucester on the Sunday evening.

A round of holes had been drilled late on the Sunday but not fired. These were loaded and fired on the Monday morning. This, I understand, caused a bit of an upset with the Quarry Manager who from memory had a group of visitors and who asked what the hell was going on.

Unfortunately, this incident resulted in no further work being undertaken."

Simon dismayed at his dented Land Rover! (©Anne Bell)

The closing logbook entry is as follows:



10/85 Blob Hall, cwm dwr

A good time was had by all over the long weekend 18 – 21st inclusive. Many clubs in South Wales helped and loaned equipment. The shaft is now about 18' deep. Technical work was done by John Lister, John Harvey & Paul Taylor. Work is due to restart on weekend on November 9th & 10th.

AB

Chris Howes was an SWCC member at around this time and we are very grateful to him for allowing us to publish a collection of his photographs on the following pages. These, with their captions, complete the story better than further words could do.

The shaft-sinking project was never resumed but Cwm Dwr Quarry was not neglected for long. In November 1990 members excavated another shaft at a point where water was observed to sink in the quarry floor. There was a suspicion that this was the lost entry to Cwm Dwr 2, first discovered in 1938 and then filled with quarry debris. Once a breakthrough had been achieved this did indeed prove to be the case when footprints were encountered.

The amount of cave rediscovered was modest, but members were soon fired up by the digging prospects and what then ensued became an epic story of pumping, digging, damming, bad air and vile conditions, combatted by grit and determination on the part of the diggers. All-in-all, a tale in the finest tradition of SWCC digging. This is told in detail in SWCC Newsletter 109 (1991)[12] accompanied by a survey.

Ultimately, digging revealed a pitch and upstream and downstream sumps. Blob Hall was located, and the bottom of the borehole spotted in the wall, having almost missed open cave. Thus came to a close, this phase of the Cwm Dwr story.

There is an epilogue, however. In 2015 a joint Dudley CC / SWCC[13] team had a bash at the sand sump area of Cwm Dwr 2. Brendan Marris[14] explains their motivation, "*We were really hoping that once opened up there may be further digging opportunity to reach the upstream section of the streamway…*" By syphoning, bailing and enlarging a sump they eventually squeezed through to enter the passages beyond.

Keith Edwards emerging from the Sand Sump. (©Brendan Marris)

Shaft Sinking—Cwm Dwr Quarry October 1985
All photographs on this and the subsequent 3 pages courtesy of Chris Howes FRPS.

Above. Early Preparations

Right. Mining engineers, John Harvey (L) and John Lister (R) discuss the finer points of the shothole pattern to be used

Below. The dig in action. The tripod was lifted and carried to one side before drilling and blasting.

Diggers in their element, Clockwise from top right
Paul Taylor; John Lister; Clive Jones; Simon Amatt

Work well underway after the first round had been cleared

Smoke clears after a blast

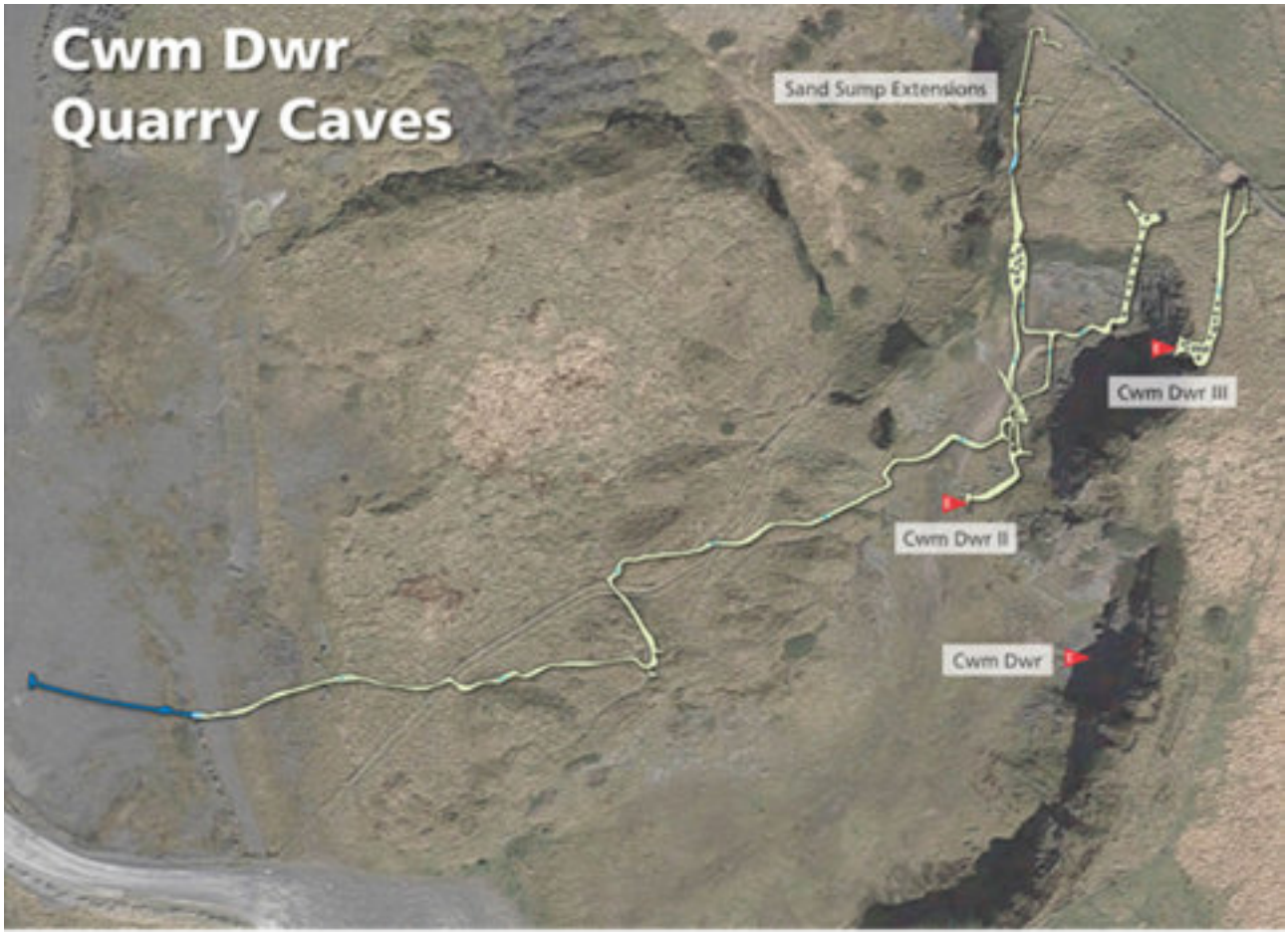
The dumper truck was a valuable tool. It was employed to shift spoil well away from the worksite

Roger, 'The Bomber', Bryan priming charges with delay detonators

The night shift in action. The borehole clearly visible between John's feet

Andy Amatt mucking out

In fact, this turned out not to be a new discovery. Subsequent research revealed that Owain Harvey had squeezed through the constriction in 1990 and the thinnest of a party led by Tony Donovan had done so a few years later. The 2015 team surveyed the extensions which can be seen below.



Graphic courtesy of Brendan Marris

Upper series in Cwm Dwr 2 (©Brendan Marris)

Lower Series in Cwm Dwr 2 (©Brendan Marris)

Sites in Cwm Dwr Quarry:

Cwm Dwr 1 (Gated entrance to OFD) SN 85745 15592 339m asl (CCR entry 339)

Cwm Dwr 2 SN 85722 15621 339m asl (CCR entry 335)

Cwm Dwr 3 SN 85760 15648 347m asl (CCR entry 343)

Digs in the Cwm Dwr Catchment

Twll Gwent Oer SN 85874 15958 368m asl (CCR entry 348)

After the dye testing carried out in 1976, a few years passed until, in early 1979, Brian Jopling[15] and Bob Marsh started poking around in shakeholes in the area where dye had been injected – though they were never sure which those had been. They soon hit upon a likely hole and over the space of several months a major SWCC digging project got underway involving sinking a shaft some 8m in depth. Breaking through in early May, the explorers entered a rift carrying a stream which soon came to a sump. Martyn Farr[16] was soon on the scene, but the sump proved to be too tight for him to make much progress.

The next attempt on the sump involved hiring a submersible pump, getting a generator on site and attempting to pump out the sump into a dam of timber and plastic sheeting near the bottom of the shaft. I remember snapping the outlet spigot off the pump almost before it had been used and having to sheepishly return it to the hire company and ask for it to be repaired! That project was not a success.

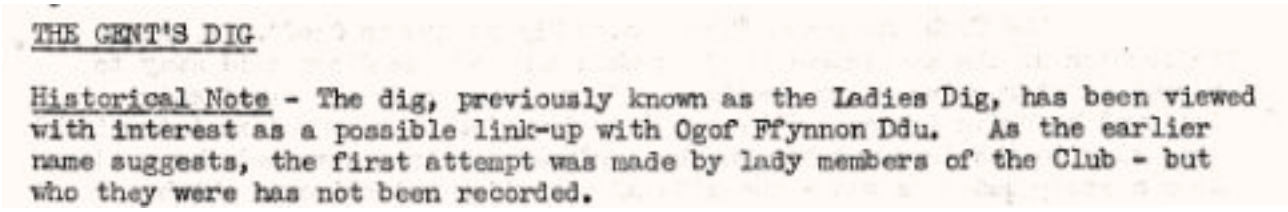
Sometime later a full-on mining effort was undertaken with a compressor, an air drill and lots of 'banger' – the objective being to blow the roof out of the sump. I remember helping with this enterprise but don't know how it came to an end. There is certainly still a sizeable gap on the survey.

Zach's Dig SN 85880 15698 368m asl (CCR entry 345)

Zach's dig was a Gary Evans project over a good many years, which he writes up very fully in an article in NL126 (Apr 2007)[17]. It connects underground to Ogof y Dinion (see below). Allan Richardson reports that there is continued instability in the side of the shakehole.

Gent's Dig SN 85849 15632 368m asl (CCR entry 346)

Gent's dig goes back to the earliest years of the Club, having initially been referred to as the Ladies' Dig, as Les Hawes[18] explains in NL11:



THE GENT'S DIG

Historical Note - The dig, previously known as the Ladies Dig, has been viewed with interest as a possible link-up with Ogof Ffynnon Ddu. As the earlier name suggests, the first attempt was made by lady members of the Club - but who they were has not been recorded.

Les goes on to describe digging activity in the 1950s and the site was certainly given sporadic attention after that.

In 1996, a team comprising Dominic and Barbara Hyland, together with Andrew Ward, started excavating a mud-filled passage. They found that the mud had shrunk as it dried over the summer and they could detect a draft and an echo. Despite a set-back when the mud became wet again, they persevered, using sandbags filled with semi-liquid mud to back-fill and stabilise the slope behind. After a few hours digging they broke through[19]. Dominic tells me that, Allan Richardson, "*…bimbled along after Andy, Barb and I broke through.*" and then adds, "*I'd never seen him move that fast before!*" Over 300m of cave was ultimately explored and surveyed.

Further digging was undertaken, and Andrew tells me that he hopes to dig there again in the future. Now that the site had become a true cave, (with pitches!), it was felt that it should become an Ogof. It will now be found under the name Ogof y Dynion on the OFD survey, and in the Registry.

A few years later the Clockwork Cavers turned their mechanised attention to the site, although digging in a different place altogether. Allan Richardson[20] describes the background:

> "*One New Year a few years later, a number of us (Sam was the prime mover if I remember correctly) started digging along a sand-filled passage at the base of the concrete tube-lined entrance shaft. Graham Christian et al built a plateway which was very effective in getting the spoil to the base of the shaft, from whence Graham's winch hauled it 'to day' ('To day' is a mining term meaning 'to daylight', thus, 'to the surface'). A considerable amount of sand was brought out in quite a short time by this*

Colin Hayward near the bottom of the extension (©Andrew Ward)

Andrew Ward with digging paraphernalia at the bottom of the extension (©Andrew Ward)

system. The dig was abandoned when Brian Clipstone managed to destabilise & collapse the main way on after being told not to dig in one area. This collapse is still evident on the surface by the remains of posts and fencing around a small collapse feature near Gents Dig!"

Graham adds:

"The dig was restarted as we wanted somewhere that was close and readily accessible to the HQ. On one session, in snow, surface work was limited to 10 buckets before the underground/overground teams swapped as it was so cold. Lunch could be taken back at the HQ and a general re-warming undertaken."

Below, images of the dig as it was in 2002 (© Graham Christian)


South Wales Caving Club
CWM DWR

Conclusion

This clip from the survey illustrates the significance of Ogof y Dynion in relation to a large blank area where it is reasonable to suppose cave passage is waiting to be found (Think of Northern Lights, which is only 300m off to the north-east.)

And of course, Twll Gwyn Oer lies about 250m north of Zach's Dig with a proven water connection to Cwm Dwr 2. So, pushing and poking, underground and on the surface, is clearly the key to some exciting new discoveries. (Reminder: the grid squares are 100m.)

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Chapter 5: Digs Above Ogof Ffynnon Ddu 2 and 3

In the early decades of the SWCC much attention was given to the 'missing miles' of Ogof Ffynnon Ddu. Underground digs were part of that and ultimately led to the discovery of Hush Sump and Dip Sump and the sequence of discoveries that followed. But in parallel with this were numerous efforts to gain access to those missing miles from the surface, on the high ground south west of Pwll Byfre. Of these sites, 'Dai Hunt's Dig', which later became 'Steel Drum Dig', Hot Air Mines, and Engine House Dig stand out. Babysitters' Dig lies in the same general area but has a more recent history. Another hole, now named Razorblade Pot, lies not far from Steel Drum and is a site of uncertain history. There are a great many others.

What these sites broadly have in common is the potential to connect to known parts of OFD2 or 3. This in turn raises both ethical and political issues, particularly so if the site lies outside the designated National Nature Reserve. This is a subject I return to in a later chapter.

Engine House Dig SN 86420 16130 463m asl (CCR entry 361)

This is one of a number of sites that had been identified as one at which snow was known to melt in winter, indicating warm cave air coming close to the surface. It is not a site for any future digging – we know where it leads – but it serves as an interesting object lesson in what could have been achieved.

The summer of 1967 was a very exciting time to be around the HQ. There was just so much activity. The connection between Cwm Dwr and OFD2 had been established that Easter and exploratory parties were pushing into the newly discovered dry cave above Maypole Inlet most weekends. In tandem with these endeavours, Engine House Dig was being enthusiastically excavated. I remember digging there with Clive Jones several times that summer and also the dye-tracing event described below[1].

5. Engine House Dig is reported to be going 'like the Clappers of Hell!'.. (quote from Martin Gough.) The all time depth record is likely to be broken any day now so diggers are urgently required. On the weekend of 2nd of September Clive poured twenty gallons of fluorescein down the dig and it was seen eight hours later issuing from an aven in the mainstream in OFD II near the maypoles to Clay Series. At the time of going to press a big push had been planned for the following week with the radio transmitter and walkie-talkies... By the time you read this the new route to the stream will be a realistic possibility.

Of course the final prophetic statement was to come true just two weeks later when the present 'Ogof Nos Hir' entrance was excavated, thus making Engine House Dig redundant. With hindsight the outcome was a good one – had Engine House Dig been prosecuted with a little more energy our upper entrance to OFD would have led directly into Column Hall!

What strikes me about this 'might-have-been' scenario is the timing. Determined and focused digging in the summer of 1967 came so close to a breakthrough. Had the same energy been put into the site ten or twenty years previously how different the story of the Club would have been! Knowledge of the 'hot-spot' was an established element of SWCC folk wisdom, yet it never inspired anybody sufficiently for them to persevere. Perhaps there is a lesson here.

Fragment from OFD Survey. Ground level at Engine House Dig is recorded as 463m asl. The spot height at the choke 448m. So, we were ever so close back in 1967!

Steel Drum Dig SN 87258 16545 511m asl (CCR entry 375)

Situated close to the boundary wall, above and some 300m west of Pwll Byfre, this dig lies well beyond known cave yet breathes warm air in winter and has attracted much interest over the years. The site was once known as 'Dai Hunt's Dig' but had ceased to be a going concern by the mid-60s when I first walked the area with Club members. It remained derelict for many years after that, with work only resuming in 1995 when Clive Jones, Tony Donovan and others brought modern digging methods to bear on the challenges of the dig.

Clive[2] reported on progress in some detail soon afterwards and followed this with an update in the 50th anniversary Newsletter[3].

What caused the dig to be abandoned is not recorded but the shaft remains, secure and ready for what, in Clive's terminology could become 'Episode 3'!

The Hot Air Mines SN 87059 16228 499m asl (CCR entry 367)

True to its name, this dig is notable for the powerful warm draft that issues from it in winter weather. It was a site and project much spoken about but rarely visited during my early years visiting the HQ. The Hot Air Mines has remained somehow on the horizon like a mirage, there, but never actually resolving into anything. But clearly the early diggers were pretty keen on the place as these Newsletter extracts make plain:

Below: Bill Birchenough[4] in NL27 (1959)

4. THE HOT AIR MINE.

When the first snow of the winter fell, it was thought to be a good time to look for shake holes with "wind" in them. The weather being fine, Clive Jones, Bill Harris and David whose name I forget, we set out from Penwyllt, up the valley to the East of the engine house.

About 400 yds. S.E. from the frog tanks a number of holes were found. The following weekend we dug in them. One became unstable so we moved to the next and so on. About this time Bill Little found a rabbit hole, with a very strong draught, nearby. All effort was put on to this hole, soon a torch could be lowered about 20 ft. Gordon Clissold lost his car key down it, at least we could not find it.

Next day's dig took us down to 18 ft, by now it was a helmet and lamp dig. Another day added about 15 ft. and we were looking down a 10ft. pitch about 4 ft x 1 ft with a nice hole at the bottom which led into a chamber about 20 ft. square and as much high. At the bottom of the pitch we dug a tunnel about 10 ft. long and have gone down about 6ft. to an interesting rift from which a wind comes.

We hope to continue this dig and reach who knows what!

B. Birchenough.

Below: Clive Jones[5] in NL44 (1963)

A few years ago some excitement was caused by Bill Birchenough's discovery of the Hot Air Mines. At thirty feet down a small chamber gives access to a tight rift through which a strong draught blows. The rift was blasted for about 12ft. before the project was given up, but this, like all the others, is worth further effort.

There was a brief renewal of interest in the 'mine' starting in April 1992. John Lister, "*was the main driver*" with support from Andy and Dave Dobson. They, "*concentrated on the side rift going off from the chamber but this was very tight, John did some banging, but the rift was very narrow & obviously not a viable ongoing project*" according to Andy[6]. He goes on to say, "*We had a few trials in the chamber itself - it had clearly had attention from others previously, but again there was no apparent promising option, the floor is just a large cone of boulders & scree - the draught dissipates.*"

The 'mine' was revisited in 2001 and surveyed by Graham Christian and Allan Richardson. Their survey appears on the published survey of OFD. One corner of the passages shown is named, 'Kermit's Flat'. Allan Richardson[7] explains this as follows: "*A Flat is another name for a horizontal mineral deposit, a term usually found in the Northern Pennines, in this case it was also a play on words as after each successive blast a frog was found in the blast zone, seemingly unharmed.*"

(Left) Clive Jones in Engine House Dig 1967. (©Jem Rowland SWCC Archive Serial JJR2_032)

However, Andy Dobson tells a slightly different story, "*We had to keep removing frogs while digging - particularly when JL was setting a charge. Consequently, Dave suggested we name the 'passage' Fragmented Frog Freeway. Hopefully we saved the frogs but unfortunately never found the freeway.*"

We now know the relationship between the 'mine' and the nearest parts of OFD, so this is, perhaps, not a dig to be pursued in the future.

Razor Blade Pot SN 87242 16597 510m asl (CCR entry 1806)

The history of this dig is obscure, as is any name it might once have had. Graham Christian[8] tells the story of its recent past:

During digging week 2006, "*…a narrow, north-south trending rift was examined… just to the north of Steel Drum Dig. On the old timbers that 'protected' the hole was an old rusty razor blade. A working name of Razorblade Pot was coined. Again, an assessment was made of what tackle would be needed to get down it and have a thorough examination of its potential.*" And he reports, "*…over at Razorblade Pot, a descent had been made, it was pronounced interesting, and concrete lintels were transported to the site to cover it over in a more secure manner than previously.*"

Given that this shaft is only 50m or so from the deeper one in Steel Drum Dig it is hard to know what interest it holds. It would be helpful to discover who dug it, when, and most of all why?

Babysitters' Dig CCR SN 87006 16562 502m asl (CCR entry 368)

This dig was a major SWCC undertaking for many years and was very fully described by Sam Moore[9] in NL118. In addition, Graham Christian[10] has written in some detail about the technical challenges of pumping water from the dig and developing a winch to facilitate speedy haulage.

For reasons I have not been able to discover it has been dubbed 'Pwll Meillion' in the Registry. None of the original diggers seem able to shed light on the origin of this name.

Sam now provides us with an account of how the dig progressed after 1996. And indeed, offers the aspiring digger a 'dig prospectus' suggesting future options for this important site.

Background

The early days of what became known as Babysitters' Dig are described in the Club's 50th Anniversary Publication, NL118, referenced above. Interest in the site was driven by a recognition that it was 600m up-dip from, and much higher than, the nearest part of OFD (the OFD3 streamway). By analogy with Top Entrance, which is only about 500m from the OFD2 streamway, there is clearly the potential for a lot of cave in between.

Description

Looking down the dig from the surface. The ladder is 6m long. The digger is Clark Friend. (©Graham Christian)

Looking down the final section of the shaft from below The Flume. The substantial dimensions of the rift are apparent. (©Graham Christian)

The dig is sunk in the fill of what was originally once a large rift passage running away from a shaft and roughly parallel to the hillside.

To the left of the photograph above left taken from the surface is the upstream end of the shaft, which has some calcite flow lower down.

The first ladder lands on a small, scooped ledge before the shaft steps off to the right of the photograph. This made hauling very difficult, and the structure (known as 'The Flume') that the caver is passing was fabricated from two lengths of Armco barrier to act as a deviation and to give a smooth surface up which to haul buckets.

The second photograph on the right is taken from below the flume and shows that this is really quite a large rift, with solid walls that meant that shuttering was only needed across what was originally the open downstream end. The problem that eventually led to the dig being abandoned is that the lowest section did not free-drain. In the end, there was usually about 2m of standing water which had to be removed before digging could commence. A borehole pump was used to give the necessary discharge head, but it still took most of a day to get back to the point where progress could be made.

The fixed ladders visible in the photographs were recovered (legitimately) from the Coelbren fire tower when it was being decommissioned. There are 6 x 3m lengths in total, making the dig currently around 19m deep, or 20m from the datum at the original ground level. Taking the average cross-sectional area to be $4m^2$, possibly an underestimate, that translates to about $80m^3$ of spoil removed, or something approaching 200 tonnes, since there was no voidage anywhere in the dig. There is a very large spoil heap, which at one point could be seen from satellite photographs but which has now more-or-less blended back into the hillside.

What next?

The dig has not been progressed in any real way for about a decade now, so a restart would first need a careful appraisal of its stability. The concrete surface platform and upper cast shuttering is not going anywhere, ever. The timber shuttering in the dig has not been looked at closely for a few years, but last year still appeared to be in reasonable condition on a cursory inspection. The lowest fixed ladders have been removed but could easily be refitted. The real question is what, if anything, should be done next?

Deepening the shaft further seems likely to be futile, not least because it would result in ever-increasing quantities of water to remove before starting to dig. However, the factors that made this a good place for a dig have not changed.

One option is simply to find another dig spot in the same general area and to start again, but there is nothing very obvious.

Another approach would be to come back up the shaft a few metres, to a point above the normal water level, and then to drive an adit along the rift with a view to breaking out of the far side of the infill debris cone. There may be a touch of optimism bias in that statement, I suppose, but that is probably true for every dig prospectus that has ever been penned. One advantage of this approach would be that it would be some time before any spoil had to be raised to the surface. Since the adit would be about 15m below ground, there should be little danger of it breaking out to surface.

Acknowledgements

With thanks to the dozens of people who at one time or another have helped with the dig. It was very much a team effort, and it would be unfair to pick out any individuals.

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Babysitting life… All photos © Chris Grimmett

***A**: Graham's winch stimulates much interest from John, Andy and Dave Dobson, Dave Edwards and Ian Todd. Easter 2000;*

***B**: Brian in shaft fitting shuttering ably assisted by Allan, Keith, Simon and unknown caver. 2nd September 2000;*

***C**: Graham and Keith concreting the shaft collar. 2nd September 2000;*

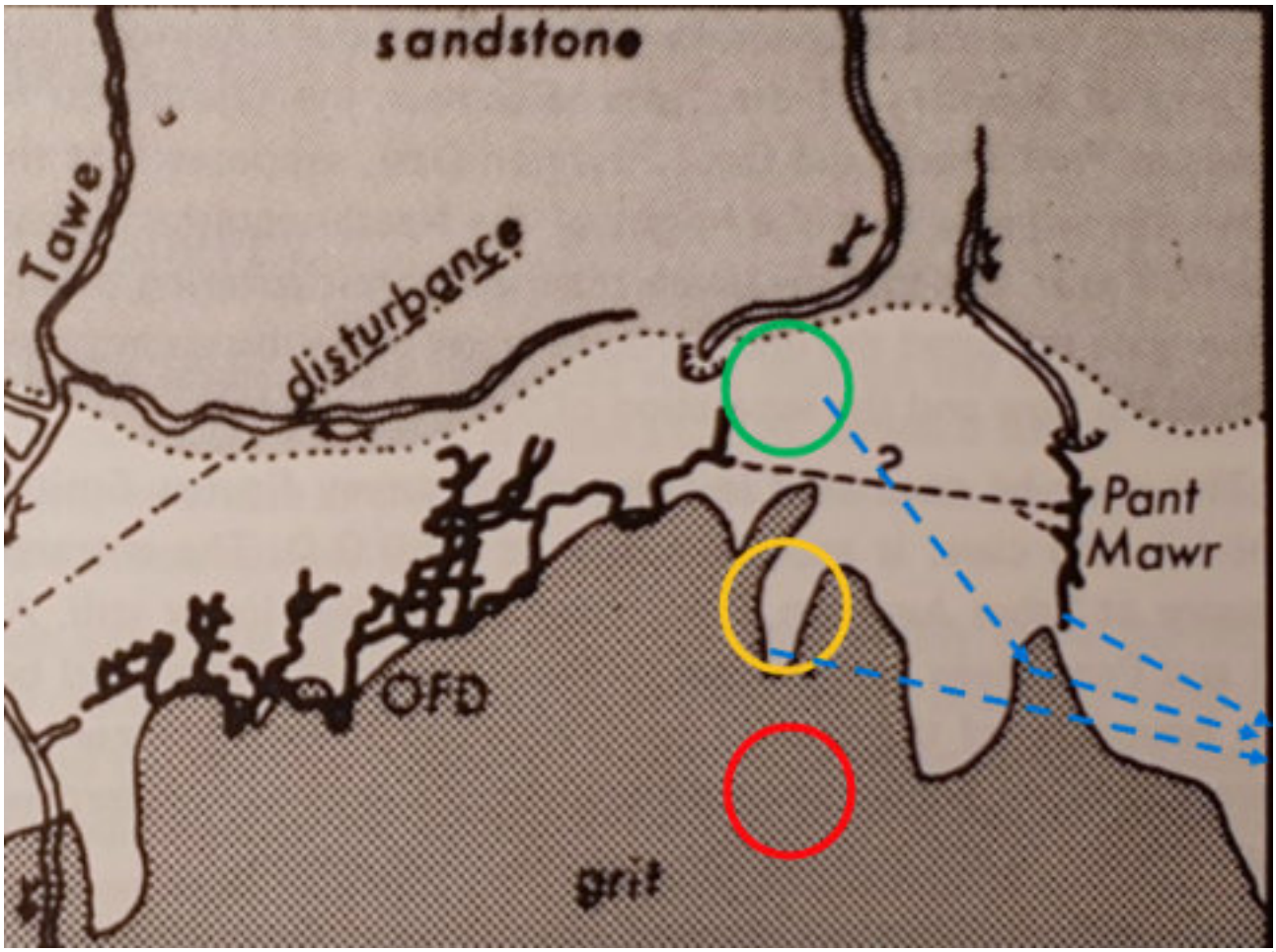
***D**: The shelter. From front, Simon, Milo, Andy, Fred, with the headframe over the shaft in the background. 14th February 2000;*

***E**: Chris Drilling in preparation for fixing shuttering. August BH week 2000.*

Chapter 6: The Ogof Ffynnon Ddu Hinterland

The area covered lies to the east of known parts of OFD and dig sites in three specific areas are reported on here.

1. The area immediately east of Pwll Byfre (green circle on map)
2. The area known as the 'Lost Valley' (yellow circle)
3. The area of 'chasms' (red circle)
4. In addition, we reprint an important article by Peter Harvey that provides at least some of the theoretical inspiration for digging in this area.



An outline view of the area covered in this section taken from Page 45 of the reference, Paddy O'Reilly[1]

The white band across the centre of the map is the limestone. Note the postulated fossil link between OFD and Pant Mawr (in black). Also note the established drainage (shown in blue) from Ogof Carreg Cadno (in green circle), Pant Mawr Pot and Heather Hole (in yellow circle) eastwards to the Pant Mawr Rising (R1) in the Nedd Fechan Valley. The green circle shows the area of Chas Jay's Digs and Pete Francis' Dig. The yellow circle shows the area of the Lost Valley and the red circle the area of the Chasm.

Theoretical background to digs in this area

Clearly finding unknown cave is our life objective (!), so where might the elusive cave lie in this area?

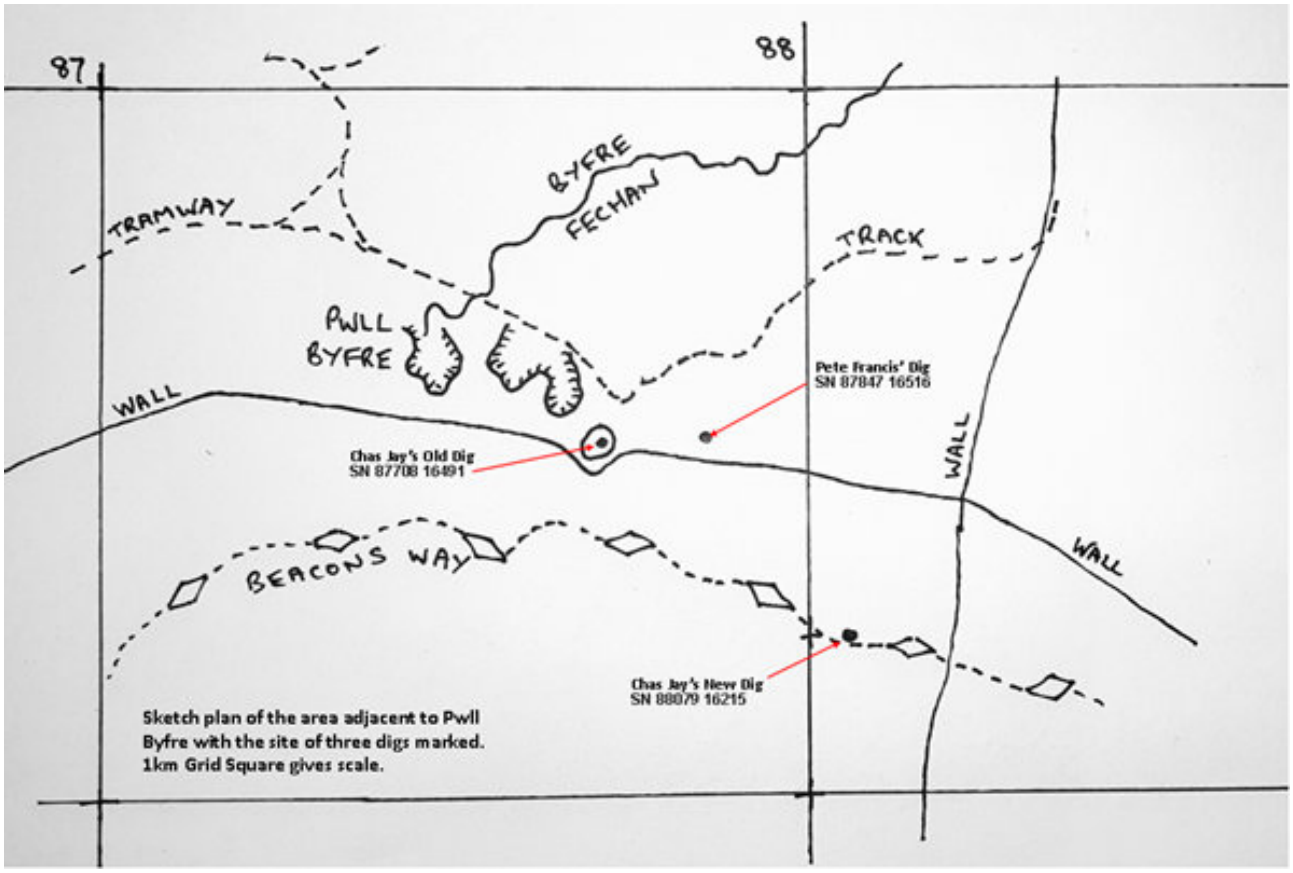
Present-day hydrology is no great help: the big cave we seek has not been carved out in recent time by minor streams like the Nant Byfre. Our interest must lie in large fossil passages that once formed part of a drainage system now long redundant. But where is it concealed?

A number of authors speculate on how OFD and Pant Mawr may have developed and where remnants of a postulated historic master cave may lie. One such discussion by Peter Harvey is reproduced in full as an appendix to this section, see P96.

Gerry Eldridge[2] discusses OFD and speculates on a historic cave running NE from Pwll Byfre, having been cut off from OFD by the collapse that gave rise to the sand deposits quarried nearby. Likewise, Paddy O'Reilly[3] covers similar ground and speculates on the possibility of Pant Mawr and OFD being linked.

Digs adjacent to Pwll Byfre

Three digs stand out as being sites worthy of consideration in this area. They are 'Chas Jay's Old Dig', 'Chas Jay's New Dig' and 'Pete Francis' Dig'. The relative positions of these are shown below.



Chas Jay's Old Dig SN 87708 16491 489m asl

Chas himself begins the story:

"The site of this dig which is a cross between a shake hole and a swallet is located on the hillside just above the old sand quarry. Its current appearance is very different now from what it was when the dig was started. The base of the shake hole was flat with a stream bed down the middle and there was no sign of anyone having dug there. On the right-hand side there was a roughly vertical peat bank and, on the left, the bank was stepped, with a combined height which brought it level with the other side. The back wall had a nearly vertical face with three large boulders projecting directly over the digging site. On the left were two large boulders in

a somewhat threatening position but not likely to be an immediate danger. Ideally all five large boulders should have been removed but an alternative solution was found. This entailed moving two lengths of railway rail from the sand quarry. One was curved and fitted nicely under the rocks on the rear face and the other was straight and this was used on the right-hand side of the dig to hold shuttering against the peat bank. Digging commenced with a reasonable team. At first the buckets were passed up by hand, later by rope as the hole got deeper, and then finally, when it was too deep for either method, a tripod with block and tackle became necessary. Timber was in short supply and chicken wire was used to stop small rocks falling on the diggers. However, as the dig got deeper, water from the top became a nuisance and, at first, polythene sheet was used, but this proved an even greater nuisance and eventually a leat was dug, directing the stream to an adjacent shake hole. At a depth of some 20 to 25ft, a change occurred in the dig, with a rocky floor and no escape for the water, which backed up several inches before escaping off to the right. To proceed, the rock in the floor would have to be removed or the dig would have to take a right turn. In the circumstances the latter course would have been too difficult going underneath the peat. Eventually, an explosive expert was asked to help. Unfortunately, he was too enthusiastic and, rather than using several small charges, he used one large charge which loosened the shuttering which ultimately collapsed. At more or less the same time, the academic year had come to an end and the core of the digging team dispersed around the world. Lacking interest from anyone else, the dig was abandoned and the leat filled in, but the site was, to some extent, maintained to keep it safe.

I do not know why this was called Chas' dig because Bruce Foster was just as involved. We started visiting South Wales in 1964 and were supported by Clive in our application for Membership, partly due to working at Waun Fignen Felen I suspect, joining the Club in 1965. This recommendation was absolutely necessary in those days, as we found out one evening when John Oz came into the kitchen, saw Bruce and me, walked over and said, "you two aren't members, get out now." Fortunately, I had a letter from the Secretary giving us consent. On seeing it, John turned and walked away without a word; friendly type!!!

Our dig site seemed to be just a smaller version of the Waun Fignen Felen dig and, if Clive's theory was right, we would have 40-50ft to dig down and this is what tempted Bruce and me to dig it. Our 'explosives expert' was Rod Stewart and there was a time when just he and I were there. He kindly gave me a short course in blowing up pipes and railway lines. No pipes were available but there was a railway rail. Charges set and we retired a 'safe' distance. It was a lovely bang, only two sticks of Polar Ammon gelignite, a few inches of Cordtex, one det and a few feet of fuse were required and a lump of the bull nose of the rail sailed past our 'safe' distance about head height some 30ft away to the right. It is likely still to be up there somewhere.

Over the years this seems to have been, to quite a considerable extent, a 'self-digging site' in that the digging area has been slowly subsiding and the top of the shaft was perhaps some ten feet below our starting level. The slope down the shaft entrance has also subsided and what was the spoil heap is now part of the slope, which supports my feeling that there was some sort of a void below. The peat bank never caused any problems – it was slowly eroded and washed away."

The most recent attention this site has received was during SWCC 'Digging Week' commencing Saturday 26th August 2006. This was reported in full by Graham Christian[4] not long after. What follows are some extracts from Graham's account to give the flavour of the dig.

"Prior to the digging week, a number of members had wandered over to look at the site of one of Chas Jay's old digs. Just beyond the Byfre sink, in an easterly direction, there is a small stream that runs north out of the Nature Reserve onto the Cnewr Estate and sinks in a large shake hole. On the eastern side of the shake hole is an exposure of solid limestone, while the rest of the depression is in boulder clay with a peat floor. The stream has cut down through the peat, leaving a number of limestone blocks exposed, and it sinks in wet weather by the east wall. In drier weather, it either does not run at all, or sinks in stages across the depression. Chas was questioned on the history of his digging and what he had found. He claimed that he had found evidence of cave passage, before the dig slumped in. It appears that instability was a feature of this dig, so we resolved to make sure that the shuttering was adequate from the start.

The back wall seemed sound enough, so we knew that we had something to which scaffold bars could be bolted. The dip of the rock seemed to be in a south-easterly direction, so we were hopeful that cave passage might possibly head that way too. A load of scaffolding poles, attendant clamps, spanners, hammers, drills, bolts, picks, spades, buckets, ropes and all the other tat that a good dig warrants was transported up to the site and a round of scaffolding was set and the digging was started. A zip-wire was installed over the dig and tensioned up to a substantial length of steel channel that was hammered a considerable distance into the ground.

We could now haul buckets up from the dig, then move them sideways on a pulley to an area where we could unload into a wheelbarrow. Big rocks that came out of the deepening hole were dumped in the channel of the stream to make steps and the finer stones, gravel, sand and peat barrowed to the side of the shake hole,

well above the stream course…… The digging started and the rigging further refined as the day went on…… At the end of the day, we were over 2m down, with the wooden shuttering being pushed down behind the scaffold poles as we went. We packed up just in time for it to start raining.

Simon and Annie did the honourable thing and took the dog for a walk up to the dig to see what was happening. They reported back that the stream, which was now flowing, did not make it to the dig, but was sinking in the middle of the floor of the shakehole. However, it then reappeared in the bottom of the dig, flowed across the floor and disappeared into the bedding plane at the back and showed no sign of backing up at all. The bottom of the dig was now clear of peat - all washed through, with a bit of foam clinging to the roof of the bedding plane. Yet more scaffolding was put in and adjusted. Tony Donovan sent a quantity of optical brightener on its way to a resurgence. The Nedd and Tawe valleys were both to be monitored over the next week.

After a good week's progress, down at least 3m, we packed all the gear up and boarded over the hole. The optical brightener turned up on the following Tuesday at the Ffynnon Ddu resurgence and, surprisingly, the pool opposite Craig-y-Nos Castle. We are unsure of quite what the last bit means, so further tracing is planned." (*As far as can be discovered there was in fact no further tracing and there is a significant question mark over the reported link to Craig y Nos Castle grounds.*)

The team reassembled a few weeks later, on 23rd September…

"……and another fine day was spent on the hill. This time the petrol-engined winch was taken up and rigged into the 'Blondin system'. It worked so well that we were able to prove that just one person could haul the bucket up, traverse it to the unloading point, tip the contents into the wheelbarrow and dump the spoil. By using 2 buckets fully laden each time, we were able to drop the floor by about another metre in this one day. What was most interesting was that we were able to pull rocks out of the floor and find gaps beyond, from which draughts of cool air were blowing out.

Then: No digging was done today, (Sunday) but even more scaffolding was put into the bottom of the dig. It was quite awkward putting it in, but we want to reduce the chances of a run-in to a minimum. The Blondin system is still in need of refinement, but work is already in progress to address our needs."

In November 2020 Graham brought things up to date in an email as follows:

"The Blondin system was completely rebuilt and coupled to the motorised winch, which proved invaluable for further work.

It is at least twice the depth now (9m rings a bell), but solid bedrock has still not been found. The original timber shuttering from 2006 has now decayed to the point of needing replacement before any more work can be carried out. Working at the bottom knowing that there is loose rock, albeit shuttered, all around is quite thought provoking. I don't think it can be described as an easy dig."

But it has some very positive features, not least of which is its position beyond any known part of OFD and potentially at a point where it might intercept the postulated link to Pant Mawr!



A selection of photographs illustrating the work done in 2006 (©Graham Christian)

Ogof Carreg Cadno / 'Chas Jay's New Dig SN 88075 16216 505m asl (CCR entry 394)

Chas reported on the early years at this site in 1996[5] and a slightly updated version of this report appeared on the 'old' SWCC website[6]. The first part of what follows is a short precis of some of Chas' earlier material, used here to set the scene. The second part was written by Chas in late 2020 and continues the story up to the time he stopped digging.

"To the best of my knowledge this dig was started by Stuart France quite a number of years ago.

With Stuart's consent I commenced digging in a rather desultory fashion. The original entrance was via a very narrow slot making access difficult. Past the entrance there was a short crawlable section, but the passage soon became half filled with mud and required digging. The digging was confined to the right-hand wall with the spoil being packed against the left-hand wall. Digging continued in this manner until the first bend was reached where the passage dipped down sharply and became completely filled with mud.

At this point is became clear that spoil would have to be removed to the surface which required that the entrance would have to be made much larger. Simon kindly obliged with the necessary bang. With easy access, digging continued down and round the bend but with little progress being made until the work commenced in earnest this year. Digging continued for about 5 or 6 yards with the passage turning slightly left and with a very small air space, through which a draft could sometimes be felt. Initially, in digging this part of the passage, there was a problem of flooding which necessitated bailing, but Andy Dobson found a small rift on the side which he persuaded to allow the majority of the water to escape, albeit very slowly.

At the end of this passage the nature of the spoil changed, and boulders now appeared. Having removed the large boulder the roof started to rise and what appears to be a small chamber, filled with mud and boulder but with a small air space over the top, has been reached.

The chamber has now been dug into a little way, and the source of the blockage has now been reached. This, as expected, is a rift filled with somewhat unstable boulders and with water trickling down in the middle. The left-hand wall is solid, and on the right, there seems to be a small rift going off but with an unstable looking roof."

Chas now tells us how the dig progressed in the years that followed, looking back several decades to do so.

"The dig continued, burrowing under part of rift, creating a tunnel about 2' 6" square. The spoil being removed consisted of small limestone rocks cemented together (surprisingly, without any sandstone) with mud. Digging was quite difficult when the mud was dry as each piece had to be prised out. The tunnel was protected by scaffolding on three sides, with timber over the top (ideally, it would have been on four sides, but scaffold clamps were in short supply at the time) and wood on the left-hand side behind the scaffold (a lot of the spoil was packed in behind this wood to form a firm 4" side). The tunnel was arranged to slope up slowly due to an influx of water (this was later found to be coming in from high up on the left-hand side and bringing spoil with it which meant, at times, progress was 3ft forward and 2ft back). After about 12ft, a very large boulder appeared in the floor, perhaps bedrock, and shortly after a fairy large rock fell from the roof; later two further rocks fell. Rocks of this size had not been seen since starting the tunnel and suggests that they came from the inner edge of the rift. The roof here was securely protected by a piece of planking about 2" thick by 8" wide and 2' 8" long. It appeared that the tunnel was now just past the location of the water. Unfortunately, little more work was done after this. At present, looking forward at the end of the tunnel on the right appears to be a shattered Limestone wall and to the left a continuation of the mud bound fill.

Chas hard at work in his dig. Image taken from SWCC old website. Photographer unknown

Notes and comments:

- Removing spoil from the dig was a big problem and a team of six was needed to get it to the surface. As a result, when there were too few helpers the spoil was put in plastic rubble sacks and stored at the bottom of the entrance pitch or in the cave itself.
- On wet days the source of the water can be seen on the hillside and it flows down just a small crack or edge of a rock in the heather.
- Great care is advisable if digging here. The first rock that fell from the roof just brushed my right cheek giving it what a child would call a 'butterfly kiss'. A few minutes later Geoff asked me if I knew that the right side of my face was covered with blood (mud is a good coagulant). The rock was about 18" long, lozenge-shaped, with a centre part 4" square with razor sharp planes in it. On the occasion of a second rock fall, I was working alone in the unprotected part of the tunnel, preparing for the next round of

scaffolding and I heard something rattle on my helmet, looking up I saw nothing untoward, so I just carried on. Some minutes later there was another rattle; this time I turned on my back and could see a faint crack in the centre. I watched for several minutes but nothing happened, then quite suddenly I had a premonition, so I wriggled back into the tunnel, turned round and sat across it and I was still getting myself comfortable when 2 very large rocks came down. I guess they weighed about 25lbs each. My guardian angel is clearly a caver.

- There is no obvious way to go now. To go left could be tempting but dangerous as, from the amount of spoil washed down, there must be a considerable void above. My plan had been to continue to try and dig up to a hard roof, if necessary, turning right if the shattered face is bedrock. Of course, I had never looked when the opportunity occurred. I was making an assumption, that the inner side of the rift would be much like the outer and, if so, it may be possible to see which way to continue digging.

My thanks go to Andy, Dave, Kevin, Geoff and all others that made contributions to the work. Unfortunately, I had some serious illnesses in the early 2000s and, as happens, during the times I was away, members of the team found more interesting and useful tasks. A lot of the later work was done by me or with help from Kevin and occasionally Geoff. This didn't matter too much as there wasn't much for anyone else to do when I was cutting up scaffold poles across my knee. Early diggers include, among others, Stuart France, Bob Hall, Alan Richardson, Twigs, Simon Amatt, Paul Quill, Dai Bancroft. More recently diggers include Gary Evans, Andy & Dave Dobson, Geoff Amabilino, Bob Radcliff, Graham Christian, Chris Grimmett, Andrew Gardener, Kevin Diffey, Jasper (from Holland), etc.

In 1996 the cave was 51.5m long and had a depth of 6m according to measurements made in October 1996, by Chris and Jasper."

An important note about hydrology

Chas told me that he had heard a rumour that Tony Donovan had dye-traced this dig to Pant Mawr. Tony tells me that this is not quite correct. In actual fact, Tony[7] reports that he and Roy Morgan carried out a test using 'optical brightening agent' with a positive trace to the Pant Mawr Rising (R1) in the Nedd Fechan. Tony speculates that the water may enter the Pant Mawr Streamway, perhaps at the Fire Hydrant. Only further testing will resolve the matter.

The Fire Hydrant in Pant Mawr Pot. Does water from Ogof Carreg Cadno meet join the Pant Mawr drainage here? (©Brendan Marris)

Peter Francis' Dig SN 87840 16515 506m asl (CCR entry 391)

This dig is situated a little further east than Chas' Old Dig but in a similarly promising position if you give credence to the theories discussed above.

This photograph makes the location pretty clear. But let's be honest, this dig has all the pathos of an abandoned puppy – it is begging you to give it some care and attention! (©Brendan Marris, from CCR website)

Below, Pete Francis tells us the story of how this dig came into being:

"The 7th December 1974 was a bleak day at the Club. Heavy cloud enveloped Penwyllt; there were few members about, and I had to put a 'D of E' Gold aspirant through his paces in navigation. We went up the hill and walked back and forth across Pant Mawr moor seeing nothing. On the way back I came across an interesting slot in the hillside, east of the Byfre sink and a little to the east of a prominent sink that Chas Jay had previously dug.

The following week, in better weather, I persuaded Nigel Ellis to go back there and pull a few rocks out.

In January a few of us were back up there; the slot looked big enough, so I carefully lowered myself into it – not carefully enough! What felt like a large slab detached itself from the side wall and suddenly I felt it trapping me below it! I managed to contort my arm enough to slide it behind my body and grasp the slab. To my relief I found it was only an inch thick, so I coolly pushed it back into place and self-consciously crawled back out – the dig had started!

By January 6th we were down 6ft. The regular diggers were local lads; Bob Ratcliffe and Brian Jorgensen were up from Swansea while the 'valley boys' in the form of Brian Smith, John (Paddy) Williams, Brian Jones and Glyn Jones were the power houses, with Bruce Foster and Haydn Rees also lending a hand while Jopo (Brian Jopling) travelled all the way down from Birmingham to be in on the action.

We had to shore up one wall, using old railway sleepers from the nearby silica quarry but digging was quick, only requiring chemical help when the stone blocks were too big to manhandle. We dug it consistently through the winter and spring, getting down to 20ft, with it draughting and a bat coming out from below on one occasion.

Then the summer came and a group of us were off bottoming the Berger and after that a 20ft-deep slot on a wet and cold Welsh hillside seemed less appealing, so we left it for other things.

It had been my first dig and perhaps I should have persevered for longer. The site was promising; the theory behind choosing to dig it was that it was east of Smith's Armoury and the foundered area around there, so if the cave had started further east then we might get into that continuation. I also thought that the proto-Byfre stream might also have sunk further east; further upstream than the present sink where land surfaces were higher. It's still a controversial theory but if anyone fancies it, it's still up for grabs and not too far a walk from the Club."

Sam Moore[8] soon picked up the baton and during his incumbency the dig was further deepened and when writing about it in October 1976 had the following to say about this dig's qualities:

"Removal of spoil is done with a bucket and a pulley system on a semi-permanent tripod... Progress has been rapid, and on the last two occasions when a party of 4 or 5 has been available, better than 6ft has been gained.

Thus, in the last two months the shaft has been deepened from 15ft to 30ft approximately. Because of the fragmented nature of the spoil this is a very easy dig… and it is very easy to haul out large quantities of rock."

So, folks, an easy dig by all accounts, and one in a good spot too. Bearing in mind that both Pete and Sam were pretty new to digging back in the 70s it could be considered a 'beginners dig'. Another fine site to give some thought to – and remember those pleading puppy eyes..!

The Lost Valley

As a name, the 'Lost Valley' is informal, having been coined by SWCC many years ago and subsequently adopted by cavers working in the area. It's a descriptive name, but an unhelpful one. Not only is there a 'Lost Valley Sink' above Dan-yr-Ogof but of course numerous 'Lost Valleys' throughout the anglophone world, as

any attempt to use Google in this context soon reveals!

The Lost Valley is an area roughly SSE of Pwll Byfre just to the east of Carreg Cadno. It is a slight declivity sloping southwards for almost a kilometre, ending in a small intermittent sink. This is the site recorded in the Registry as 'Lost Valley Sink' at SN 87805 15455 455m asl (CCR entry 1425). This 2020 photograph shows little or no evidence that this site has been dug.

Lost Valley Sink (©Gary Evans, 2020)

However, Clive Jones[9] reported briefly in NL13 as follows:

> "*How many members have looked into the small valley to the SE of the Byfre Sink and wondered where the hole at the end goes?? It takes a fair amount of water and in the recent warm summer months a powerful outward draught has been present.*
>
> *Well, it doesn't go… A couple of hours digging and one small bang showed quite clearly that the sink hole is an enlarged joint which does not get any wider than 9 inches.*"

This valley roughly corresponds to a tongue of limestone extending south between gritstone crags on either side – shown as the yellow circled area in the map shown at the start of this article. The floor of the valley is quite lush and quite unlike the sparsely vegetated gritstone countryside around.

Peter Harvey's theoretical musings, reproduced below, promoted the idea that this area was worth digging and it has received intermittent attention over the years.

Early years at an uncertain location

"I first remember working on a dig in the valley back in 1969. As was often the case the dig was one of Clive Jones' and fine Easter weather got quite a decent crowd to turn out. The photograph below sets the scene. The actual dig was underground, and Jem[10] recollects the dig "*being in a chamber in grit, entered directly from the surface, with Clive starting to excavate a shaft, Gwynne Sanders passing me rocks and me building a dry-stone wall.*"

Digging Party 1969. From left, Roger Smith, Keith Ball, Gwynne Sanders, Margaret Ball, Bob Hall, John Stevens (©John Aldridge, SWCC Archive JA0293)

In those days trips to such places were often by Land Rover, which was part of the fun of course, but things did not always go smoothly. The next photograph is of John Osbourne's Landy bogged down and attempts being made to 'Tirfor' it out. This was somewhere between Pwll Byfre and the valley itself.

John Osbourne's Land Rover being recovered. Cast, from left, Unknown, Gary Jones, Bob Saunders (Sos) operating Tirfor winch, Colin Fairbairn, Gwynne Sanders, John Stevens, Bob Hall. (©John Aldridge, SWCC Archive JA0303)

However, sometimes we walked, and on one visit to the dig a motley gaggle of us were trudging over the hill carrying large baulks of timber when we happened upon a group of walkers approaching. Clive's voice then boomed out, calling: "*Join us for Easter*." The walkers scattered hastily! In any event, the project continued for some months, certainly into the summer, but as is so often the way, digging petered out and fresh enthusiasms supervened."

Subsequent activity

Allan Richardson[11] reports that he and Gerry Eldridge dug in the Lost Valley in the early 1980s and that Clive was also active in that period. Quite where Clive might have dug is uncertain but there are several other sites recorded in the Registry and by Gary Evans[12] that are possible candidates.

More recently, Tony Donovan, Bernie Woodley and others were active at several sites in the valley in 2003[13] with inconclusive results.

Summary of identified digging sites of interest

Dig at SN 87690 16010 499m asl (CCR entry 2018-7)

Gary Evans[14] describes this site as an '*Old dig out towards the Lost Valley sites*', and as a '*Dig in depression*'. It is on the northern lip of the valley proper. This is probably one of the sites dug by Tony and Bernie in the early 2000s and it is recorded in the Registry on that basis.

Old dig at SN 87690 16010 (©Gary Evans, 2020)

Site of 1969 digging? (©Gary Evans, 2020)

Heather Hole (©Allan Richardson, 2020)

Dig at SN 87721 15554 466m asl (CCR entry 390)

This is very probably the site of my 1969 digging experience. No other published record of digging here has been found.

Heather Hole SN 87941 15266 444m asl (CCR entry 2021-1)

Allan Richardson[15] reports having dug here with Gerry Eldridge in the early 80s.

Tony Donovan, Roy Morgan and others dug here in 2003 as recounted in a report in Descent[16] but for some reason named it as 'Lost Valley Sink', which it is not: "*Attention then turned to Lost Valley Sink (sic) where it is reported they, dropped a 5m shaft, passing the old SWCC limit.*"

And some months later it was reported[17] that: "*The group was highly encouraged when, at a depth of 11m, the dig dropped into a small, gritstone chamber. Predictably, this proved to be a breakdown chamber formed entirely in grit and was only 1.5m wide by 2m long. In wet weather it takes a stream, which disappears between a large, detached block and a solid wall. The bottom of the terminal slot is choked with rubble and this is clearly the point where the draft emerges.*"

During this period Tony and Roy carried out a dye test from this dig with positive connections to risings in the Nedd Fechan. This dye test was incorrectly reported in Descent[18] and elsewhere as having been made from 'Lost Valley Sink'. In an email from Tony Donovan[19] he confirmed to me that the dye test was conducted from the dig now named Heather Hole and NOT from the site generally known as Lost Valley Sink described in the introduction to this section.

'The Chasm': *Remembered by Bob Hall with nudges from Jem Rowland!*

The Chasm was the SWCC's 'Premier Dig' of its day in 1972, after attempts to find a way on in Waun Fignen Felen had petered out two years previously.

So why the Chasm? Jem suggests that: "*We dug there because Peter Harvey had always wanted to dig there. We were too inexperienced to question his opinion (although we may have done so anyway!). It had obviously collapsed into a great big hole in the limestone underneath and it seemed like a good Club project. There was a draught, of course. (There was also Clive's tongue-in-cheek attitude that the digging was far more important than actually finding something and this wasn't even in limestone!!)*" Peter[20] had this to say about this, the 'more westerly Chasm':

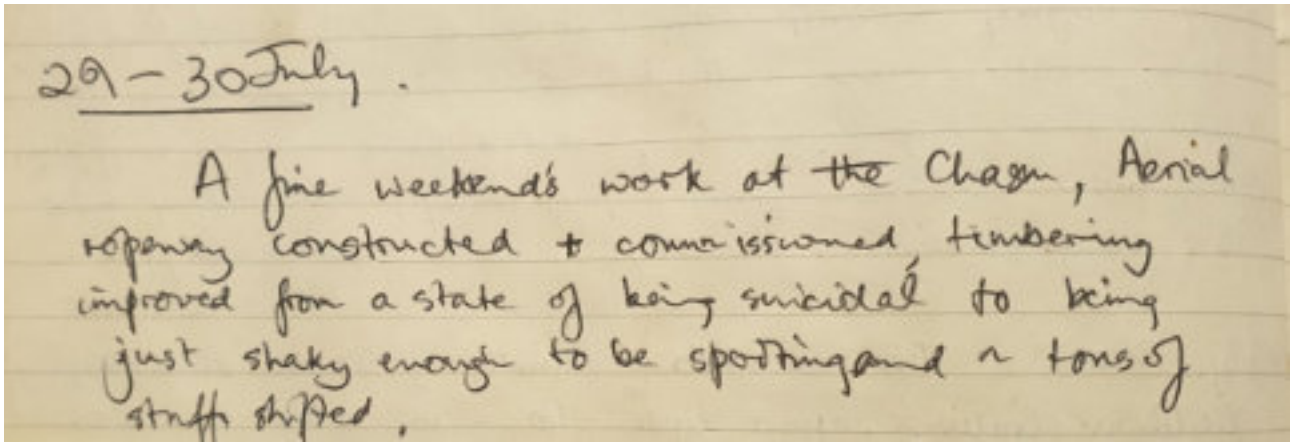
Therefore,
all the evidence goes to show that the more promising dig would be the
Lost Valley Swallet or the more westerly chasm. This chasm is in millstone
grit, but I am pretty confident that we should be in Limestone about
20-30 ft down. I think I am right in saying that a draught has been
noticed - my diaries say so anyhow.

"We were young, we were keen, Jem had a Land Rover and an explosives licence: what could stop us?

Well, access for a start! The site lies on forestry land just across the boundary fence that separates it from the open moor about 2km SSW of Pant Mawr Pot. Fortunately, we had Roger Smith on our side, and he was not only able to negotiate permission for us to dig on forestry land but also to use forestry tracks coming up from Coelbren to get very close to the dig site. Heavy equipment could be moved in!

With permission in place and the vital key to the gate in Jem's Landy, we were soon making regular trips to the site and beginning to get rocks out and timber in. Now, the Chasm is located in the grit beds that overlie the limestone and what we were removing was mostly small fill and grit rocks of manageable size. Larger ones were attacked with plaster charges of varying weight, but rather ineffectively by comparison with blasting limestone. That grit was tough old stuff! And to add to the fun the charges were fired using plain detonators and slow fuse.

To add to the challenge, the whole pile in the bottom of the shakehole seemed very unstable and our best efforts with timber provided only limited reassurance. The following logbook extract gives the flavour:

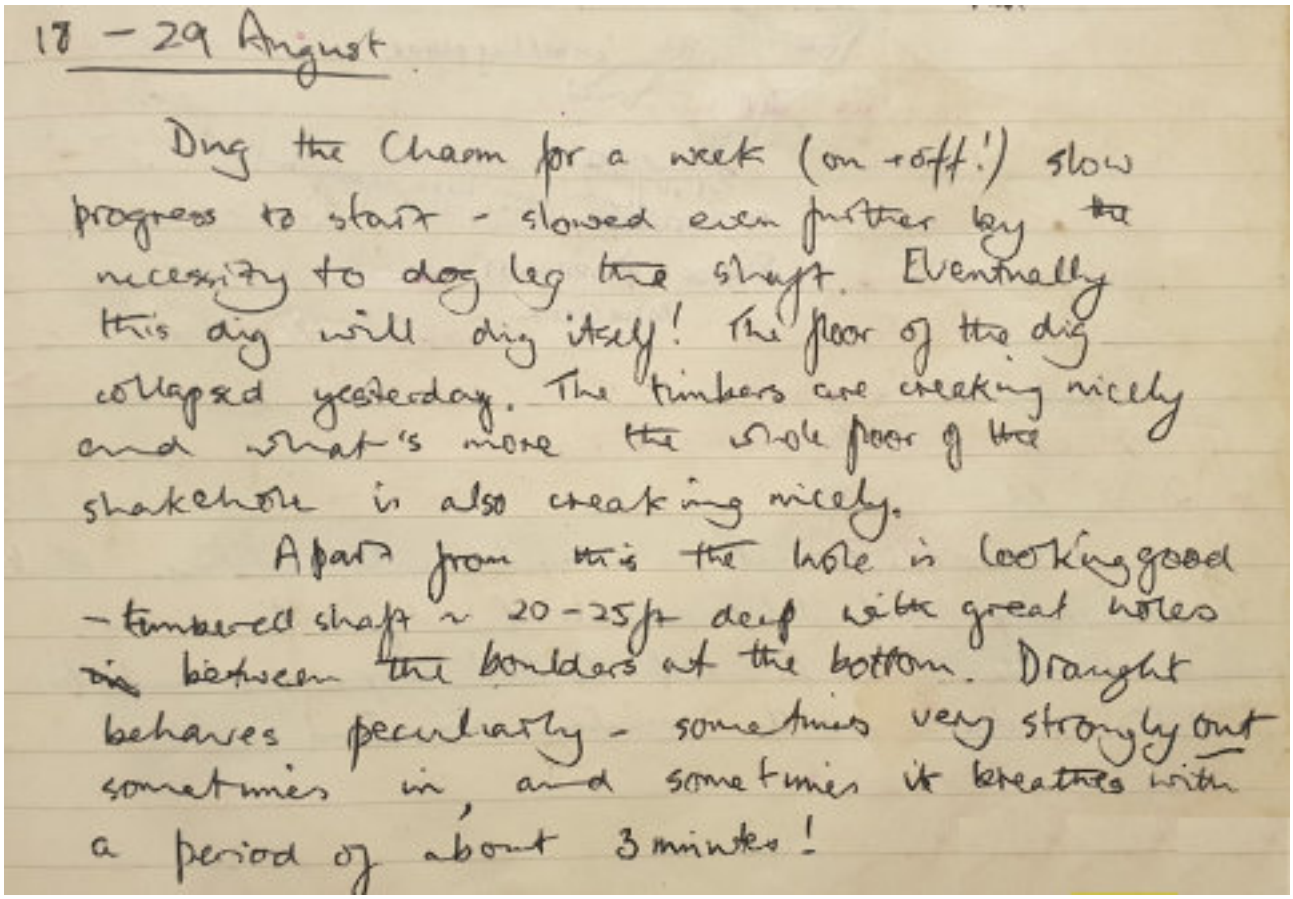


29 – 30 July.

A fine weekend's work at the Chasm, Aerial ropeway constructed + commissioned, timbering improved from a state of being suicidal to being just shaky enough to be sporting and ~ tons of stuff shifted.

As the shaft got deeper the need for serious clockwork caving became apparent. A generator was brought to site – this was the same kit that had powered the winch at Balinka six years before – and we were able to use the Kango Hammer to fix steel cables to the cliff face and to a huge boulder in the centre of the shakehole. Aluminium scaffold tube sheer-legs completed an effective aerial ropeway allowing spoil to be moved well back from the shaft. Haulage was by means of an ex-military balloon winch Frank Salt had acquired from somewhere. With 240V on site we could drill shotholes but soon discovered just how obdurate the grit could be. I remember sharpening star drills in the workshop back at the HQ almost every night.

In the August a full-scale campaign was launched, and a fair number of members walked over from Penwyllt each day to gawp and wonder, or do a shift in the shaft, according to temperament. The following logbook extract gives a summary, but in truth there were complications.

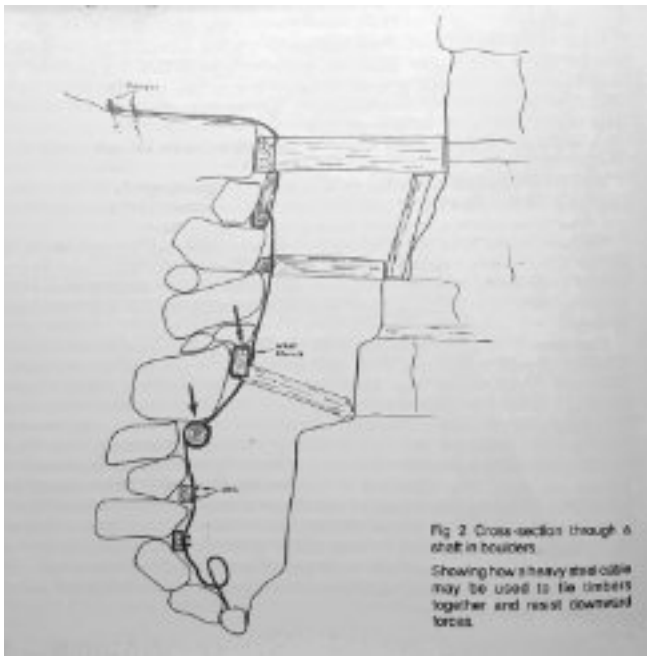


18 – 29 August

Dug the Chasm for a week (on + off!) slow progress to start - slowed even further by the necessity to dog leg the shaft. Eventually this dig will dig itself! The floor of the dig collapsed yesterday. The timbers are creaking nicely and what's more the whole floor of the shakehole is also creaking nicely.

Apart from this the hole is looking good - timbered shaft ~ 20 – 25ft deep with great holes in between the boulders at the bottom. Draught behaves peculiarly - sometimes very strongly out sometimes in, and sometimes it breathes with a period of about 3 minutes!

The solid wall we were following began to intrude into the shaft stepwise and we had no option other than to timber a dog-leg in the shaft. Sourcing timber was an issue, but there was still a pile of railway sleepers outside the HQ at that time, and I well remember the labour of splitting these with a wedge and sledgehammer to produce baulks of more manageable dimensions.



As a confidence boosting exercise, we employed steel wire rope to tie the timbers together. The drawing left gives the idea. I drew this to illustrate a chapter I had contributed to the book *Caving Practice and Equipment*[21] many years later, but it was undoubtedly based on my indelible memories of the Chasm and its creaking timbers! The weather was kind that week, and whilst the dig might not have been a picnic, picnics were certainly had!

We continued to dig sporadically as summer merged into autumn. On the final occasion, after blowing a boulder at the bottom, there were sounds of grinding and snapping boulders coming from below us and all around us - we were standing by the winch at the time - well away from the shaft. Given that the bottom of the shaft was more than 25ft down and dog-legged under a load of boulders held up with railway sleepers and wire rope, we really didn't fancy carrying on if the whole lot was as unstable as that! When we abandoned it, we half-thought that if we left it to settle for a good while we might feel confident to have another go the following summer, and Jem submitted a report on our activities to the Forestry Commission with that objective in mind. But over the succeeding months enthusiasm waned and we each turned to other projects."

And so, the Chasm story came to a close.

Epilogue

Jem recalls that it was ten years or more before the last of the equipment was retrieved. He remembers: "*driving over there in my 109 Land Rover, which I didn't get until 1981, to retrieve the winch (can't remember what else). I had to drive over there from behind the Club because by then we no longer had access to the Forestry. Got there, climbed over the fence to retrieve the stuff, got it back to the L/R and promptly backed it deep into a bog while doing a 3-point turn. Walked back to the Club to encounter Galpin who was highly amused! However, he drove me back in his Range Rover and pulled the L/R out of the bog! There was a good bloke in there somewhere...*"

Future Prospects

With modern methods, alloy scaffold tube, lightweight drills and so forth, it would not be difficult to restart this dig. But would it be worth the sort of sustained assault necessary to reach limestone? My view would hinge on having a clearer picture of the local geology and the potential hydrology. Most of the nearby moor has surface streams that drain broadly southwards merging into the Nant Llech and tumbling over Henrhyd Falls. Presumably some rainwater finds its way through faults, fissures and collapse features into the limestone beneath. Certainly, water in Heather Hole in the Lost Valley 500m to the north has been traced to the Nedd Fechan, as mentioned above, so it is not beyond the bounds of credibility that the Chasm is associated with the same postulated cave system draining eastwards.

Furthermore, the motivation for digging at the Chasm certainly came from Peter Harvey and there was a sound basis for his enthusiasm. We have reproduced in full his 1962 article which provides very plausible arguments for digging both the Chasm and in the Lost Valley. (See following pages after photo gallery). It's a site within walking distance of the HQ, well off the beaten track, in a pleasant location. If I was fifty years younger, I could certainly feel motivated to spend some glorious summer weeks up there! And of course, there is always the other Chasm to have a try at!

Activity at the Chasm, Summer 1972

***A**: Cardy in blue, Jem supervising, Gerry Woolf on winch, Bob Radcliffe seated, Pete Francis in yellow. (©Jem Rowland)*
***B**: Frank Salt (L) and Gerry Woolf in shaft. (©Jem Rowland)*
***C**: Cardy on winch, Bob Hall behind, Pete Francis in his famous lederhosen, and Frank Salt in hat. (©Jem Rowland)*
***D**: Frank Salt, Pete Cardy (blue) and Bruce Foster (red). (©Jem Rowland)*
***E**: Bob Hall (on winch) and Radcliffe (tipping spoil). (©Jem Rowland)*
***F**: Picnics! Terry Rowland and John Harvey. (©Pete Francis)*


A


B


C


D


E


F

The Chasm at SN 87930 14910, the subject of this story. (©Brendan Marris, 2020)

The Chasm at SN 88286 14526. Maybe another project for a new generation? (©Gary Evans, 2020)

Some final details

Historic sources identify two Chasms. The subject of this article is the more northerly of these, at NGR: SN 87933 14910 430m asl (CCR entry 392). There is a report in NL13[22] of Clive Jones and party digging at a 'Chasm' in 1955 but the characteristics of their dig suggest it was in the southern Chasm at SN 88286 14526 407m asl (CCR entry 396) or possibly an adjacent, smaller shakehole.

'THE ORIGINS OF THE 0.F.D. CAVE SYSTEM'

As presented by Peter Harvey in 1962: Reprinted with commentary. (First Published in SWCC Newsletter 40, June 1962)[23]

Background comments

Peter's diagrams have been reproduced unchanged save for labels etc having been retyped.

It is important to remember that Peter wrote this article before any of part of OFD2 or 3 had been discovered and Cwm Dwr Cave had yet to reach Cwm Dwr Jama. At that time Pant Mawr Pot had been quite recently extended and was then one of the major caves in the area. The theory that Peter puts forward was very influential and had a significant impact on both subsequent theorising and the thinking of Club diggers for many years to come.

A further point to note is that a dig, Heather Hole, a short distance south-east of the sink Peter describes as 'Lost Valley Swallet', has been relatively recently dye-tested to R1 in the Nedd Fechan Valley. This finding in no way undermines Peter's theory, but rather provides further evidence of capture by the Nedd Fechan.

Finally: Peter makes reference to, "*the more westerly chasm*." This is The Chasm which the SWCC actively dug in 1972, as described above.

Peter's Article

"Further exploration in the cave system of Ffynnon Ddu has been at a comparative standstill in recent years. Progress seems to be blocked on the inside by the boulder choke and no new advance has been made from the mountain. Ogof Ffynnon Ddu 2 still seems a long way off.

It has occurred to me that it would be of interest at the present time to examine all the evidence available and try to arrive at some idea of the History of the cave's formation. This might point to possible lines of development and direct digging operations in a more fruitful direction.

Considering the area between the rivers Tawe and Neath, the present situation is that the water entering the ground at Pwll Byfre resurges at OFD1, and the water which goes to ground at Pant Mawr Pot resurges in the Neath Valley a few hundred yards north of Pwll Du.

I have long held the view that this has not always been the case and that the following theory is one which has some appeal.

I believe that originally a river rising roughly in the area of Fan Fraith where the Nant-y-moch now rises, originally flowed SW past Pwll Pant Mawr*, into the Nant Llech Pellaf, a tributary of the Tawe, and not into the Neath. Examination of the contours proves this is a possibility. This river and its small tributary, which was probably rather larger in those days and may even have include the upper reaches of the Nedd Fechan,

*Note: for clarity Pant Mawr Pot is the cave, Pwll Pant Mawr is the lake.

gradually went to ground, first near or at the Lost Valley Swallet and then at Pant Mawr Pot and formed the Pant Mawr - Ffynnon Ddu system. The cutting down of the river Neath in recent times altered the direction of flow of the groundwater. The drastic dropping of the water table on the Neath side caused this. Eventually although the then cave system was flowing west, a new system, formed by the new direction of flow of the ground water was eventually formed flowing East. Thus, the River Neath captured the water flowing in Pant Mawr Pot underground. The Nant-y-moch probably changed its course and flowed into the Neath before this. The timing of these changes does not appear to be important. What is important is - did they occur?

At this time a cross section of the area, looking North, would be very roughly as Figure 1. The millstone grit would cover the limestone at this time possibly as far North as Pwll-y-Rhyd. The altitude of the known bottom of Pant Mawr Passage which must have been part of the original cave from its size alone, is about 1,030 ft. A.0.D. The present altitude of Pwll-y-Rhyd is 1,000ft. A.O.D. so this water is unlikely to have risen in the Neath Valley. The assumed water table is shown dotted and shows that the movement of ground water in this region would very possibly be towards the West. Even water in the upper river Neath area (Pwll-y-Rhyd) could have tended in this direction. The dip of the rocks in the whole of this area is approximately West of South which would also have helped this tendency, the angle of dip being in the region of 8 degrees.

The cutting down of the Neath in recent times altered the direction of flow of the groundwater. Figure 2 would give a rough idea of the final state of the flow in the area. The Neath Valley has been cut down removing the Millstone Grit cap for a considerable distance until at the Risings for the Pant Mawr stream the altitude is 750ft. A.0.D.

This then is the theory and I consider that it has a number of points to commend it, although at first it may appear rather far-fetched.

Consider first of all Pant Mawr. It has been proved that the stream flows to the Neath Valley and rises in a number of miserable little risings which give the impression that the System behind them is pretty new (geologically). If this river always flowed East there should be evidence of one or two resurgences at higher level, say 200-500ft. and perhaps half a mile further North. I have spent quite a bit of time in this area and have never come across any indication of an old, well established system. The millstone grit overlies the limestone and is not many feet above the risings. When the riverbed was 200-300ft higher before the rejuvenation period this grit would cap the limestone for quite a long distance to the North. Also, the ground and the dip of the beds is rising gently in this direction and this would increase the distance to the North where any possible resurgence from Pant Mawr could have been. There is an indication of a dry valley running N.W. from Pwll-y-Rhyd, but it does not look very hopeful. Any possible rising in this period must have been in the Pwll-y-Rhyd area because of the grit cap, but the bottom of the cave as has already been shown, was already at depth level with Pwll-y-Rhyd. This water could have risen near Pwll-y-Rhyd, but it is unlikely when considering that the Swansea valley was about 400ft. lower.

If we assume that the theory put forward is correct, then except for Sabre Junction there is nowhere in Pant Mawr Pot where there is any hope of making a connection. It is possibly well hidden in mud. It is true that the existing stream finishes up in an uninviting crack on its way to the Neath Valley.

To the SSW of Pant Mawr there are two large chasms which are in the right place if there was a connection between Pant Mawr and Pant Ffynnon Ddu. The 'Lost Valley Swallet' is most interesting, and there is a possibility that a main swallet exists very near it. Examination of the area shows it to be rather covered with peat, but it may be possible to hit the right spot for digging.

The resurgence of the water has never been proved, but if it did go to Ffynnon Ddu it would be pretty conclusive evidence that Pant Mawr and Ffynnon Ddu were connected. (*Editorial Note: more recent investigations suggest that the Lost Valley area drains towards the Nedd Fechan*)

It is very probable that Pwll Byfre is a relatively recent swallet. It was not many years ago the Byfre flowed towards the Tawe in the open air and in fact it would not be difficult to divert it again as was done in 1951 when rescue operations were carried out. One might expect therefore, to find a pretty primitive cave system at this swallet, much on the lines of that opened up at Sink-y-Giedd. Therefore, all the evidence goes to show that the more promising dig would be the Lost Valley Swallet or the more westerly chasm. This chasm is in millstone grit, but I am pretty confident that we should be in Limestone about 20-30ft down. I think I am right in saying that a draught has been noticed - my diaries say so anyhow.

Figure 3 shows the relative positions of the various places mentioned.

The foregoing may seem like a lot of nonsense to some people, but I think I could draw a few conclusions from it:

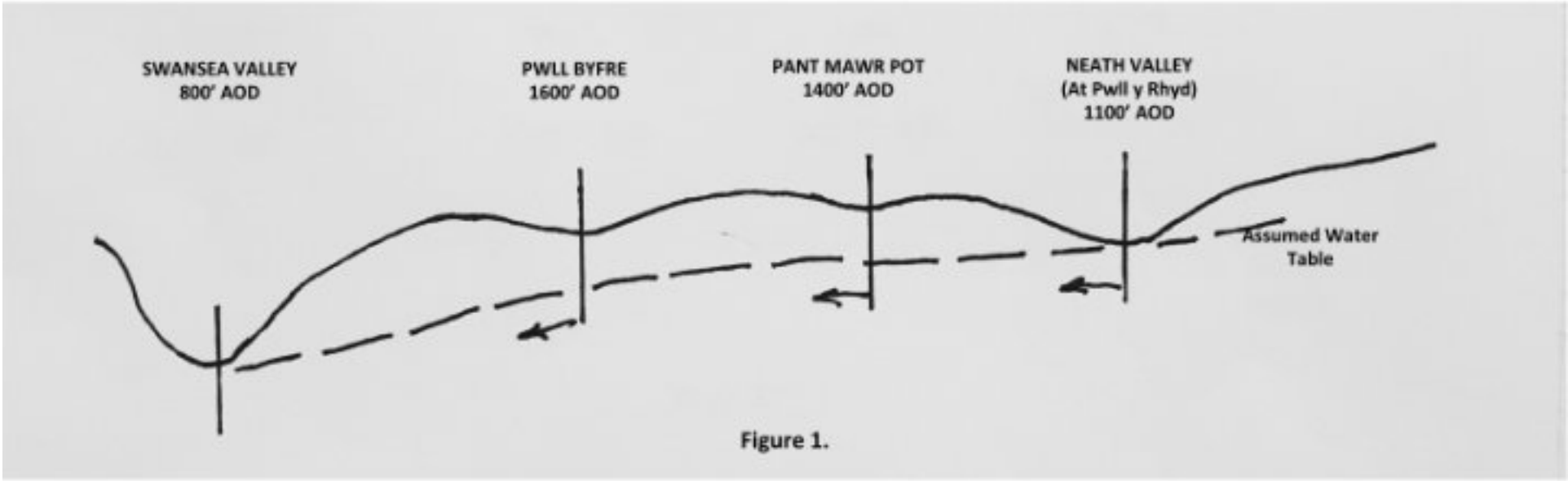


Figure 1.

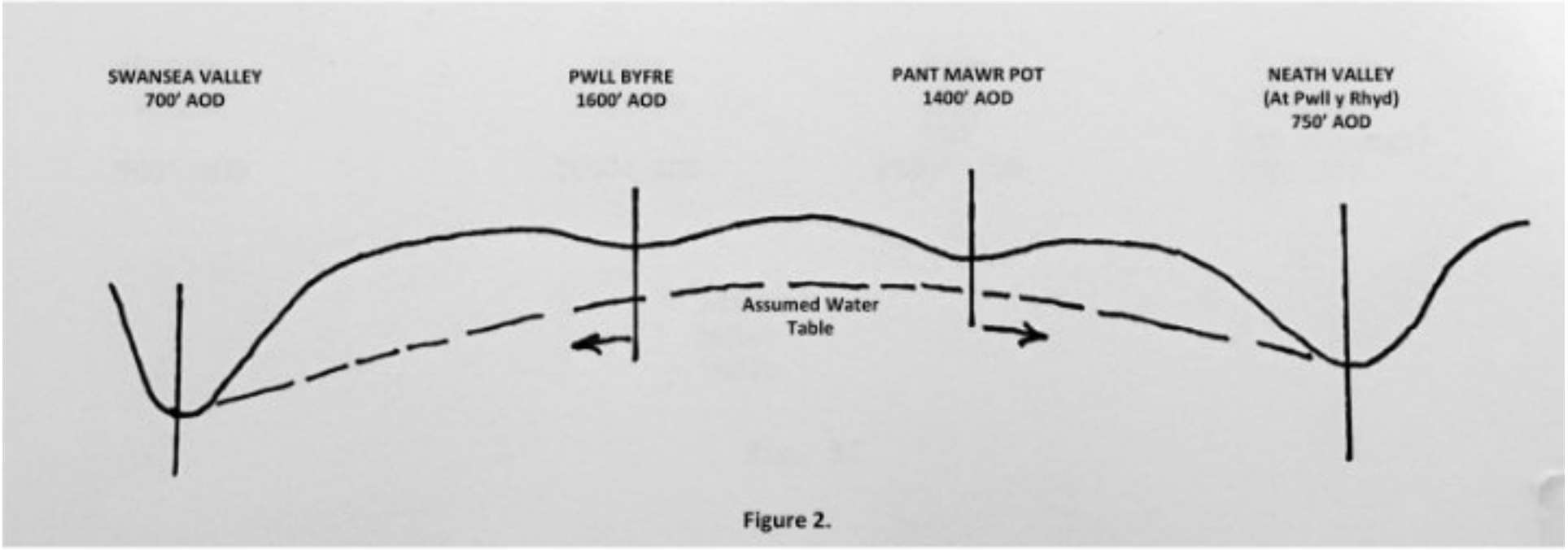


Figure 2.

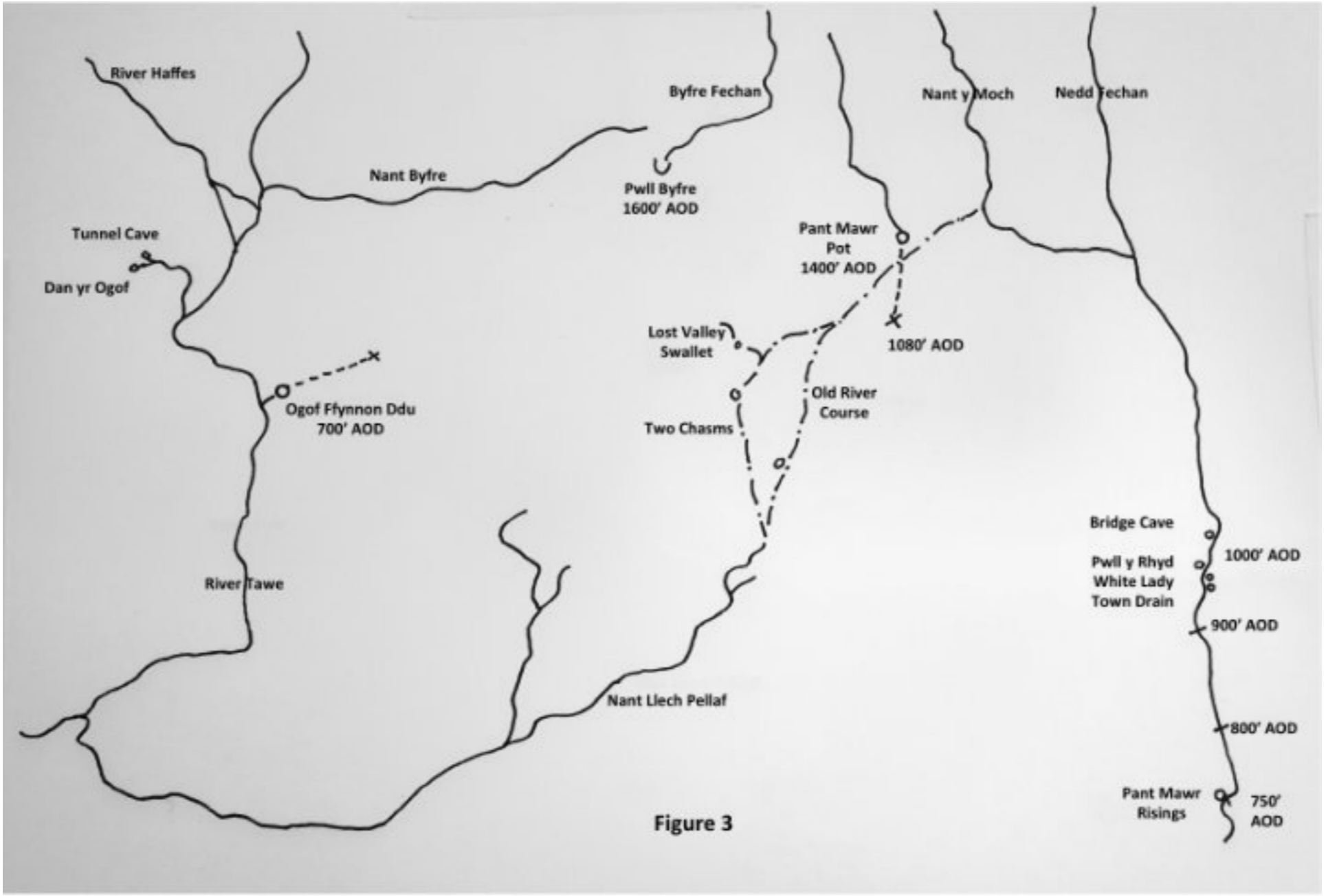


Figure 3

Digs, Digging & Diggers

1. Pwll Byfre is probably a pretty recent Sink and therefore any cave would be rather small and new. Possibly digging would not produce any prolonged System. This can be compared with Sink-y-Giedd which is also a new System.
2. The best places to dig on the mountain would appear to be the most westerly of the two chasms and the 'Lost Valley Swallet'. I have done a little digging at both these sites but never to any great depth. The Lost Valley Swallet looked as though it could be most rewarding, especially as it might be an old swallet for the Afon Moch.
3. The Boulder Choke in OFD is still the most obvious place for entering this vast unknown cave system. Possibly also Cwm Dwr will by-pass this, but the Boulder Choke will always be attractive because it is the actual 'Master Cave' passage only blocked with rocks.

There are a number of interesting possibilities in the progress of being dug on the mountain such as the Hot Air Mine and Dai's Dig etc. but getting in in this kind of place is obviously a matter of pure luck. Anyway, let's hope that somebody gets a bit of luck soon.

P.IW. Harvey"

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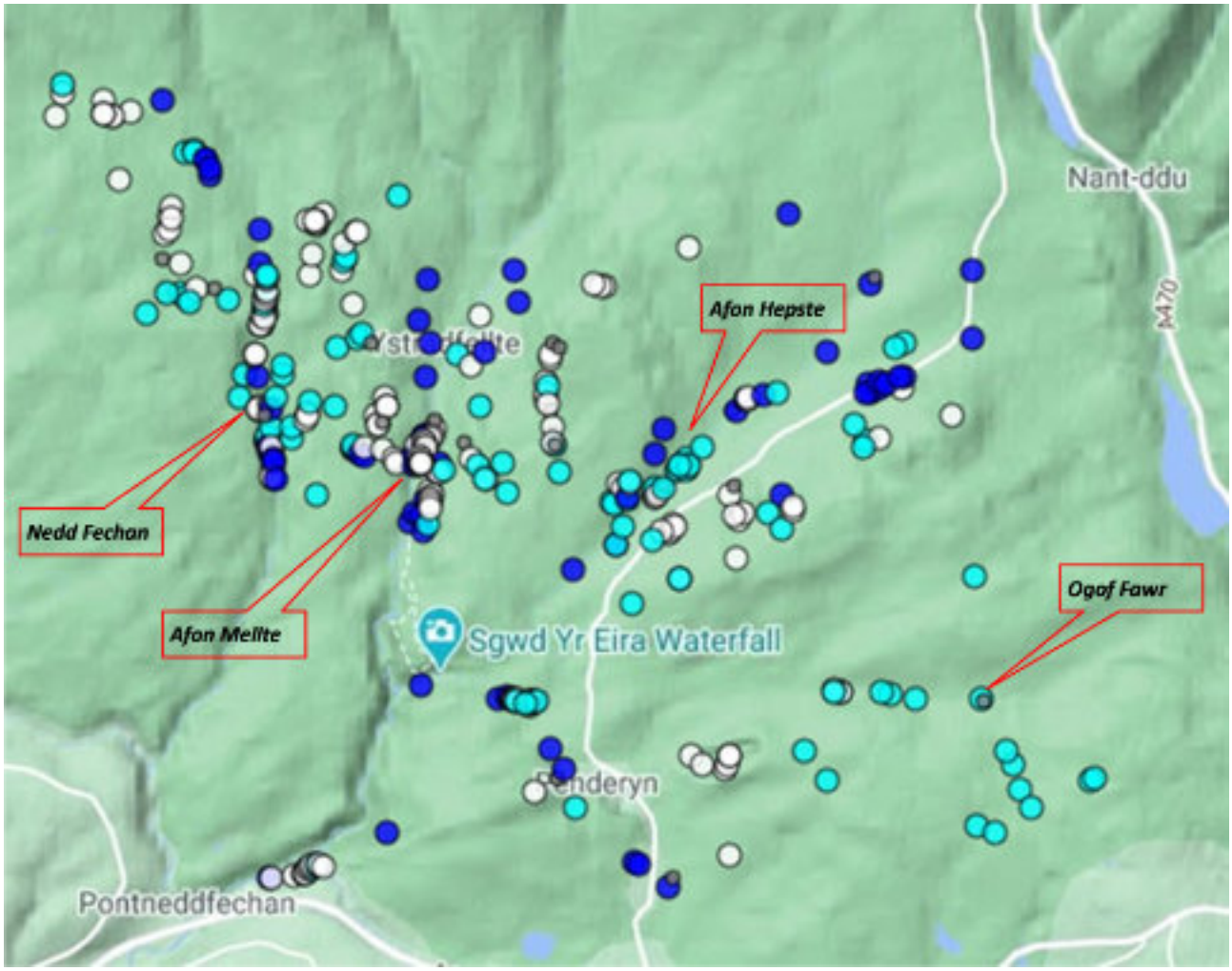
Chapter 7: Pant Mawr, The Nedd Fechan and Selected Points Beyond

Part 1. Pant Mawr

This chapter in my survey of digs and discoveries was to have been two, or even three chapters in my original vision. But once I started work, I soon came to realise that I could only hope to give a cursory snapshot of an area that boasts well over two hundred recorded sites; not least because I am very unfamiliar with the area beyond the Mellte. Also significant is the fact that both the Westminster Speleological Group and Croydon Caving Club have club cottages in the area and both clubs have a long record of digging and exploration in their own right, and their efforts far exceed those of SWCC. Furthermore, both clubs have a long record of publishing their work, much of which is easily available in digital form. So, what follows is no more than a broad overview with a few highlights selected for interest, curiosity value, personal involvement, or in some cases, real significance as discoveries.



This map is a fragment taken from the Cambrian Cave Registry, extending from Pany Mawr Pot in the north-west corner to the Taff Fawr reservoirs in the east. The density of sites in the Nedd Fechan, Mellte and Hepste Valleys is evident.

Pant Mawr Moor

As we have done in earlier chapters we begin in the west – at Pant Mawr Pot - and journey east, visiting some of the many interesting caves and digging sites along the way. But before the coach departs, a brief review of the background is required.

In the interests of clarity allow me to mention the placenames involved. 'Pant Mawr', used without qualification, means the moor itself. The pothole entrance is 'Pant Mawr Pot' whilst 'Pant Mawr Sink' is the point a hundred metres north of the pot where a small stream sinks to enter the cave. 'Pwll Pant Mawr' is a shallow lake near the southern boundary of the moor and is of no speleological interest.

Theoretical and Hydrological Background

As elsewhere, *Limestones and Caves of Wales*[1], although published in 1989, gives a useful introduction to the underlying geology (p16) and hydrology (p51) of this area with further discussion in Chapter 15.

The significance of Pant Mawr Pot and its possible relationship with OFD has already been alluded to in the previous chapter. Peter Harvey's thesis regarding the development of the surface and underground drainage is highly relevant to the area we are about to visit. And, as an attentive reader, you will have registered the reported dye tests connecting both Heather Hole[2] in the Lost Valley and Ogof Carreg Cadno[3] with the Nedd Fechan. Despite these results, the subterranean watershed between the Nedd Fechan and Tawe has not been accurately determined. Further dye tests from sites such as Pete Francis' Dig and other sites in the Lost Valley are required.

The situation to the east is possibly more complex, with some sinks draining to the resurgence known as 'R1', as does Pant Mawr Pot itself, whilst Ogof Cul has been proven to connect to the rising for Little Neath River Cave, R2. This result suggests that the water from Ogof Cul crosses under the Nedd Fechan and joins the water from Little Nedd River Cave which resurges at R2. Our understanding of this is largely based on a programme of tests conducted in winter 1984/5 by Bill Gascoine[4]. The table opposite is a summary of published tests. Again, there is ample scope for further dye-testing in this area.

Pant Mawr Pot itself is an extensive, active cave with some large passages carrying a significant stream. The open moorland entrance gives access to large passages downstream that clearly predate the present stream which is no more than an opportunistic invader. In *Limestones and Caves of Wales*, Sam Moore[5] speculates that a larger river, draining a more extensive catchment to the north-west, might once have sunk at the present open entrance.

The stream encountered underground sinks 100m or so north of the pot and it is possible to get quite close to it by going upstream in the cave and then climbing a waterfall. How many other sinks on this moor might yield a cave on the scale of Pant Mawr Pot if dug with enough determination? Furthermore, there is the theoretical speculation that the vestiges of a pre-glacial, fossil system may exist, its lofty wonders yet to be discovered. In short, another area of great potential.

The strip of moorland between Pant Mawr Pot and the Nedd Fechan is about a mile wide and somewhat more than that between the forestry land to the north and to the south. In that space there are a host of shakeholes, minor sinks, digs and small caves, as is evident from the map above.

Ogof Dryw SN 89011 15904 455m asl (CCR entry 397)

This 'dig-in-a-cave' is situated close to the wall one follows walking over the hill from Pwll Byfre, heading east. Anne Franklin and I stumbled on this little hole back in the summer of 1975. My eye was caught by a wren (y dryw) flitting into a shakehole, and we went to investigate. Anne, being very tiny, was able to slip through a small slot between boulders into a chamber beyond. We bookmarked the site mentally and continued our walk, returning the following day with John Lister and digging tools, and a dig was born.

The most noteworthy detail of what ensued was the problem we faced when trying to excavate seemingly thixotropic mud that refused to stay where we put it! Our solution was to laboriously back-pack a bag of cement powder up from the HQ which we then stirred into the slurry to create a form of concrete.

Ogof Dryw is in a promising position above the potential line of the postulated link between the Grit Chokes in OFD3 and Pant Mawr Pot. I don't remember why we stopped digging. At a guess, summer turned to autumn and by the time fine weather returned we had other projects.

The name Ogof Dryw was corrupted to Ogof Derw (Oak Cave) at some point in the past and was thus recorded in the Registry. That mistake has since been rectified.

Summary of Water Tracing Tests on Pant Mawr Moor and Associated Catchment						
Date	Name	Agent	Sink	Result to	Time	Reference
1954	Peter Harvey	Fluorescein	Pant Mawr Pot	Positive to Nedd Fechan	5 days	SWCC Newsletter 7 (1954)
July 1968	UBSS	Fluorescein	Bridge Cave Sink	Positive to R2 and Pwll Ddu (Negative to R1)	36hrs	UBSS Proc. 1971 12(3)
15/12/84	Bill Gascoine	Lycopodium	18th Hole	Positive to R1	24hrs	SWCC Newsletter 100 (1985) (Note 1.)
15/12/84	Bill Gascoine	Lycopodium	Pwll Derwen	Positive to R1	24hrs	SWCC Newsletter 100 (1985)
15/12/84	Bill Gascoine	Lycopodium	Sarn Helen Sink	Positive to R1	2 days	SWCC Newsletter 100 (1985)
15/12/84	Bill Gascoine	Lycopodium	Ogof Cul	Positive to R2	2 days	SWCC Newsletter 100 (1985)
28/12/84	Bill Gascoine	Fluorescein	Ogof Cul	Negative to OANF & Bridge Cave	N/A	SWCC Newsletter 100 (1985)
28/12/84	Bill Gascoine	Lycopodium	Ogof Cul	Positive to R2 and Pwll Ddu	4 days	SWCC Newsletter 100 (1985)
28/09/85	Jon Young	Fluorescein	Ogof Cul	Positive to Blaen Nedd Isaf Inlet in OANF and downstream of NE inlet. (Negative in NE Inlet. Negative at R2)	30 hours	Jon Young, Private Communication 2021. Data from contemporary personal diary.
??/08/93	Tim Barter	Lycopodium	Ogof O'Flaen yWaun	Negative to R1, R2.	N/A	WSG Bulletin 9(7) (1994)
Spring 2003	R Morgan and T Donovan	Optical Brightener	Site now known as Heather Hole	Positive to "All risings associated with Pant Mawr"	N/K	Private Communication from Tony Donovan. (Note 2.)
	R Morgan and T Donovan	Optical Brightener	Ogof Carreg Cadno	Positive to R1	N/K	Private Communication from Tony Donovan.
	R Morgan and T Donovan	Optical Brightener	Ogof Cul and Ogof Cull	Positive from Ogof Cul to Ogof Cull and then onward to R1		Private Communication from Tony Donovan. (Note 3.)

Note 1. Gascoine also reports his work in Ford (Ed), Limestones and Caves of Wales, 1989, page 51. In NL100 Gascoine refers to the SWCC having conducted a dye test from Pant Mawr to R1 in the 1970s. No evidence of such a test has come to light despite extensive enquiries.

Note 2. Morgan and Donovan's 2003 test was erroneously reported as having been from 'Lost Valley Sink'. In fact it was from a dig nearby that was named by the first diggers as 'Heather Hole' NGR SN 87941 15266 442m asl.

Note 3. This result is inconsistent with previous tests by Gascoine and Young which indicated a connection between Ogof Cul and the OANF system draining to R2.

Ogof O'Flaen y Waun SN 89510 16051 424m asl (CCR entry 401)

This small sink lies some 400m east of Pant Mawr Pot and was discovered[6] in 1970 by Nathaniel Crudy* and other SWCC stalwarts whilst looking at another nearby site. It was extended further on subsequent trips, after which the diggers moved on.

The cave was reopened in 1989 by WSG[7], who surveyed and further extended it. In 1973 the WSG conducted a water-tracing exercise using Lycopodium, but this did not reveal where the water from the cave resurges. The reference above includes a detailed description of the cave.

It remains a cave with real prospects for the dedicated digger – and who knows – perhaps the mighty storms of recent winters have washed through the cave and altered its geography to the explorers' advantage.

About 150m south of Ogof O'Flaen y Waun, and stretched out in a line several hundred metres eastwards, is a series of digs and cave features comprising what I shall term the **Ogof Hebog Group**[8]. Several of these were dug in the 1980s by Croydon CC and others. The team included Clive Jones (with banger), Chris Grimmett, Sarah Tindall and Jon Young.

As ever, perhaps worth another look?

We now head south-east to visit **Blaen Nedd Isaf Sink** and **Blaen Nedd Isaf Swallet**. The first of this pair is described in the Registry as a "*likely dig*" and the second as a, "*very promising dig*." Adjacent to the **Swallet** is **Lewis' Pot** (or Lewis's if you must). This is a site of some passing interest, as it is the last resting place of a clutch of WW 2 mortar bombs! A reminder that the area was used as a range in the war era. Clive Jones describes being shown the site by the local farmer in a short article in NL51[9]. Clive writes:

> The entrance, 4' x 6', is partly hidden by heather and there is no conical depression associated with the shaft which is 20 feet deep. There is about 30 feet of level passage at the bottom and a stream that sinks just outside runs through the cave. The shaft has been used as a dump for mortar bombs.

Presumably, the stream Clive mentions is that sinking in the Swallet about 20m away.

Our next stop is another group of features, this time the **Ogof Cul Group**, somewhat less than 1km south of the features described above. Ogof Cul is essentially a single, shallow cave with multiple entrances. These entrances and associated features are located in a shallow valley that contains the long-derelict Pant Mawr Farm at its southern end. Discovered in 1983, these caves were dug, explored and surveyed by Croydon CC together with Unit Two Cave Research and Exploration members, including one Graham Christian.

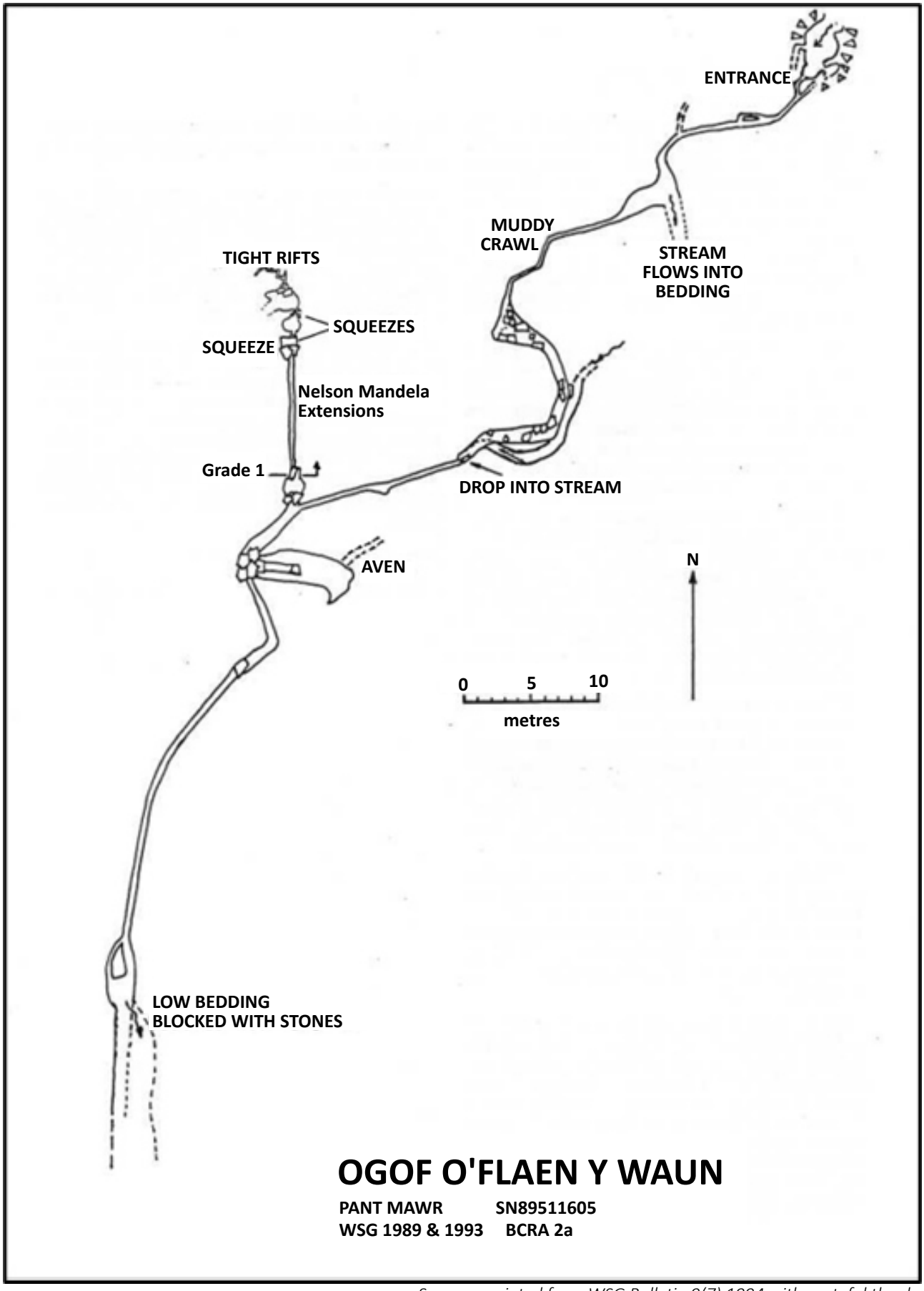
Graham[10] subsequently produced a detailed report on these caves and the work done there, from which I quote:

> "*One of the big driving forces behind the continued effort beside Pant Mawr Farm is that there is no known large cave system under the moor in that area, but there is a feeling among cavers that there should be. Between the large, south-trending main passage of Pant Mawr Pot and the valley of the Little Neath River there is next to nothing in the way of caves, in spite of the large catchment area. The largest passage found to date is Bishopsgate in Pwll Pindar, which only serves to heighten the speculation that there must be something big waiting to be found. The other caves in the area consist of mainly small passages that end in mud chokes. Ogof Cul does not. This is another encouraging sign that has served to spur the diggers on.*"

Bill Gascoine's 1984 dye tests have already been referred to and the proven connection between Ogof Cul and the Ogof Afon Nedd Fechan hydrological system adds additional interest to this cave. Graham concludes his report with a discussion of both dowsing and resistivity surveys conducted to try to identify the onward direction the cave might take.

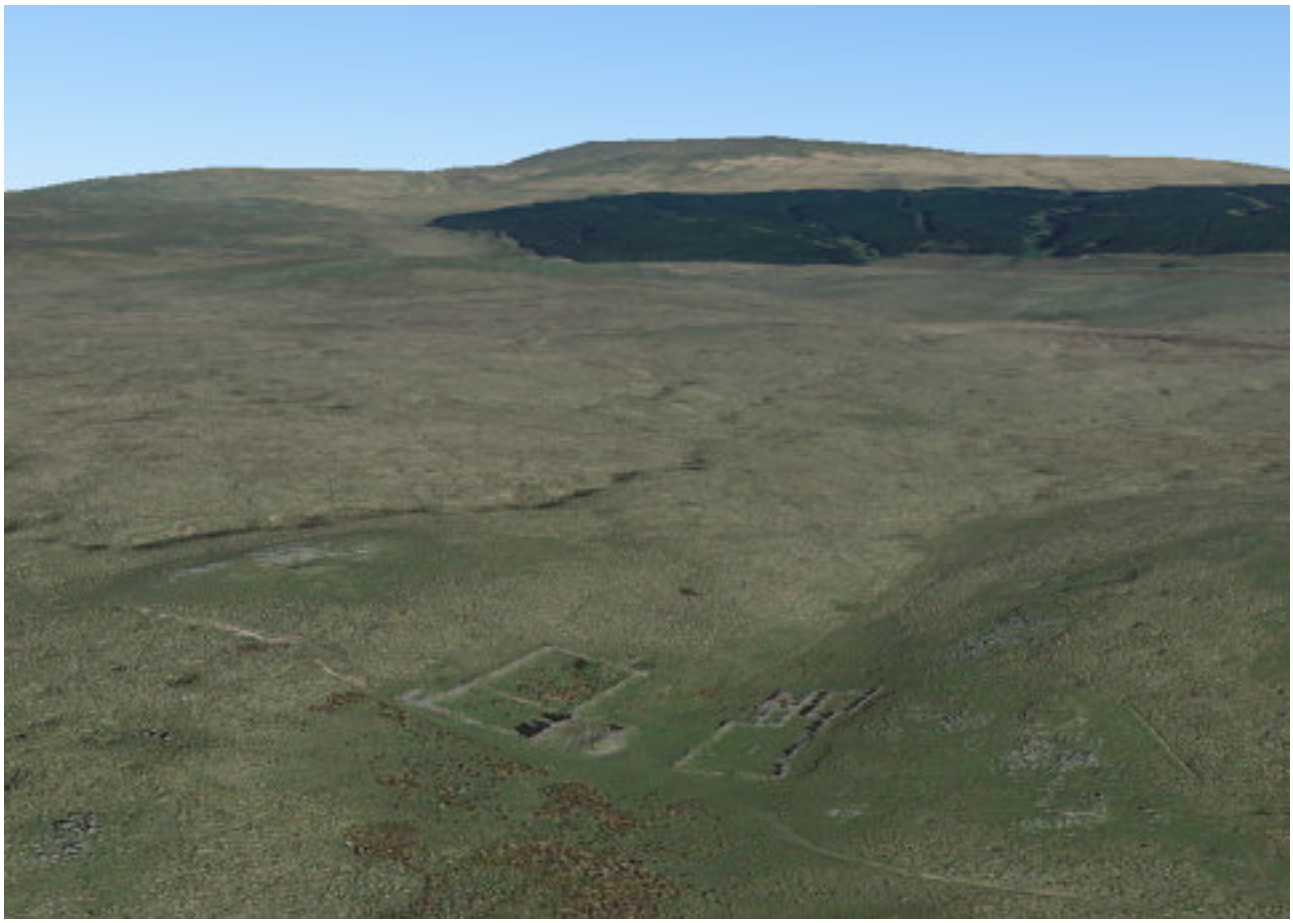
In the light of the subsequent discoveries described below it will be interesting to see an analysis from Graham of how his studies compare to later realities.

**Nathaniel Crudy is one of many nom de plumes used by Clive Jones. One can only assume that he held a deep-seated loathing of librarians, bibliographers and future researchers!*



Survey reprinted from WSG Bulletin 9(7) 1994 with grateful thanks

Google Earth view of the remains of Pant Mawr Farm looking NNE with Fan Gyhirych on the skyline. The 'shallow dry valley' is visible, running from between the buildings northwards. The entrances to Ogof Cul lie strung out along that valley. Another site, 'Crowbar Hole' is on the slightly higher ground SW of the western farm building.



Since the period covered by Graham's report a significant second era of digging has taken place in the period 2001 -2002. The team involved included Croydon CC diggers Adrian Paniwnyk and Chris Crowley, Roy Morgan and SWCC members Bernie Woodley and Tony Donovan. The project began with the sinking of a shaft about 10m south-east of the '5a' entrance to Ogof Cul. Securing this excavation was reported[11] to have consumed 30m of SWCC scaffolding!

To distinguish it from Ogof Cul, the new enterprise was named '**Ogof Cull**'.

Tony[12] tells me that during the summer of 2001 Elsie Little had negotiated continued access to the site despite the Foot and Mouth epidemic which had required the widespread culling of cattle. This inspired the mutation of CUL to CULL. But I rather wonder if it may equally have arisen from the site's seeming determination to eliminate a proportion of the digging team! As Tony[13] wrote in *Caves and Caving*, "*The terminal choke is an ideal location for anyone experiencing suicidal tendencies. It's certainly a locality where very loose bowels are encountered in the very loose bowels of the Earth.*" Subsequent to Tony's rather gloomy report, work continued, and a breakthrough was achieved. (What follows is my precis of an account of exploration kindly sent to me by Adrian Paniwynk[14]. His story has since been published[15].)

The stream was regained, followed by a chamber. After radio-location that chamber has become the site of a second entrance which facilitated another round of discovery including a sump, beyond which there is 30m of walking-sized passage with formations! Adrian writes of continuing possibilities, telling us: "*There is small descending tube on the left which soon gets too tight but through which the author thought he could hear the continuation of the Cull stream. This would make a nice dig for somebody that does not mind getting very muddy!*"

It is important to note two facts relating to hydrology of these sites. First, unsurprisingly, it has been proven by dye testing that the stream sinking in Ogof Cul 5 reappears in Ogof Cull. Second, the water in the Cul/Cull stream has been traced to Resurgence R1 in the Nedd Fechan. This result runs contrary to a sequence of tests carried out in the mid-1980s by Bill Gascoine and Jon Young which indicated a connection from Ogof Cul (and by implication, the then unknown, Ogof Cull) to Ogof Afon Nedd Fechan and Resurgence R2. (See table on Page 103)

Another site close to Pant Mawr Farm ruins is **Twll Trosol** (**Crowbar Hole**). The location of this dig is 50m south west of the Ogof Cul 5a shaft, on the slight rise in ground seen in the bottom left of the image above. This is another project pursued some years later by much the same 'Croydon-plus' gang as had worked in Ogof Cull in 2001. The dig broke through to a stream after two scaffolded pitches of about six metres. A hand-drawn Grade 3 survey is published in Pelobates 97[16]. This dig may yet have potential, especially given the fact that its stream has not been dye tested (as of early 2021).

As the observant reader will have noticed, we have slewed southwards on our journey and now continue in that direction to the next pub on this crawl. **Pwll Pindar**. (Should you choose to read more about this important site you will understand my seemingly incongruous pub reference!)

Pwll Pindar was a WSG[17] digging project for many years in the 70s and 80s. Over that time a shaft was sunk, ultimately to a depth of some 12m, and in spring 1988 a breakthrough was made. Further digging led to the discovery of over 300m of crawls, pitches and some spacious passage leading to Bishopsgate illustrated below.

Breakthrough day at Pwll Pindar. A fine achievement for WSG diggers including Dave Pullinger, proudly holding boulder (©Alan Taylor, WSG)

Jess Burkey approaching Bishopsgate in Pwll Pindar (©Brendan Marris)

Mark Burkey in Bishopsgate itself (©Brendan Marris)

We visit Pwll Pindar on this journey largely because it is a fine example of the rewards that await a team of dedicated diggers but also because it is a key piece in the jigsaw that will ultimately lead us to the Pant Mawr Master Cave.

Continuing southward for about 500m to a point where the moor ends, and forestry begins we encounter a feature marked as 'Swallow Hole' on my OS map which does indeed show a stream sinking. This sink was known for years as 18th Hole after its position on a list of local features in the classic UBSS Little Neath River Cave publication. More recently it has been dubbed '**Productus Pot**'. It is important, being a sink proved to connect to the Pant Mawr Pot drainage system, resurging at R1. (See table on Page 103)

The site has seen epic digging efforts by WSG over almost fifty years but has yet to surrender to their assaults. Toby Clark[18], one of the leading WSG diggers, should have the last word:

"All this drainage would have been off the millstone grit to the west. A similar feature to the north created Pwll Pindar. And all of this is a part of the greater drainage of the Pant Mawr area. That there is a Pant Mawr Master System, there can be no doubt. That the 18th Hole complex is one way into it, there can also be no doubt!"

So, with that call to battle ringing in our ears we swing once again to the east and descend towards the Nedd Fechan Valley where we meet the course of the Sarn Helen or Roman road, by the side of which is situated **Sarn Helen Sink**. This is another of the sites traced to the Pant Mawr drainage system so is important on that account. Furthermore, the Registry tells us that it, "*Looks a promising dig*."

Summary of sites visited in the Pant Mawr Area.

In the case of Ogof Hebog and Ogof Cul, only the first site in the group is given. The others can readily be located using CCR data.

Ogof Dryw SN 89011 15904 455m asl (CCR entry 397)

Ogof O'Flaen y Waun SN 89510 16051 424m asl (CCR entry 401)

Ogof Hebog 1 SN 89792 15921 432m asl (CCR entry 402)

Blaen Nedd Uchaf Sink SN 90340 15502 399m asl (CCR entry 411)

Blaen Nedd Uchaf Swallet SN 90442 15513 395m asl (CCR entry 413)

Lewis' Pot SN 90442 15513 395m asl (CCR entry 412)

Ogof Cul 1 SN 90195 14926 391m asl (CCR entry 407)

Ogof Cull SN 90165 14688 380m asl (CCR entry 2021-29) (Coordinates estimated.)

Twll Trosol (Crowbar Hole) SN 90108 14654 387m asl (CCR entry 404)

Pwll Pindar SN 90279 14338 371m asl (CCR entry 409)

Productus Pot (18th Hole) SN 90263 14029 365m asl (CCR entry 408)

Sarn Helen Sink North SN 90760 13958 335m asl (CCR entry 418)

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Chapter 7: Pant Mawr, The Nedd Fechan and Selected Points Beyond

Part 2. The Nedd Fechan Valley

The Nedd Fechan Valley

This is a valley of huge interest with a major catchment, Pant Mawr, to the west and a major cave system, Ogof Afon Nedd Fechan (OANF), to the east. Once again this is an area that has seen more attention from the locally based Croydon and Westminster clubs than from SWCC, with UBSS having made a pivotal contribution in the 1960s and 70s with their discovery and exploration of OANF[1].

Limestones and Caves of Wales is, as always, an invaluable resource with a complete chapter by Sam Moore[2] covering this valley. Much else has been published by Croydon and Westminster clubs and is available on their websites as well as in the SWCC library. Ample reading for wet days and winter evenings!

A little background

I cannot do better than quote the following from the 1971 UBSS[3] description:

> "*The headwaters of the Nedd Fechan drain off the Old Red Sandstone of the Fforest Fawr Mountains. The river meets the Carboniferous Limestone near Blaen Nedd Isaf and sinks in its left bank over a distance of some 200 m. In winter water flows on under the bridge to West Passage sink and in wetter weather down to Pwll y Rhyd, where it cascades into the Chasm and then resurges from White Lady Cave. A small stream always flows out of the latter, even when Pwll y Rhyd is dry.*"
>
> "*When the Nedd Fechan is in spate most of the floodwater resurging from White Lady Cave remains on the surface, flowing down the valley to meet the water resurging around Pwll Du, 1700 m south. A little of the water, however, goes underground for a second time, sinking partly into Town Drain and partly in the bed of the river further downstream.*"

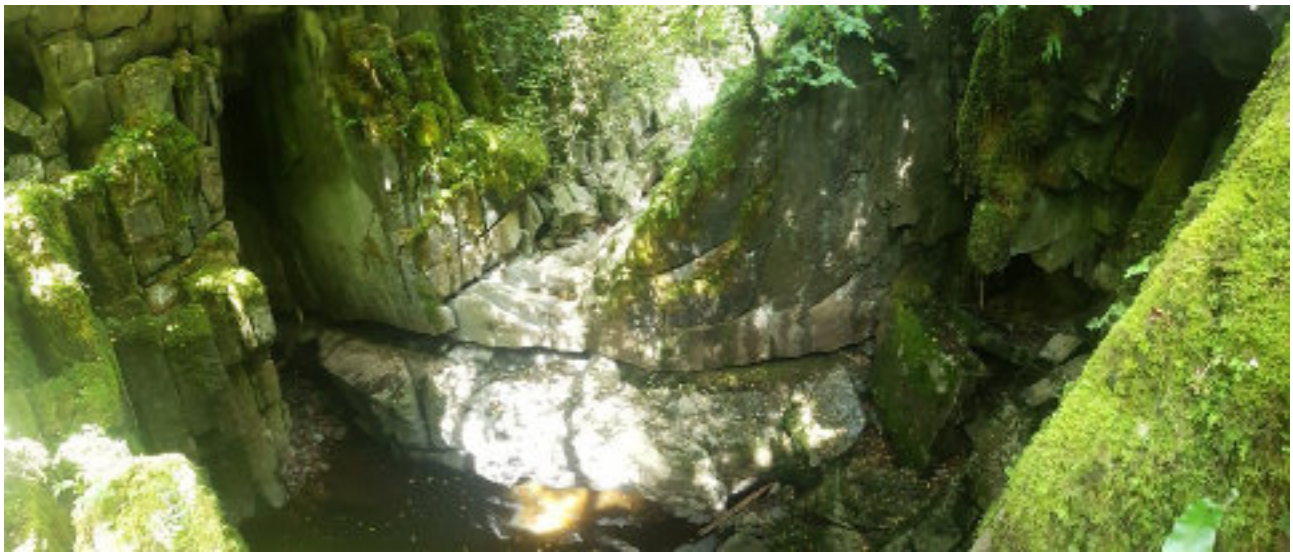
The 'small stream' referred to in the first paragraph is of interest because it enters the cave through the Inlet Series discovered by John Parker in 1969. That is from the west, the Pant Mawr direction. We will return to the Inlet Series shortly. Much of the interest in the Nedd Fechan relates to its relationship to the postulated Pant Mawr Master Cave. The SWCC certainly played its part in the early years and individual members have made significant contributions in the decades since, as the brief tour that follows will reveal.

The West Bank: Complexities and Conundrums

We start our tour by the bridge where the minor road from Ystradfellte meets the river, just south of Blaen-Nedd-Isaf farm. A few hundred metres downstream from the bridge is Cwm Pwll y Rhyd, a significant trench-like chasm running across the line of the river. In dry weather all the water in the river sinks upstream to enter Ogof Avon Nedd Fechan. Sometimes a slight trickle is seen at the chasm but in wet conditions a mighty torrent thunders over the lip in spectacular fashion. This water passes through a sump to resurge at White Lady Cave.

But it is at Cwm Pwll y Rhyd that we pause for a brief snippet of history. The substance of what follows is drawn from a detailed report penned by Graham Christian[4] and published in 1987. Graham was also involved in the survey of the cave.

Cwm Pwll y Rhyd, seen looking north, that is, upstream. The sunlit ledge is the point at which, "a mighty torrent thunders over the lip in spectacular fashion." (©Tarquin Wilton-Jones)



Back in the mid-1980s, Clive Jones and his family were out walking in the area when his daughter, Anwen, noticed a small hole in the bed of the Nedd Fechan, under the cliff of the west bank about 20m upstream from Pwll y Rhyd. Excited, the group pulled out some rocks and a deep rift was exposed. In the weeks that followed, Clive's teenaged stepson, Owain Harvey, together with Jon Young and other Croydon CC cavers gained access to 300m of passages via a low entrance at the bottom of Cwm Pwll y Rhyd. The entrance is amongst the river cobbles seen just above water level in the lower, left of the photograph. (Some of these cobbles generally need to be removed to gain access to the passage.) Exploring beyond a canal, a diving line was found, showing that John Parker and Peter Standing[5] had been there first, but via White Lady Cave and a 70m-long sump. What had been discovered connected to the 'Inlet Series' (aka 'White Lady 2') mentioned earlier.

A very young Owain Harvey in the extensions he helped to discover. Circa 1985. (©Graham Christian)

Downstream of Cwm Pwll y Rhyd is the resurgence at **White Lady Cave** from which John Parker dived to first discover the Inlet Series. The main sump coming through from Cwm Pwll y Rhyd is quite spacious and pleasant so is popular for training dives. But on one such it proved anything but pleasant for me; diving from

White Lady Cave, through to the upstream sump pool I surfaced under a disintegrating sheep's carcase. Ych-a-fi indeed!

At this point, on the eastern bank of the river, we find **Town Drain Cave**. This cave has seen some pretty serious digging attention from Tarquin Wilton-Jones[6] and Gareth Davies quite recently, and their progress was reported in some detail in NL136. It is interesting to note that the primary motivation behind this dig was not so much to find new cave, as to find a 'dry' – that is non-diving - route into the further reaches of Ogof Avon Nedd Fechan and thus facilitate further exploration.

Our next stop is a few hundred metres further downstream where we return to the west bank and **Ogof Igam-Ogam**. This cave is the result of an epic endeavour over more than thirty years by members of Croydon CC[7] and rates as the most significant discovery in the valley for a generation. Malcolm Stewart has been at the forefront of much of the exploration as the only diver involved for many years. In 2018 Malcolm finally passed Sump 4, thirty years after first diving there! Since then, Gareth Davies has also been involved, particularly with climbing a 35m aven beyond Sump 4. This major project continues!

About half a kilometre further south, situated high on the wooded west bank is an extraordinary feature known as the 'Great Chasm' or **Cwm Huw Bwb**. The following photograph gives some idea of the scale of this vast pit.

Cwm Huw Bwb or 'The Great Chasm'. (©Huw Jones, Brynmawr CC)

In *Limestones and Caves of Wales*, Sam Moore[8] opines that, "*It seems probable that this is an abandoned resurgence for Pant Mawr Pot, active when the riverbed was perhaps 30m higher than at present.*" The implication of this observation being the possibility that it could be a 'back door' into fossil passages of the Master Cave such as are seen in Pwll Pindar.

Certainly, Peter Harvey[9] took an interest in this site back in the early fifties as his diaries reveal. More recently, in the early 1990s, WSG[10] conducted a determined dig downwards for about 25m but the Pant Mawr Master Cave eluded them as it has so many others. Perhaps a site for a fresh pair of eyes and a new push?

Moving on again, passing the bridge below Dyffryn Nedd farm, we come to a complex group of caves which should be considered together for a number of reasons. Not only do they all lie within a few hundred metres of each other, but they are hydrologically connected, draughts have been shown to pass between some of them and they are strongly influenced by a fault which runs from south to north, parallel to the river. This is an important area in relation to the Pant Mawr Master Cave and the interested reader is strongly advised to read Dave Everett[11], Andy Brooks[12] and Guy Cox[13] in WSG Bulletins of 1972.

Pwll y Coeden Gnau is a pothole high on the west bank and was first descended by Peter Harvey[14] and an SWCC party in August 1952. SWCC subsequently dug there and extended the cave in several directions with further work being done in later years by WSG and Croydon CC.

Ogof Cas is an aqueous cave in the west bank that has been explored by divers for over 100m. It extends beneath Pwll y Coeden Gnau and intersects the fault that runs parallel to the Afon Nedd Fechan. The Registry notes that, "*It floods rapidly in wet weather and is very active. The hydrology is interesting.*" The WSG authors referenced above discuss Ogof Cas as a flood resurgence for the Pant Mawr drainage and that is a widely held view, supported to some degree by dye tracing evidence (see below). Malcolm Stewart, who has worked in the sump over a good many years, takes a different view based on his experiences. For example, in a dive report from 1990[15] he noted: "*Cas resurging considerable quantities and river (normally dry) flowing strongly. Dived to a point half-way through bedding plane in Sump 2 but at no point was current detectable.*" Malcolm[16] inclines to the theory that some of the main flow of the Nedd Fechan is diverted though some unknown conduit to resurge from Ogof Cas.

As a digging site Ogof Cas offers little, other than to divers. CDG diver Mike Barnes[17] conducted a significant solo attack, digging underwater in 2006. It remains an open, but challenging, opportunity.

Ogof Siom was also discovered and first entered by Peter Harvey's party in August 1952[18], "*after a bit of work with a hammer.*"

Ogof Cragen is a much more recent discovery having been spotted as a draughting hole in the summer of 2002 by Tony Donovan and Roy Morgan who then dug there with considerable determination over several years[19].

Finally, a few hundred metres further south is **Ogof Cwbl Hardd**, also on the west bank, which is rightly part of this group despite its physical separation. This is another WSG discovery[20] where a brief dig in 1990 revealed a short, awkward crawl leading to a sump. This was dived repeatedly by WSG's Alan Taylor[21], ultimately becoming a bold underwater dig, before a narrowing bedding plane rendered it hopeless.

We now come to the culmination of our excursion: the resurgences.

Just a few metres downstream from Ogof Cwbl Hardd is a resurgence in the riverbed known as **R1 / Pant Mawr Resurgence**. The Registry describes it as, "*easy to find in dry weather as the river from here to Pwll-y-Rhyd and to Bridge Cave is quite dry. It is not so easy to spot in very wet weather as there are no distinguishing landmarks in flood.*" About 50m further is another resurgence, recorded in the Registry as '**Unnamed Rising**' but colloquially known as '**R1.5**' or '**R½**'. And, finally, 100metres further still, is **R2** on the west side and the amazing pool of **Pwll Du** on the east. There is an excellent photograph of Pwll Du in Chapter 1 on page 8, taken on the occasion of the first attempt to penetrate it by diving.

Our journey from Ogof Iagm-Ogam to Pwll Du may have seemed somewhat rushed as we scampered through a whole catalogue of caves without much commentary, bar a short scrap of history here and there. There is a logic to my approach: it is impossible to say much about one site without referring to others, so I felt it best to provide an overview first. With that completed we can consider some of the detail. To complement what follows I have compiled a sketch map which is a synthesis drawn from several sources[22] but ultimately relies significantly on original work by Roy Morgan.

When considering the geology, the existence of three or more broadly parallel faults running from south to north through the area is very significant. Peter Harvey commented on the fine exposure of one such fault in Pwll y Coeden Gnau soon after its discovery, noting in his diary[23] for 30th August 1952, "*The fault was easily visible in the cave. The grit going down to within a foot of the floor at the west side. The east side being entirely of limestone.*" His sketch taken from NL4[24] is shown over. Note the phrase in the title, "looking south." The western, Pant Mawr side, is the downthrown one.

It is highly probable that this fault has had a profound effect on the underground watercourses that it intersects in the locality as well as the development of the caves and surface features such as Cwm Huw Bwb.

As far as the limestone sequence goes, this stretch of the valley runs over beds of the upper limestones, principally Oxwich Head (Penwyllt) Limestone. The limestone forms a narrow tongue, extending some way southward, with grit on the high ground on either side of the valley. As shown in Peter's section, the fault

forms the western boundary of the limestone on the surface and a number of sinks along the line of the fault provide further evidence of this.

For the hydrology, the overarching scheme is that water disappearing into the sump in Pant Mawr Pot resurges at R1. Along its 4km (straight line) course this stream picks up feeders from a number of sinks. (See table on Page 103) R1½ is a supplementary rising, perhaps associated with some flow southwards along the fault-plane. The area around the R1 resurgence has naturally attracted the interest of diggers and divers from the earliest days of the SWCC – as witnessed by Peter's poking about in 1952, and much work since. The lure of a way into the hoped-for Master Cave has been a powerful one.

So, working back up stream from R1, we return to Ogof Cwbl Hardd and its sump. In his dive reports Alan Taylor[25] describes how he, "battled against the current for 10m" in one section of the sump and he is of the opinion that he was in the main 'Pant Mawr' watercourse. At this point he was working upstream, but still only a few tens of metres away from R1.

Section through Pwll y Coeden Gnau looking south

In late 2002 a programme of tracing using 'optical brightening agent' was conducted by Roy Morgan, after the discovery of Ogof Cragen. This has been reported in some detail by Adrian Paniwnyk[26]. These tests confirmed that water from a small stream in Ogof Cragen joins the 'Pant Mawr water' to resurge at R1 and R1½. A very rapid (<3hours) trace to Ogof Cas confirmed that it too is part of the same hydrological network. Ogof Cas has long been considered to be a flood rising for the Pant Mawr water and in such conditions, water backs up into the lower passages of Pwll y Coeden Gnau. And dye placed in the latter cave was detected at R1 in under an hour. It is also reported that a small stream sinking in Pwll y Coeden Gnau flows to Ogof Siom.

As another part of the 2002 programme, tests were conducted between streams in Ogof Igam Ogam with positive traces to R1 and R1½.

On the east bank of the river, R2 and Pwll Du are considered to be the primary resurgences for the Ogof Afon Nedd Fechan system. However, positive traces were detected at R2 (but not in Pwll Du) during the 2002 series of dye tests described above, suggesting that some water from the Pant Mawr drainage joins that from Ogof Afon Nedd Fechan under some conditions at least. Once again this may well be 'leakage' along the line of the fault.

As far as the west bank is concerned it is now clearly established that there is a pattern of linked conduits connecting Ogof Igam Ogam, Ogof Cas and Ogof Cragen to R1. Where this joins the conduit coming from Pant Mawr is yet to be resolved.

Where does that leave aspiring diggers, keen to chance their crowbars in the quest for the Master Cave? To them I say, "*I am not the prophet you seek; read that which was written by the wise ones of yore, seek truth in fields and amongst the trees, on warm days seek the cool air on your skin as it wafts from secret crevices, be bold.*"

Sites Visited in the Nedd Fechan Valley

Cwm Pwll y Rhyd SN 91130 13780 292m asl (CCR entry 451)

White Lady Cave SN 91098 13676 290m asl (CCR entry 442)

Town Drain Cave SN 91100 13673 290m asl (CCR entry 439)

Ogof Igam Ogam SN 9104 1337 265m asl (CCR entry 424)

Cwm Huw Bwb SN 91090 12810 290m asl (CCR entry 431)

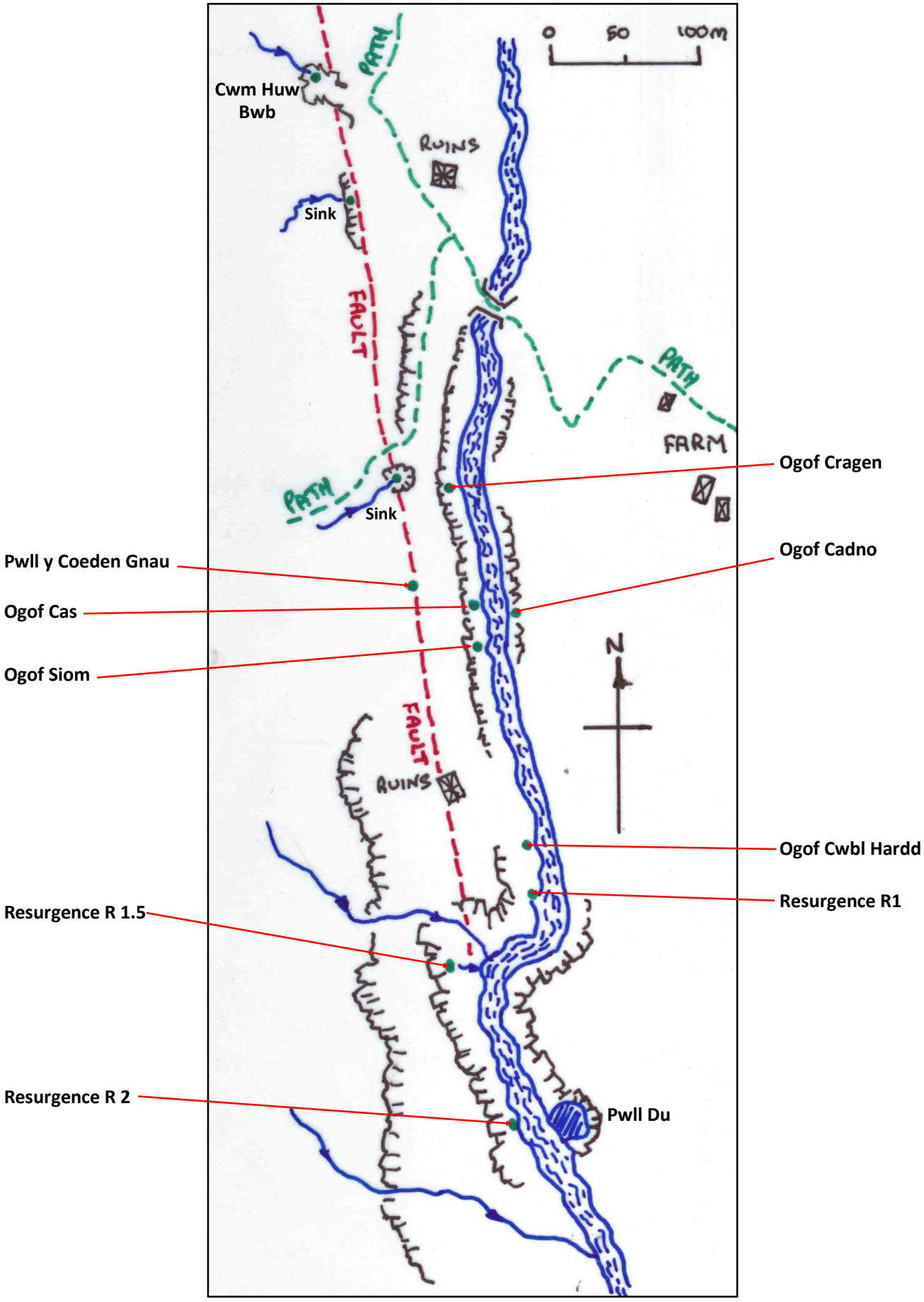
Pwll y Coeden Gnau SN 91130 12450 262m asl (CCR entry 444)

Ogof Cas SN 91170 12433 240m asl (CCR entry 464)

Ogof Siom SN 91175 12388 253m asl (CCR entry 460)

Ogof Cragen SN 9114 1248 250m asl (CCR entry 2017-29)

Cave Features of the Nedd Fechan Adjacent to Dyffryn Nedd Farm



Ogof Cwbl Hardd SN 91200 12280 234m asl (CCR entry 476)

R1 / Pant Mawr Resurgence SN 91200 12270 227m asl (CCR entry 479)

R1½ / Unnamed Rising SN 91192 12214 247m asl (CCR entry 458)

R2 SN 91205 12084 215m asl (CCR entry 475)

Pwll Du SN 91218 12084 215m asl (CCR entry 480)

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26. Paniwnyk, Adrian (2003) *Pelobates* 83, pp.4-10.

Chapter 7: Pant Mawr, The Nedd Fechan and Selected Points Beyond

Part 3. The Afon Nedd Fechan to the Afon Mellte

From the Afon Nedd Fechan to the Afon Mellte

The area we will briefly visit is dominated in the west by the presence of Ogof Afon Nedd Fechan beneath it. Unlike many other catchments we have visited, the greater part of the water flowing in OANF has its origins in the valley itself and surface sinks make only a modest contribution to the main flow. Thus, there is no missing 'master cave' to be found other than the potential for extending OANF further downstream, beyond the many sumps already explored by divers. One or two surface digs may be relevant in this context. There is, however, a significant catchment just to the west of Ystradfellte village, where a shallow dry valley descends towards Porth Yr Ogof and risings on the west bank of the Mellte. Proven connections have been made between two sites higher up this valley, Y Gwal and Hole by the Wall, and these risings.

In the north of the area there is a broad band of Dowlais Limestone with a good many exposures, some of which sport minor caves such as at Carnau Gwynion. This area is known as the 'Shar Wlad' - a Common. (See a later footnote for an explanation of this name.)

As always, Limestones and Caves of Wales is a sound point of reference, but another useful local resource is to be found in Pelobates, the Croydon CC Newsletter, issues 51 to 56, where Allan Ockenden presents a very comprehensive survey of the Mellte area.

Our path will be roughly in the form of a closed loop, beginning and ending at Berthllwyd Farm (SN 91312 13258).

One kilometre north of the farm is **Ogof Dan y Rhedyn**.

This cave is a fine example of SWCC digging producing a good result[1].

Brendan Marris[2] tells the story very well in his website entry for this cave.

> "*In the late 1980s the Greensites Project was championed by the late Clive Jones as a way of using nature to indicate the presence of unknown cave entrances. During the summer of 1991 Clive Jones was on a bike ride, checking out shakeholes as he went along when he noticed some frost sensitive ferns growing in a small shakehole. Taking this as an indication of warm air rising from a cave below, he made a preliminary investigation, and realising he would need additional manpower, it was left for another day. In the spring of 1992, he returned with Neil Weymouth and after a short spell of digging the bottom of the shakehole fell in revealing a shaft. This was quickly laddered and the 85 metres of cave seen today was explored.*"

This cave passage went somewhere once. Certainly a place worth investigating for its digging potential. Lovely limestone!

Moving on north, we pass **Ogof Shar Wlad**, a Croydon CC dig-that-became-a-cave, which might yet repay a visit with a keen eye and a crowbar. Several hundred metres further on we come to a group of shakeholes of some interest. Two of these contain named sites.

Main Chamber: Ogof Dan y Rhedyn (©Brendan Marris)

The most southerly, **Ogof Rasyr**, is reported in the Registry as having been discovered by SWCC in 1976 and is a 10m shaft with limited horizontal development. Who from SWCC was involved I cannot say, and research has drawn a blank.

The other named site, **Theoretical Pot**, has been looked at by both WSG and Croydon CC in the past.

The Croydon effort in the early 90s involved Adrian Paniwnyk[3] and Malcolm Stewart. Adrian describes the dig as follows:

> "*The dig is situated through the tight squeeze at the base of the 30 feet pitch. It is obvious that this dig has been worked by persons unknown in the past. Digging this time around involved removing spoil from a tight, steeply dipping tube, carrying a small stream. After a few digging sessions it became clear that the tube degenerated into a very low bedding plane, approximately three inches high. Work continues to enlarge this using chemical means of persuasion. Many thanks must go to Malcolm Stewart for constructing a spoil retaining structure, without which the dig would not have proceeded, and for hiring a Bosch drill.*"

And writing again a few years later he describes how he had continued digging using SLB (Soundless Breaker) with some difficulty in the confined space, with progress slow. But he notes that the pot is in the Dowlais Limestone, carries a stream that has not been traced, has a draught, and lies on a fault visible in the cave which is known to carry on down to Porth yr Ogof. So, an ideal site for slender, agile diggers with access to explosives!

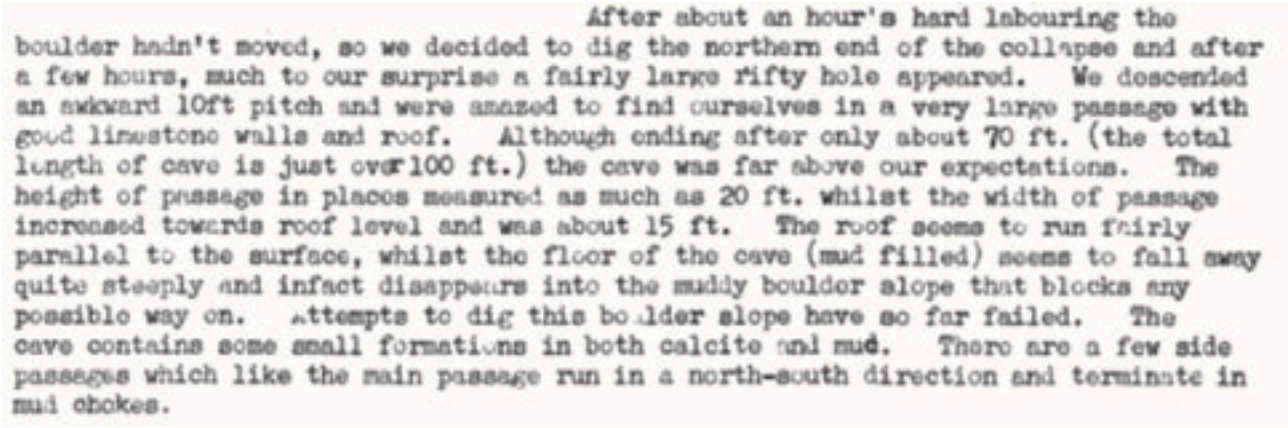
There are two other shakeholes nearby that have unnamed holes – maybe one of these will provide greater rewards – who can say?

Turning slightly south of east and climbing gently to some craggy limestone outcrops, Carnau Gwynion, where we find a few minor caves and digs that might tickle somebody's fancy but are worth the walk in any case for the sake of the scenery!

South of the high ground there is little of interest until we reach **Einon's Hole**, which should in truth be 'Holes'. The Registry tells us that, "*the Westerly shakehole contains well fretted limestone which could contain a good dig.*"

About 350m further south is Y Gwal, a digging site that has attracted the interest of cavers since Arnold Jones (Clive's brother) happened upon it in the late 50s.

His story is told in NL30[4] but this extract contains the gist of it.



After about an hour's hard labouring the boulder hadn't moved, so we decided to dig the northern end of the collapse and after a few hours, much to our surprise a fairly large rifty hole appeared. We descended an awkward 10ft pitch and were amazed to find ourselves in a very large passage with good limestone walls and roof. Although ending after only about 70 ft. (the total length of cave is just over 100 ft.) the cave was far above our expectations. The height of passage in places measured as much as 20 ft. whilst the width of passage increased towards roof level and was about 15 ft. The roof seems to run fairly parallel to the surface, whilst the floor of the cave (mud filled) seems to fall away quite steeply and infact disappears into the muddy boulder slope that blocks any possible way on. Attempts to dig this boulder slope have so far failed. The cave contains some small formations in both calcite and mud. There are a few side passages which like the main passage run in a north-south direction and terminate in mud chokes.

Arnold concluded that, "*The possibilities of extension are good, but it means the inevitable 'dig'.*" It turned out that Arnold was quite right, and Y Gwal was indeed extended by some forty metres or more including a streamway, whether by Clive Jones and his team in 1973[5] or later I cannot say. Tony Donovan reported to me in late 2020 that it has been blocked, "*by the farmer*."

Several hundred metres south, lies the '**Hole by the Wall**' sink. This is a site of significant hydrological importance because tracing work carried out by Jon Young and Bill Gascoine in 1985 suggests that water sinking here flows both east and west. Jon Young[6] writes as follows.

> "*The water sinking at Hole by the Wall resurges predominantly in the Nedd Fechan, probably at R2, in less than 21 hours. Some also resurges in the Mellte in less than 24 hours, though probably not via the resurgence in Porth yr Ogof.*
>
> *Two possible situations might exist:*
>
> *(i) The water reaches the local zone of saturation and then diffuses in all directions.*
>
> *(ii) water flows along a discrete conduit above the saturation zone until it bifurcates, thus additionally following a secondary route.*
>
> *The former appears the least likely, since water flow in the zone of saturation characteristically produces longer transit times and large tracer dilution.*"

The Hole by the Wall has received attention many times over the years, including a campaign in 1974 involving Gary Jones[7], Bruce Foster and the 'Valley Boys' (John 'Paddy' Williams, Brian Smith, Elfed Jones and co.). The prospect of a significant cave system draining this area of the Shar Wlad towards the Mellte rising must surely justify a renewed effort here. Or if not here, then nearby.

Heading south west for a few hundred metres brings us to the **Gyrn Fawr Sink** which has been dug in the past by UBSS and perhaps others but would probably require a full-blown clockwork caving approach to get anywhere, assuming permission could be obtained.

Some 600m further south we come to **Pwll y Gelynen**, a large and significant sink which does not appear to have been dye tested or dug. The Registry describes it as follows:

> "*It is about 30m diameter by 8m deep and takes several streams from different directions, in wet weather, sinking in the boggy base. There are several other shakeholes to the Northwest which take water in wet weather.*"

Interestingly it lies on a fault with Penderyn Oolite limestone to the east and grit to the west and is 'only' a few hundred metres from Sump 6 in OANF – but 70 or 80m metres above it! On the other hand, Ockenden[8] speculates that water sinking here may follow the line of the fault to meet the Mellte several kilometres away where an unnamed spring at SN 92613 11593 is recorded. A dye test and a close look at the geology seem to be called for!

Moving westward across the grit brings us to a tongue of Oxwich Head (Penwyllt) Limestone protruding southward and at the boundary we come upon **Ogof Lliwiog**, a cave 'discovered' twice and burdened with a plethora of names approximating to 'dead sheep cave' in (misspelt) Welsh! The Registry description is, perhaps, less than encouraging: "*The entrance shows well-fretted limestone, and it takes a lot of water from*

the surface N-E wards. It is very wet."! But that water has to go somewhere, there is no record of a dye test, and it is only 50m or so from the next site which does drain to the OANF Master Cave. So not without possibilities by any means.

And so, to the aforementioned, 'next site', **Pwll y Ffordd**. This is one of only three sinks in the area to have been positively connected to OANF[9]. In this case the test is believed to have been done with fluorescein in the early 1970s by UBSS. The water is reported to resurge in the streamway between sumps 4 and 5. Pwll y Ffordd is yet another site situated on a fault, running broadly parallel to the Afon Nedd some 400m to the west

And looking west, into the valley, there is yet another sink in the field towards Dyffryn Nedd farm. This sink, **Pwll Dyffryn Nedd**, is described in the Registry as, "*A likely dig if permission could be obtained.*" The OANF resurgences are now little more than half a kilometre away to the south-west so could this be a backdoor to downstream extensions?

Finally, returning to our starting place, Berthlwyd Farm, takes us past **Berthlwyd Swallet**, which has proved to connect to OANF[10], entering the cave via Foot and Mouth Passage. Its proximity to the farm and the likelihood of both rubbish and pollution makes this an unappealing digging site.

A Linguistic Aside

Both the Westminster and Croydon clubs adopted the name 'Shar Wlad' for the Common Land lying between Ystradfellte and the Nedd Fechan many decades ago. Quite where and how they came across this term I do not know: it certainly isn't used by the Ordnance Survey – not even on nineteenth century six-inch maps. Now, I am no linguist and certainly don't speak Welsh but somehow this didn't ring true. Whilst 'wlad' may mean 'country' or 'land', being a form of 'gwlad', 'shar' was more problematic. Certainly nothing came close in my Welsh dictionary and a great deal of Googling did not help. Then I took another tack and researched 'Ystradfellte Common': Bingo! I got several references that gave me a clue. One was in 'Google Books' and is a catalogue entry for Bronze Age burials in Breconshire. Here we have a reference to 'flints and charcoal' from "Share y Wlad" – so a combination of English and Welsh perhaps, approximating to 'Shared Land'? The second hit was much closer to home and is in legal papers relating to a hearing concerning commoners' rights held in 1984 before the Commons Commissioner. This hearing related to six tracts of land, one of which was in Penwyllt and another was described as 'Siarelad' in Ystradfellte. (Roger Smith is recorded as representing SWCC at this same hearing in relation to our rights as commoners in Penwyllt!) Now it made sense: 'Siar e Lad'. Y sîar is a noun – the share, and siaro a verb, to share. So, in all probability we have a phrase, 'Siar y Wlad', that has variously been mis-heard, misspelt or carelessly rendered into an anglicised form many times.

Sites visited on the Shar Wlad and nearby

Ogof Dany y Rhedyn SN 91615 14202 366m asl (CCR entry 2017-42)

Ogof Shar Wlad SN 9165 1440 378m asl (CCR entry 502)

Ogof Rasyr SN 91700 14710 390m asl (CCR entry 503)

Theoretical Pot SN 91620 14760 396m asl (CCR entry 500)

Einon's Hole SN 91960 14240 359m asl (CCR entry 508)

Y Gwal SN 92056 13885 338m asl (CCR entry 518)

Hole by the Wall SN 92096 13516 322m asl (CCR entry 519)

Gyrn Fawr Sink SN 91888 13423 341m asl (CCR entry 506)

Pwll y Gelynen SN 91850 12820 289m asl (CCR entry 505)

Ogof Lliwiog SN 91567 12747 298m asl (CCR entry 497)

Pwll y Fordd SN 91542 12692 282m asl (CCR entry 496)

Pwll Dyffryn Nedd SN 91410 12610 277m asl (CCR entry 487)

Berthlwyd Swallet SN 91320 13150 295m asl (CCR entry 483)

From the Afon Mellte East

The Mellte valley is, of course, dominated by Porth yr Ogof, with its many entrances and sumps, but there is more to the hydrology and prospects for finding cave than this system alone, and I do not intend to discuss Porth yr Ogof itself. Risings from the west, upstream and downstream of the main part of Port yr Ogof, have already been mentioned, with the prospect of tributary cave systems in both cases. This whole area has been covered in some detail by Allan Ockenden in 'Caves of the Mellte Valley' previously referred to and has been

the subject of a valuable update by Adrian Paniwnyk[11] Both these authors are much more knowledgeable than I can claim to be, and I see little value in rehashing their material; I commend these references to you. Rather, I will concentrate on some aspects of the hydrology and geology and a couple of sites which have seen a good deal of SWCC activity over the years.

A Gritty Tale of 'Orrible 'Oles

Many visitors to Penwyllt become aware that the limestones of the area are overlain by strata we often refer to as simply 'grit' or 'gritstone'. Modern terminology classifies our local 'gritstones' as 'Twrch Sandstones' but it will prove easier, and maintains consistency with existing literature, to stick with the terms 'grit' or 'gritstone' in what follows.

Immediately east of the Afon Mellte, in the woods south of Cwm Porth farm, and up on the heights where gritstone crags mark the edge of Gwaun Cefn y Garreg, there are lines of minor caves. None are of any great length or depth, but they have a characteristic in common: they are all formed immediately beneath the overlying gritstone and have developed at this boundary. In the 1960s a careful and systematic study of these caves was undertaken which resulted in the development of a novel theory of cave development. An introduction to this hypothesised process of development is described in NL61[12] and a much fuller account can be read in a paper by A. R. Burke[13] in the BSA Proceedings of 1967. For the present purposes, the following short extract from Allan Ockenden[14] provides an admirable summary of the topic.

> "*This type of cave is a feature peculiar to the Northern Outcrop of the South Wales Limestone and, particularly, of the Ystradfellte area. They have formed in the unconformity immediately below the Millstone Grit caprock and occur along the limestone boundary where this capping is thin.*
>
> *Typically, they are fairly small consisting, in the mature state, of a series of blind shafts on the limestone, connected by bedding development in the unconformity itself. The roof of the caves is the underside of the Millstone Grit. This is slightly permeable, and the shafts are formed by water dripping from its underside and corroding the limestone into sharp fluted pits. These tend to coalesce to form the caverns and are usually blind at the bottom.*"

A key component in this process is its chemical nature, brought about by the acidity of the water draining from peaty soils and percolating through the gritstone caprock.

The following small selection of sites to the east of the Afon Mellte represents a focus on interesting hydrology and perhaps a few hints towards future exploratory work.

Ffynnon Garreg Fawr is an important rising, indicative of a significant catchment. It has received only intermittent attention over the years, partly because of its aqueous character and partly because there have been access problems in the past. (The cave is used as a water supply by a nearby dwelling.) It is some 500m in length and deserves to be better known.

There are numerous references to the site but the most useful are a report by Mel Davies[15] of significant discoveries made there in 1969 and a report by cave diver Steve Ainley[16] of a number of trips in August and September 1986. Steve reported that the farm and farmland was about to be sold (1986) and he hoped for easier access in the future.

Mel describes a significant draught on a hot day which he estimates to be "*60 feet per minute*", presumably based on the time it took blasting fumes to clear. He theorises that it would take more than a small immature cave to generate such an airflow. Steve also has positive feeling for the place, writing that, "*There is a 10m high aven halfway along the cave which may be worth a look.*" He goes on to say that he, "*removed half a dozen boulders from the roof and could see into a largish continuation which will be revisited.*"

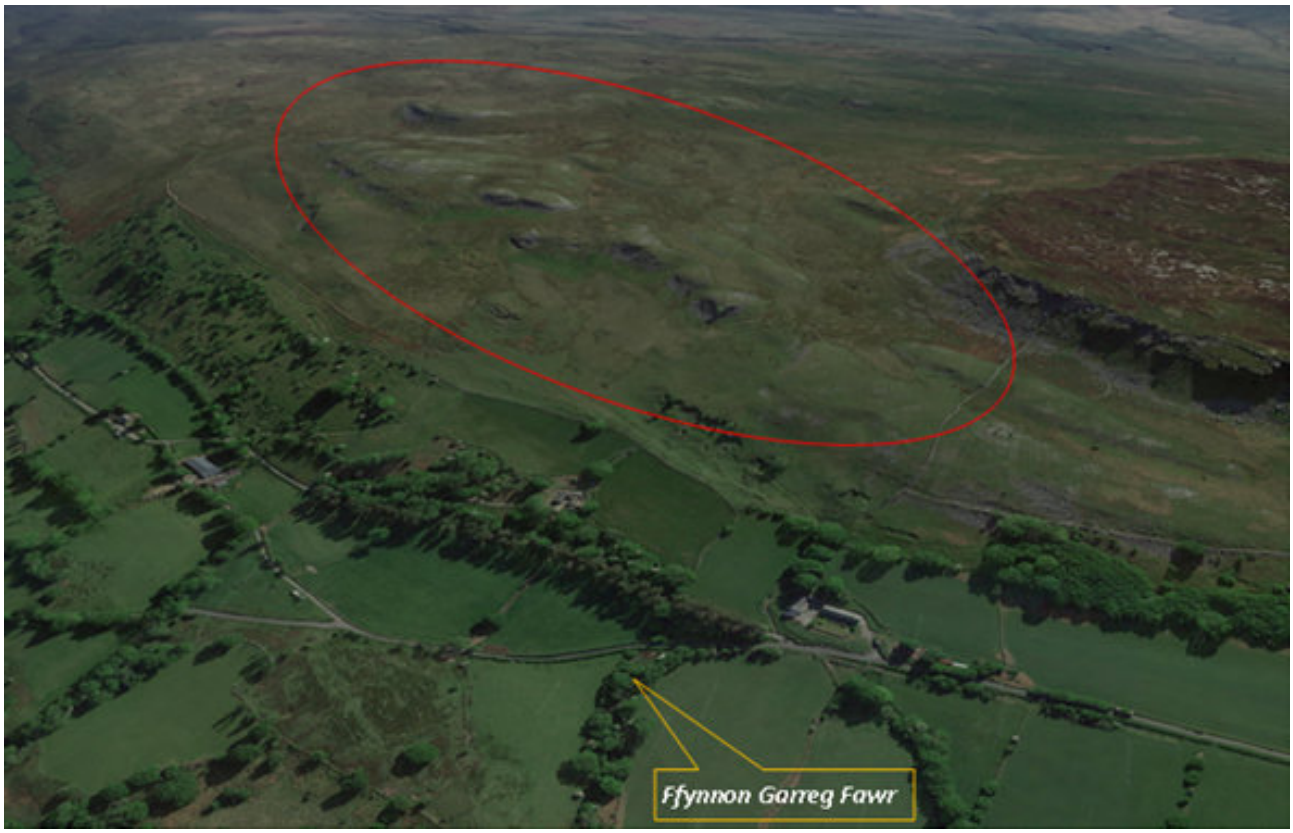
Geologically the site is interesting, being in the lowest level of the limestone, the Abercribin Oolite, seemingly very close to the underlying Cwmynyscoy Mudstones. (This statement is based solely on reference to geological mapping without fieldwork.) But significantly, there is a broad spread of open country with extensive exposures of the overlying Dowlais Limestone just a few hundred metres to the east. This area must hold real promise and deserves some serious prospecting.

Waterfall Cave has only been included to mention its hydrology. It is one of several sites on the eastern bank of the Mellte, downstream of Porth yr Ogof. Oliver Lloyd[17] very definitely states that it and other nearby caves in Cwm Porth Woods do not drain to Ogof Glan Mellte. His wording implies knowledge of dye tests connecting Waterfall Cave and these other sites to two springs or risings. These are both unnamed but identified as follows:

More southerly spring: Lloyd No. 4, Ockenden No. 26, CCR entry 548.

More northerly spring: Lloyd No. 7, Ockenden No. 25, CCR entry 551.

Google Earth view looking east. The gritstone crags along the western edge of Gwaun Cefn y Carreg are clearly visible in the top right. The red ellipse indicates the general extent of the Dowlais Limestone outcrop. The spring is clearly shown and named on the 1:25000 OS map.



Oliver Lloyd goes on to expand on how Ogof Glan Mellte fits the picture:

> "*The status of this cave is still a mystery. Burke[18] concluded, without actually naming it, that it was a deep drainer of the Cwm Porth Woods Caves, but this is almost certainly wrong. For one thing it has never shown any dye after tests. For another its water is not peaty but hard and lays down tufa. In structure the cave is a canyon passage. It is probably a relic of some previous drainage system and is now only fed by percolation.*"

Pwll Derw is a large 'Chasm-style' collapse in gritstone on the western edge of Gwaun Cefn y Garreg. A stream sinks here which was traced to the Hepste Resurgence by UBSS sometime in the 1970s. Unsurprisingly it has attracted the interest of successive generations of diggers, certainly from the 1950s if not before.

In an article titled "Pwll Derw Rediscovered", Paddy O'Reilly[19] writes of hearing a rumour that, "*when Bill Clarke entered a shakehole near Pwll Derw in the early 1950s he spotted a pitch but when he returned later on with ladder the whole place had collapsed in.*" This is somewhat ambiguous and there are several shakeholes 'near' Pwll Derw that could be candidates for Bill's lost shaft. (Ockenden's sites No. 9 and 10 being two candidates but see below.)

In any event, Paddy, Sue Bradshaw, and Colin Fairbairn were moved to camp nearby and undertake digging operations over Easter 1968. But the implication of their report is that this dig was in Bill's nearby shakehole, as Paddy mentions finding 'Bill's pitch' and later suggests that: "*The future prospects must surely be in digging the BIG shakehole ITSELF.*" (My capitals.)

The site of 'Bill's Shaft' and the 1968 Easter dig would seem most probably to be the unnamed site recorded at NGR: SN 94123 12489 358m asl in the Cambrian Cave Registry (Entry 614).

Other authors record the site, each using their own system of numbering, supplied here for reference (in order of publication):

Lloyd in Hepste River Caves	No. 21
Ockenden in Pelobates 53	No. 9
Ogof.org.uk (Brendan Marris)	Dig 70
Adrian Paniwnyk in Pelobates 90	No. 3

In the last of these references, dated 2014, Adrian[20] describes the site as follows:

"*A shaft at the north east corner of a large doline to the north of Pwll Derw which as with sites one and two is no longer surrounded by forestry. A squeeze through dubious looking boulders at the base of shaft gains a large, stepped chamber in grit. This step feature is probably in alignment with the fault which runs through this area. At the bottom of the chamber a small stream disappears into a limestone rift which is much too tight to follow.*"

This would seem to be a promising digging site in its own right, especially if the fate of the stream mentioned can be established.

Ockenden[21] reports that Pwll Derw proper has been dug by Croydon CC "*and others*" and Jon Jones[22] informed me that both Morgannwg CC and Tony Donovan had dug there some years ago. Jon and Mike McCoombe conducted a serious assault on the site in the early 2000s as Mike[23] goes on to report:

"*Almost all of the dig that we did was to follow our way down the huge and steeply-inclined roof, losing all the spoil in the black space either side. After engineering our way down steadily for years we got tempted away by the draught and sound of water coming from between the big boulders on the left. Digging here was a different proposition because the large boulders needed stabilising and we would need to remove large amounts of spoil from the cave. All the time we'd been digging there we'd been "impressed" by the sound of rock falls, unprovoked by us, out of sight to the left so getting into a space where we no longer had a solid roof above us suddenly seemed a bad idea! With hindsight, I'd go back and carry on following the roof.*

"*Having just looked again at the survey data, we reached a depth of 18m from the entrance a few metres above the sink itself with an inclined bedding plane roof going down at about 70 degrees. Given the height difference of only 110m between sink and resurgence 3-4km away we guessed we'd intersect water-level fairly soon.*"

In subsequent emails Jon and Mike have suggested that restarting this project may be on the cards. I'm sure helpers, or even apprentices, will be welcome.

One final snippet of significance is the following report from Adrian Paniwynk[24] telling us that: "*An optical brightener trace by Roy Morgan proved negative to the long inlet within the new cave at Tir Duweunydd*." This must have been in 2010 and the cave in question is Ogof T1 – see below.

The Hepste Valley

"*The Hepste caves are mainly under water. This makes them divers' caves, not cavers' caves.*"

So says Oliver Lloyd[25] in the Abstract to his *Hepste River Caves* monograph.

And, if that is not sufficient discouragement, in NL123 Keith Ball[26] remarks,

"*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.*"

So, for these and other reasons we will not linger in the Hepste other than to remark on an important cave to which these remarks do not apply!

Tir-Duweunydd South Sink (**Ogof T1**) lies a kilometre or so south east of Pwll Derw, on the flank of the Hepste valley, where a stream runs off the gritstone and sinks where it meets the limestone. This sink is one of five sites in this immediate location catalogued by Keith Ball[27].

This feature was noted by Sanders[28] in 1966 with the comment, "*A stream sink 100 yards. N of Tir-Duweunydd farm, two sinkholes connected by a rock arch. These might repay attention but to dig them out would be an extensive operation.*"

Lloyd[29] lists two features here in 1979 and, writing in Pelobates in 2011, Chris Crowley[30] suggests that it was, "*a site that had been dug by CCC, WSG and probably others over the last 30 years.*"

However, it was only when Tony Donovan[31] commenced digging the South Sink in early 2010 that progress was really made. The end result was the discovery of over 2½ km of cave with several pitches, some fine formations, and a number of promising leads. All this had been achieved with the consent and cooperation of the landowner, who had understandable concerns for privacy, given the proximity of the cave to a dwelling-house. Suffice it to say that a gate was insisted upon by the landowner, but as news of the discovery leaked out, the gate was vandalised and then removed by persons unknown. The end result was the withdrawal of access permission and the permanent, physical closure of the cave. Most regrettably, this happened before a proper survey could be completed.

The significance of this story is threefold. First it is a fine example of what can be achieved by digging. Second it is a powerful warning of what can be lost through thoughtlessness. And finally, it at least suggests the

Main Chamber, Tir-Duweunydd South Sink. (©Brendan Marris)

possibility that the remarks quoted about the Hepste might be taken with a pinch of salt! How many more caves like this are just waiting to be found on the banks of the Hepste?

Onwards and Eastwards

There are many caves, digs and recorded sites which could be described and analysed, both in the Hepste and Sychryd valleys, around Penderyn and on the slopes of Cadair Fawr but, driven by expediency and numerous other considerations we will move directly to Cwm Cadlan and its tributary valley of the Pant Sychbant. Here we find, perhaps with difficulty (!), the final cave of our mammoth journey.

Ogof Fawr is a wonderful example of the rewards that await a determined team of diggers who have the persistence and drive to battle through setbacks and adversity. It is undoubtedly one of the most significant finds of recent decades but regrettably one not reported in an SWCC publication until now.

The SWCC has always been interested in this cave as evidenced by a 1957 report from Brian de Graaf[32] in NL21:

The best prospects seem to be in the old sink to the right of the present entry point of the stream. A promising rift beneath a rabbit burrow unfortunately soon closed down, but with time and labour could be enlarged. Prospective diggers may be encouraged and refreshed by the cooling draught which issues from this hole.

"Ogof Fawr" (sic) can take a s rprising amount of water: the stream rose a good 18" overnight but there was no sign of the water backing up.

Fully fifty years were to pass before the '(sic)', above could be truly considered redundant. The major part of Ogof Fawr was discovered in 2008, after the cave was re-entered in 2007 by the crack digging team of Tony Donovan, Paul Quill and Roy Morgan along with numerous others.

The Nant Cadlan stream sinks in a large shakehole and the original route into the cave followed the water down through boulders and flood debris at the base of the cliffs. Repeated attempts to establish a lasting entrance at this point failed due to the power of winter floods and the instability of the boulders. A new safer entrance, on dry ground at the back of the shakehole was dug to provide a dry and more stable route into the cave after it had been discovered. There is a detailed account of the first (2007) phase of re-entry and exploration in Descent[33] and an equally detailed account of the second (2007) phase of discovery in Pelobates[34].

Paul Quill and Piers Hallihan at the entrance to Ogof Fawr in dry summer conditions. (©Pete Francis)

Brendan Marris[35] summarises the nature of the cave and warns of its dangers as follows:

> "*This cave is formed in steeply dipping beds of limestone and is out of character with most caves in South Wales. In many ways it is similar to Ogof Fechan as the cave is extremely flood prone and most passages are covered in a thin film of mud making the cave feel very oppressive. It cannot be understated how at risk of flood this cave is, with debris found up to 2m above the cave sink after heavy rain. In wet weather the cave completely floods in large sections, this is a cave to avoid in unsettled weather. This whole cave is very unstable: treat with due care.*"

Brendan mentions 'steeply dipping beds' but there is more to the geology than this important observation, as Keith Ball[36] explains:

> "*Ogof Fawr is located within the Abercriban Oolite (which is about 20m thick it was formerly called the Oolite Group). It is underlain by the Lower Limestone Shales (about 25m thick) and overlain by the Llanelly Formation (10m thick).*
>
> *The Lower Limestone Shales have some massive limestones at their base, but these are mainly developed further north and east; | have not observed them in the Ogof Fawr area. Mostly these are interbedded shales with thin limestone beds. The Llanelly Formation has some thickish limestone beds*

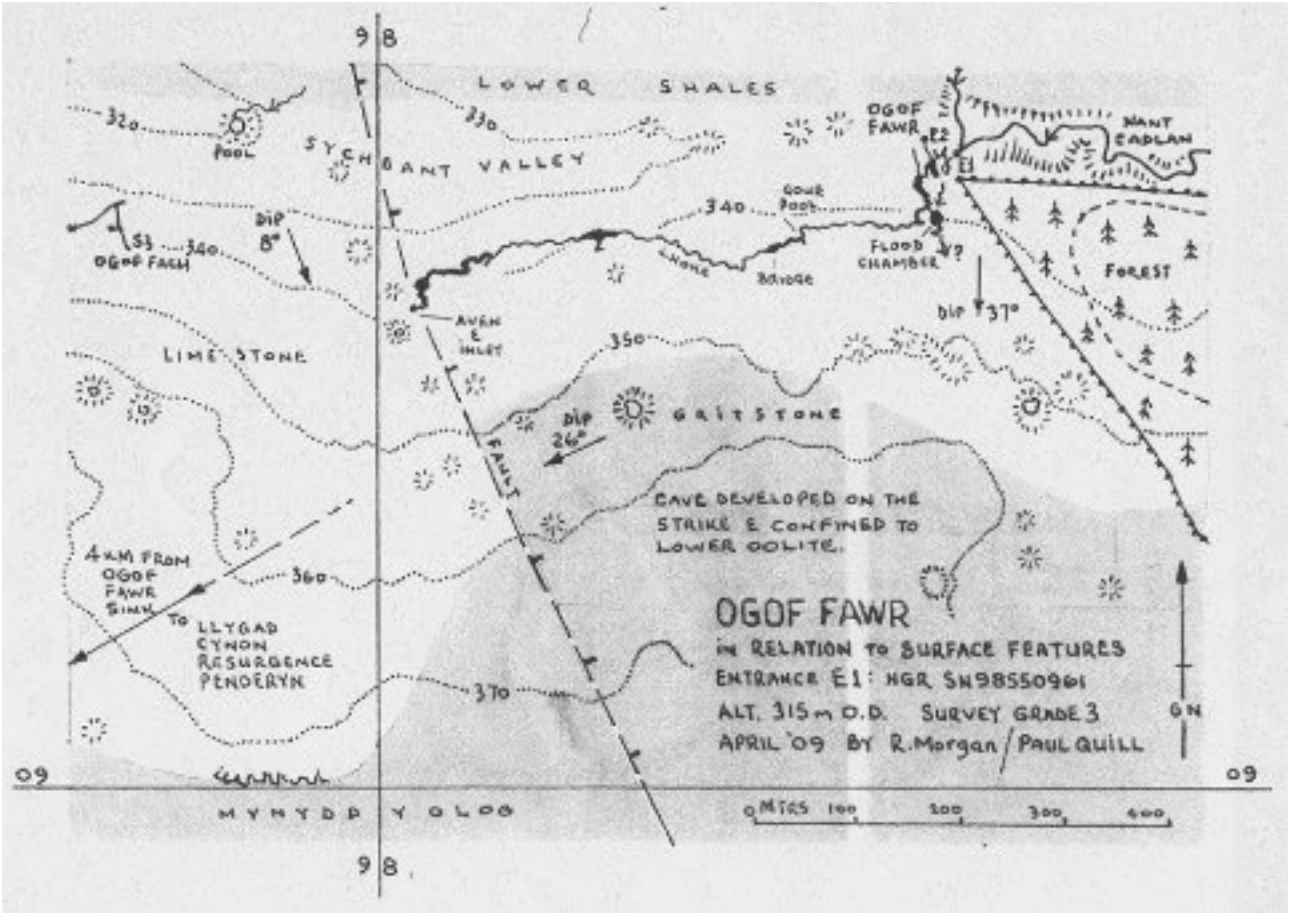
This fine photograph of the area near Clapper Bridge shows the 'steeply dipping beds' immediately in front of the caver. (©Brendan Marris)

and also important clay horizons, which isolate the Abercriban Oolite from the cavernous Dowlais Limestone.

The dip is to the south at about 30 degrees and the strike is approximately east-west. Ogof Fawr is located roughly in the middle of a fault block bounded by NNW-SSE trending faults. The easternmost fault lies 450m from the cave, is quite substantial and throws the Abercriban Oolite against the relatively impermeable Grey Grits and the Lower Limestone Shales. The Grey Grits mark the junction between the Old Red Sandstone and the basal Carboniferous rocks. There is therefore no limestone continuity across the fault. This is true at the surface and, although it is difficult to predict what happens at great depth, the relationship should be similar to at least 100m below the surface.

There is a more minor fault around 550m to the west of Ogof Fawr, where the Abercriban Oolite is found on both sides. A further 900m to the west another fault throws the oolite against the lower part of the Dowlais Limestone. There is thus limestone continuity across this fault, and this continues west all the way to the Penderyn area."

(The above account was first published in Descent 201. It is reproduced here with the author's consent)



This hand drawn survey provides some indication of the relationship between the cave and key surface features as well as some geological details. At the time of going to press we have been unable to identify any published high-grade survey of the whole cave. Survey reproduced with the consent of Paul Quill.

To give some flavour of the whole enterprise I have used notes taken during several lengthy conversations with Paul Quill to build the following picture. This is, in effect a 'ghost-written' piece incorporating quite a lot of verbatim phrases of Paul's.

"I had dug with Tony Donovan for some years, including up at Rusty Horseshoe dig, over towards Carreg Lem. We also dug together in the Far North Choke in Dan-yr-Ogof which involved some epic fourteen-hour trips. I got to know Tony pretty well and came to respect his judgement in digs and his safe and methodical approach.

Sometime in early 2007 I was at the HQ when I bumped into Tony who was trying to get a generator going, to use on some project. Anyway, to cut a long story short, I helped with the 'jenny', and he mentioned Ogof Fawr

and suggested that I come along and help re-open it. I became part of the team, and we were working away at the 'old' entrance for ages trying to find a route that was safe and eventually Tony came up with the idea of using some heavy-duty plastic pipe to line part of the way in.

We finally broke through into the cave in the summer – but this was the cave that had been found many years before and then lost when the entrance collapsed. But Tony being Tony, he was soon poking about in every possible hole, and we found a place where there seemed to be a hole in the floor, more of a rift really. Tony went to fetch a rope, but I was able to traverse along a bit and climbed down 3 or 4m. I was a bit concerned that I'd stolen Tony's thunder at that point by climbing down but the excitement was electric.

I was wary about the place. It was like walking through a house of cards. We had to go 30 or 40m down a rubble slope, gardening as we went because it was so loose and unstable. But this was new cave – a real discovery and there were bits going off all over the place and it took months to check them all out.

The next bit of real excitement came the following spring on a trip with Lump (Martin Groves). We had spotted a hole up in the roof on an earlier trip, so Lump had brought his bolting kit and SRT stuff, as this was a hole that we just had to climb up to. Whilst the others were off poking down some side passage Lump set about tackling the climb which was in quite a dangerous position at the top of a steep boulder slope."

So, Lump picks up the story…

"It felt like another one of those many aven climbing trips where excitement levels were high and expectations low, but the lead must be checked. After the thorough soaking of the entrance series my heart sank, a patter of water falling from what looked like a typical splash pot aven, the sort that bellow out as the water seeps down the wall over the millennia and fool many an over-optimistic caver who climbs it to find water emanating from a tiny impenetrable crack.

My memory of the climb is a little vague; a few bolts and a bit of free climbing led to the anticipated tiny water issuing orifice. Feeling deflated, time to go home 'for tea but no medals', I felt. However, looking away from the inlet, a narrow traverse headed off to the inevitable choke? Wanting to wrap this area of the cave up, a bit of dodgy, spider-man action ensued. The anticipated choke or pinching-in did not appear, but rather, a totally unexpected tantalizing down pitch.

A few obligatory howls confirmed that there was a significant void down there. Exploration fever struck and the adrenaline started to pump. I went back to the rope and informed Tony and the others that I would pull up the rope and drop the new pitch (none of the others had SRT kits and nearly all of the rope had been used on the climb), informing them if I'm not back in an hour then something was wrong (erm.., I did not have a watch!). A quick Y hang was rigged and soon I landed on the floor of an ongoing passage heading towards the missing miles? A choke was soon met and I wriggled my way forward through some decidedly loose pieces of Mother Earth, following an intoxicating draft. In no time, like a worm surfacing, my body popped out into a 'different world', a large boulder-strewn chamber.

With my feeble LED lighting, which was a poor man's substitute for a couple of glowworms in a test tube, all that lay ahead was darkness. Clambering down a loose boulder slope, the heart was pumping, and soon the audible sound of the streamway drove my senses and imagination into overdrive. I quickly arrived at a clear junction on solid floor, with a streamway heading into the darkness and another fossil passage heading in the opposite direction. I was hugely tempted to follow the water, but I briefly sat down to assess the situation; this had been my first significant involvement in the cave, and I felt like an interloper, stealing all of the glory from those who had done all of the hard work. In caving, comradeship and shared experiences always outweighed personal gain in my opinion, so I decided to head back and to inform the others.

Heading back into the chamber and up the boulder strewn slope just confirmed how inadequate my sole light source was, I could simply not find my way back through the choke! It had seemed trivial on the way in. I sat down to eat a chocolate bar and chuckled about the situation; imagine if I have to be rescued. Given that I had pulled up the rope on the up pitch, it would have taken some time and been very embarrassing if the cavalry were needed. I backed down into the chamber somewhat and found an alternative to the perpetual loop I had spent 20 minutes going around, and to my relief a rope appeared. A quick prusik and a little rigging and I was soon reunited with the others.

We joked about the situation but needless to say were also exceptionally excited to have potentially opened the key to one of the major question marks in South Wales caving. I recall very little of the trip out, just that I needed to improve my light sources and was right never to turn down the opportunity of climbing an aven."

And finally, Piers Hallihan describes how he became involved as a relative novice in some classic exploratory caving, and in doing so concludes Lump's story.

Beginners' luck

"I wasn't totally new to caving when I joined SWCC in late 2007 but I was sufficiently removed from my teenage experiences to be considered a novice. Consequently, I relied heavily on support and advice from more established and experienced members to lead trips and help find my way around. My brother-in-law was in a similar place. He'd caved as a student 15 years or so earlier and hadn't kept it up after graduating but was interested in visiting Ogof Ffynnon Ddu, a cave he'd heard about, but always had other commitments on the weekends when his club were visiting, so I agreed to sort out a trip.

Early in 2008 I was self-employed, and my work meant that it was often easier to make free time in the middle of the week than at weekends. This made things difficult for a novice caver – leaders are often harder to find midweek and OFD1 was still operating under the leader system at that point. Optimistically, I submitted an email to the then webmaster (PCW?) who shared it with the Club and I was rewarded a few days later by a conditional offer from Bernie Woodley to lead a trip into OFD1 on the date I was looking for. The conditional part of the offer wasn't a deal breaker – Bernie simply explained that midweek cavers were in short supply and that he had friends working on some digs who were always looking for more diggers. I couldn't see a downside. In return for being taken caving, I had to agree to do more caving!

A week or two later, I approached the impressive looking depression that holds the entrance to Ogof Fawr. I wasn't really sure what to expect but knew not to expect very much. Ogof Fawr, at the time, didn't even merit an entry in the guidebook. Roy Morgan's survey in Descent[37] only a few months earlier gave the cave a recorded length of just 101m. To put that in perspective, it's about the same distance as that between the OFD2 entrance and the Big Chamber Near the Entrance. Apparently just getting it back to that length had involved some serious digging and structural engineering after the original entrance passage collapsed in 1991. Some hard work in the late summer of 2007 had taken the cave back to, and slightly beyond, the length achieved in the 1980's but many cavers at the time saw it as something of a lost cause. Yes, any cave that swallowed a stream that size in flood must be going somewhere but most of the work being done was to repair the constant damage done by the regular floods in the entrance series – just keeping the entrance open was a challenge.

We entered via the old 'new' entrance (that is, it was new at the time but is now the old entrance, having been bypassed itself) and descended through a twisting, and at times twisted, maze of boulders and scaffolding. There was plenty of evidence of the massive forces involved in the regular winter floods, huge boulders driven against scaffolding that was bent and sheared, propped up by new looking scaff bars that we contorted ourselves between. I recall Tony Donovan saying that there was a real danger that it wouldn't take much more flood damage to close this entrance permanently.

Beyond this scary and ever-changing entrance shaft, the cave passed the original, collapsed, entrance before passing back underneath the stream that battered on my head as we crawled through the choke hidden behind it and on to the main chamber and a number of "promising" digs. More than once as we passed through this waterfall, someone pointed out that being stretchered out of there would be like being waterboarded – a reminder for all of us to take care!

I spent several hours in Ogof Fawr over the next few weeks, working with Tony, Quilly and Roy Morgan at a handful of leads heading in different directions off the main chamber without much real progress being made. On one of these trips, we were joined by Martin Groves and Gareth Davies. The plan was that Tony and I would continue digging at one of the three "live" digs whilst Martin would bolt and climb a hitherto ignored aven. Ogof Fawr sits in very steeply bedded limestone and the general consensus was that the way on must be down-dip. Since none of the digs seemed ready to give up the secrets, climbing the aven was seen as a backup project. Something leading upwards must be heading towards the surface. Maybe it would provide us with a safe, dry, bypass to the flood-prone entrance shaft.

Tony and I settled into the standard digging routine. I've dug a few sites with Tony since and the standard routine seems to consist of me discovering that there is some bend in the passage or obstruction preventing me sitting comfortably and simply hauling on a rope. Instead, I have developed an uncanny knack of finding the most awkward and uncomfortable place to lie as I manhandle a drag tray to and from the dig face. This is pretty much what we did for a few hours until we'd cleared just about everything that was moveable by hand. The way on was blocked by boulders that were too big to move and surrounded by others that were unstable enough to make even Tony think twice about chemical persuasion. We decided that we'd done enough for the day and went to find the others. Heading for the aven we found Gareth, on his own, poking around in one of the other digs nearby. When asked where Martin was, he pointed at the newly bolted but currently ropeless aven. Apparently, on reaching the top, Martin had found not a way up to the surface but a parallel climb going back down. Since he only had one rope and rigging kit, he'd come back to the original climb to retrieve the rope and then rigged an abseil down the other side. We sat and waited for what seemed like an

eternity, wondering what we would do if Martin failed to re-appear, until our thoughts were interrupted by a call of "*below*." A rope dropped down the pitch and Martin descended.

Martin looked shattered. He had cuts and bruises but most of all, he had a twinkle in his eye.

"*It goes,*" he told us before going on to describe his exploration of the loose, steep crawls beyond the climb. He also told us that he'd turned around in passage that was still going - that there was more cave to find. Fortunately, some common sense – and Martin's refusal to go back in straight away – prevailed. We agreed that the end of a long day probably wasn't the best time to go pushing. But we also agreed that the breakthrough had to be kept secret until we knew exactly what we'd found. We agreed to meet back at the site the following morning.

Typically, that was the morning my car wouldn't start. I eventually got it going and screamed up the A470 to the parking area but arrived too late. There was no-one there and the gate was closed. Shouldering my pack, I slipped under the gate and began to stride out in the hope of catching them up. I arrived at the cave entrance just as the team were ready to head underground. I was hot and tired having yomped the 4k from the car. All but the last few hundred metres were normally driven, so I was well behind. I was also the source of much amusement – apparently Tony had guessed that I was unlikely to miss out on this trip so hadn't locked the gate into the forestry after the team had passed through, assuming that I would be on my way. Had I thought to check the padlock, I could have simply removed it and driven through, catching the others at least half an hour earlier!

The team – slightly larger than the previous day as there were some people that the secret just couldn't be kept from – entered the cave, making our way through the unstable entrance series just as quickly as we dared. One after another we headed up the aven and into the series of challenging climbs and crawls now named on the survey as 'Hung, drawn and Slaughtered'.

I have to admit that my memory of the trip beyond that is hazy and, having not been in the cave for over a decade, I struggle to match the bits I do remember to the survey. I recall the wonder of heading into new chambers, unseen by any human eye, as well as the trepidation of being given my turn at leading the push, being the first person to head into body-size tubes leading down the steep 30-degree dip and not knowing whether it led to bigger passages, dangerous drops, stunning formations, or simply closed off with nowhere to turn around, possibly forcing an agonising reverse uphill. One such crawl did indeed lead to a dead end. Not a problem, it did at least have enough space to turn around and as it passed through a choke rather than a cave tube it was nothing like as steep as some of the others we'd been in. However, getting back out proved to be nearly impossible. Situated in the floor of a chamber that clearly sumps in bad weather, the tube was coated in a layer of slimy mud that defied all attempts to crawl back up it. Of course, the passage being only a few degrees off horizontal, a rope couldn't be lowered down so a second person had to descend, bringing a rope in and hoping that it would be enough to get us both out.

Larger passage was found, and we pushed on until we reached the first obstruction. A narrow awkward turn in the passage stopped Tony in his tracks. The rest of us managed to squeeze through and the passage opened up again but appeared to simply stop in a relatively large, almost spherical, chamber. I noticed a slot in the floor near one of the walls and lay on my belly to examine it. Below, I could see more cave. There was a chamber below us, at least big enough for us to enter. One by one the team dropped into the slot until it was my turn. I lowered myself in to follow the others and stopped. No matter how hard I tried, I simply couldn't make my ribcage small enough to fit in the slot. In addition, my relative lack of experience had trapped me. I'd forced myself down to a point where I was stuck, able to move neither in nor out of the squeeze. Since the passage below was only a low crawl with no space to gather and wait, the team had moved on, unaware that I hadn't followed.

A rather unpleasant few minutes followed. I managed to unpin my arms one at a time and get my elbows onto the edges of the slot. Tony, hearing my grunting and swearing was offering encouragement but was unable to get any closer, prevented by the constriction that I had just managed to pass to get to this point. With my feet dangling below, not quite reaching anything that I could push against, I managed to slowly push up with my elbows and then my hands until I was able to roll out of the slot and collapse on the floor next to it. I re-joined Tony and sat, drinking tea and eating muddy sandwiches, until the team reappeared. They had found plenty of cave beyond the squeezes with many leads still to explore. There was some discussion as to why I'd been unable to join them. The simple answer was that I didn't fit in the squeeze. The longer answer, which seemed reasonable to me at the time, was that I had two hobbies which work against each other. My theory was that 25 or so years of playing brass instruments, including doing all sorts of exercises to increase my lung capacity made it difficult for me to collapse my chest when needed. The rest of the team decided that this was a crap excuse and, to seal the joke, named the point where I'd got stuck 'Trombone Squeeze' – The name stuck and appears on the survey and in the ogof.org.uk description, even though the squeeze has since been enlarged.

I drove home from that trip tired, bruised, battered and thoroughly caked in mud; God knows what the staff at McDonald's drive thru in Merthyr thought when they handed my dinner over!

Changing work schedules meant that my midweek digging time became less frequently available and I only managed a couple more trips pushing and exploring Ogof Fawr. More cave has been discovered there since my last visit, including a safe, dry entrance well above the reach of the floods that constantly rearrange the boulders in the first two entrances, but nothing in my experience since has matched that moment, less than a year into my return to caving, when a dig that had become a bit of a joke, after 35 or more years of refusing to give up more than the first 100m or so, suddenly became a cave. Talk about beginners' luck!"

Sites Visited East of the Mellte

Ffynnon Garreg Fawr SN 93790 13870 302m asl (CCR entry 594)

Waterfall Cave SN 92835 11822 265m asl (CCR entry 563)

Waterfall Cave SN 92835 11822 265m asl (CCR entry 563)

Ogof Glan Mellte SN 92669 11698 215m asl (CCR entry 541)

Pwll Derw SN 94133 12371 339m asl (CCR entry 616)

Tir-Duweunydd South Sink (Ogof T1) SN 94744 11729 305m asl (CCR entry 627)

Ogof Fawr SN 98540 09628 325m asl (CCR entry 706)

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Chapter 8: Some Technical Aspects of Digging

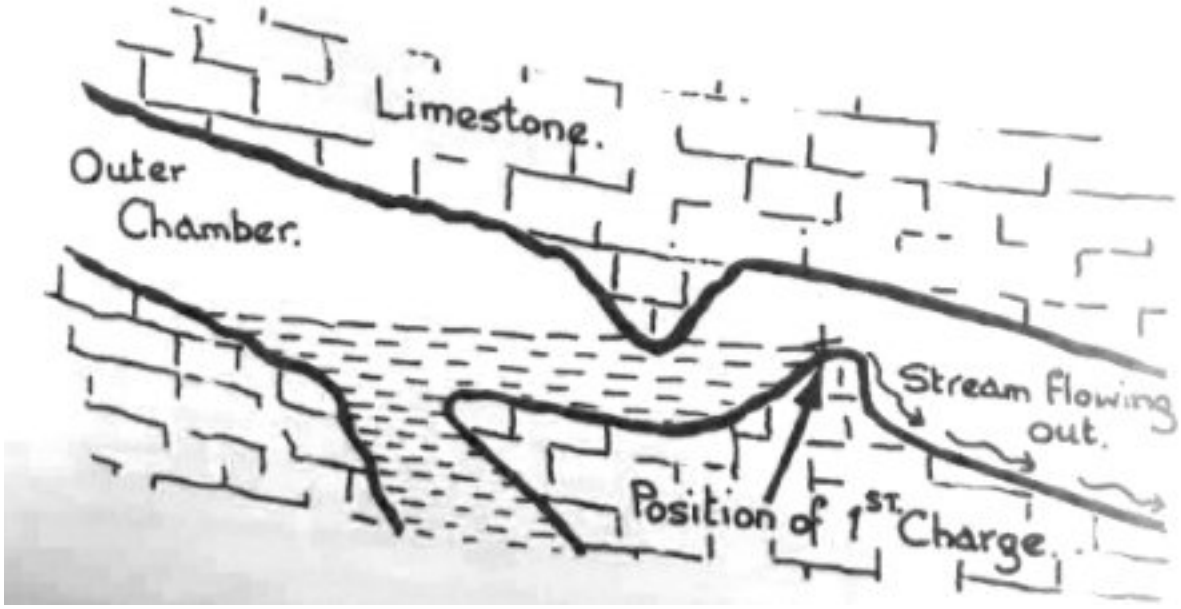
Explosives: A little history and some cautionary tales

From the SWCC's earliest days it has been a digging Club and members soon discovered that using explosives to shatter rock was a useful technique to employ. In the fifties and sixties Penwyllt quarry was active, with regular blasting, and there were numerous collieries in the valley. Many older members had served in the war and some younger ones did National Service. Thus, explosives were in regular use and were a familiar part of people's lives. So much so that the Co-op in Clydach actually sold mining explosives and detonators over the counter! A practice with its origins in the time when colliers were expected to supply their own 'powder'.

Of course, there was some regulation: you needed a licence, most often a police licence, although in Cardiff these were issued by the 'Weights and Measures Department'. There was rarely any fuss associated with getting one: you only had to convince the authorities that you were a 'Fit and Proper Person' and had somewhere 'safe' to store the required materials. No objection was raised when I proposed to store 10lb of gelignite and 100 detonators in ammo boxes in my bedroom, in a first-floor flat. It was legal to do so!

With this rather laissez-faire backdrop came a somewhat casual and gung-ho approach to using what we all referred to as 'banger'. There was no formal training and one learned 'on the job' with experienced members – in my case with Clive Jones, Eric Inson, Charles George and others. Mercifully, there were no accidents but there was a very close shave, described below.

In 1960 Dip Sump had not long been discovered (by digging through the choke in Boulder Chamber, incidentally) and there was keen interest in trying to by-pass it. The diagram below, drawn by Robin Williams and copied here from an article published in CRG Transactions[1], shows the layout as it was then. The 'Outer Chamber' is the area accessed by passing through the boulder choke. The submerged route through to OFD2 is at the bottom, left of centre.



Bill Birchenough planned to lower the water level by blasting away the lip where the stream overflows. He ducked through and placed 1lb of Plaster Gelatine (a high velocity, fairly waterproof type of gelignite) on the lip about 2ft below water level. The water provided the only tamping or containment of the charge. Having ducked back to the outer chamber he proceeded to fire the charge electrically from a suitable distance. The explosion caused, "*considerable disturbance in the outer chamber, water being thrown some fifty feet up the passage.*"

What then transpired was reported[2] as reproduced below:

About half an hour later the man re-entered the far chamber and on surfacing found that there was a layer of fumes above the surface of the water. On surfacing in another part of the chamber he found that the fumes were present throughout the area and was able to see that they formed a layer eighteen inches thick over the water. The fumes were too thick for him to see the effect of the blast and he returned through the water to the outer chamber. Here he changed into his ordinary caving clothes and made his way out of the cave at his leisure. The explosion had been set off at about 11 a.m. and he left the cave about two hours later.

During the afternoon, the caver sat enjoying the late autumn sunshine and did nothing energetic. At dusk he returned to the Club headquarters where he prepared an evening meal and retired to bed at 10 p.m. During this period of time no changes had been observed in his appearance and he had made no complaints.

At midnight he woke one of his friends, and asked to be taken to see a doctor. He was breathless and as preparations were being made to take him to the local hospital, his condition deteriorated and he started to cough up quantities of loose grey-green fluid. On reaching the local hospital, he was found to be much worse and required oxygen to prevent cyanosis. An X-ray revealed dense opacities in both lung fields due to acute pulmonary oedema. By the time that he reached the nearest general hospital in an ambulance, he was comatose and oxygen was being administered continuously.

Treatment following his admission to hospital was by sedation, diuretics, postural drainage and suction, with oxygen being administered as necessary. Within twenty-four hours, his condition had improved considerably and following a short course of antibiotics he was discharged for convalescence. For the following six months he felt a lack of his normal vigour but then returned rapidly to normal health and strength.

The patient's own impressions of his illness are of interest. After leaving the cave he felt well in himself except for a certain weariness and lethargy. He had not exerted himself unduly during the rest of the day and had gone to bed at his usual time. He awoke to find his breathing tight and coughing produced loose, frothy sputum. As fresh air did not seem to help he called his friends. He remembered being carried to an ambulance following his X-ray at the local hospital and feeling at that stage that his time had come and that as he had neither the strength nor the will to struggle, gradually sank under this feeling. His next memory was of resenting the fact that someone was slapping his back and sitting him up for an X-ray. This incident seems to have taken place after he had been at the second hospital for about twenty-four hours.

- 75 -

Bill nearly died. A close shave indeed. But also a cautionary tale for all who use explosives or otherwise produce noxious fumes in a cave environment. The full article from which I have quoted is an interesting read and contains advice which is still relevant today even if the types of explosive in contemporary use are radically different. (A shorter account of the same incident is also available in NL37[3])

(It should also be mentioned that two cavers died after inhaling toxic fumes in Cote Gill Pot in Yorkshire in 1979 after reportedly using illegally produced 'ANFO' explosives. This is the only fatal accident involving cavers using explosives to have occurred in the UK[4].)

Through the ensuing two or three decades, explosives use barely diminished and there are many tales that are best left as part of the Club's oral tradition! However, two further instances of 'close shaves' are worth recounting. The first occurred during the attempt to sink a shaft to 'Blob Hall', described on Page 64 in Chapter 4 in which Simon Amatt recounts how his Land Rover was hit by blasting debris. He commented that, "*Land Rovers look better with dents with stories attached.*" Land Rovers may look better with dents: skulls generally don't. There were some very lucky bystanders, methinks. Simon himself was an experienced user of explosives and at least two professional mining engineers were supervising the project.

The second incident occurred during a course being run to demonstrate how 'SLB' might be used as an alternative to conventional explosives. Almost everybody in attendance was an experienced explosives user, as was Nick Williams who delivered the course. The details of the incident are described, and illustrated, in NL114[5]. Suffice it to say that John Harvey was struck on the shin by a lump of high velocity fly-rock and required hospital treatment involving a number of sutures. The lessons are clear enough.

To conclude on a more positive note, relatively simple access to explosives in those years certainly made digging projects easier to undertake, especially at a time when power tools were mains powered or driven by compressed air. And of course, blowing things up was fun! The prospect of blasting operations being on the cards certainly attracted me to digging in the first place and I'm sure many others have felt the same over the years.

The Development of Drilling Technology

It is well understood that explosives are much more effective if confined in a drilled hole, indeed, 'low explosives' (deflagrating materials) can only function when used in this way. In the early years of the SWCC's digging history there was simply no prospect of drilling holes other than by hand. Hand drilling was frequently employed to drill 1" diameter holes for Rawlbolts, for example to facilitate the epic ascent of Steeple Aven in Tunnel Cave, but it was simply not practicable to drill to any depth, especially not in the confines of a boulder choke or narrow passage.

Machine drilling was employed to sink the shaft that became the Top Entrance to Tunnel Cave in 1961. On this occasion a member of that period, one Lionel Dingle, was able to provide a tractor-mounted air compressor that was driven to the dig site. Compressed air drills were employed, and conventional 'drill and blast' mining methods used to sink the shaft.

Digging Tunnel Cave top entrance August 1961. Second from left Ann Mason Williams with Clive Jones behind. The tall, balding male top right is Neil Jones with Eric Inson in right foreground. (©Dai Hunt, SWCC Archive: DHUNT_058)

Digging Tunnel Cave Top Entrance. Note the Holman compressor mounted on the tractor. (©Dai Hunt, SWCC Archive: DHUNT_067)

At much the same time a completely different approach was put to use in the excavation of Cwm Dwr crawl. Clive Jones[6] describes what took place:

A chance meeting with a company of S.A.S. out on a weekend exercise was the sort of luck we were wanting. Stories of the vast cave which must be somewhere under their feet soon sold them the idea that Cwm Dwr would be the ideal spot for demolition exercises. They returned a month later, with a device for blasting known as a 'Ffynnon Special' This device succeeded in making a hole big enough to take 14 lbs. of 'banger'.

Shaped-charge technology allowed the diggers to blast their way to what was to be named SAS Chamber.

A modern Beehive demolition charge marketed byChemring. Image from the manufacturer's website.

The 'Ffynnon Special' was almost certainly a 'Beehive' shaped charge. These are still routinely used in military demolition work. They contain several kilograms of high velocity explosive, typically a cast mixture of RDX and TNT at that time. When detonated they produce an axial jet which is capable of 'drilling' to some depth into the target. As Clive describes, that hole can then be packed with further explosives. The SAS were also persuaded to bring shaped charges to the Tunnel Cave shaft but to less effect according to the account of Ann Mason Williams[7].

What this image does not show is the conical metal liner in the base of the charge. This is what gives the charge its shape and produces the jet described. In the early 1980s some members experimented with home-brewed versions of this technology with some success, but it was never put to use in a cave dig again to the best of my knowledge. Sadly, it is unlikely that cavers will have access to commercial or military shaped charges, or to the types of explosive needed to assemble them, in the foreseeable future.

Compressed air drilling as used at Tunnel Top Entrance was unlikely to be available in more remote locations or any distance underground. However, there was an attempt to use small-scale pneumatic tools at Waun Fignen Felin in the early sixties, as Jem [see page 200] reports elsewhere in this publication. And several decades later there was half-hearted talk of driving a small air drill, a Holman Silver Feather, using a diving cylinder, I donated a redundant diving regulator to the project, but it came to nothing.

A small, compressed air drill similar to the one we planned to use with a diving cylinder.

The team digging Waun Fignen Felin also used a generator to drive a 'Kango Hammer' amongst other tools. With the Kango it was possible to approximate to mining methods of drilling, blasting, mucking out and repeating. When we returned to 'Wiggy' in 1970, a 'Kango' was employed once again and proved invaluable.

The 'Kango' was a 240V AC/DC machine, reasonably light and handy in a confined space and capable of drilling holes to about 12" depth with a determined drilling crew. Yes, crew. The Kango took two people to operate, as illustrated in this photograph taken in the early seventies at the Chasm. In the photograph I am directing the drill and applying pressure, whilst Nigel Ellis is operating a lever which turned the drill-bit to-and-fro to maintain the cutting action. It was a slow and arduous process.

Bob Hall and Nigel Ellis drilling with the Kango. (©Pete Francis)

1964 Advertising Brochure. The SWCC Kango was probably a Type 'K' or Type 'M'

Kango Electric Hammers

Fig. 8044 T

Technical details

Fundamentally these hammers consist of a Striker reciprocated by two centrifugal weights attached to bevel gearing, driven through a spline shaft by an Electric Motor.

A special Universal Motor has an ingeniously constructed Armature which prevents damage from vibration.

By removing a cover plate, the brush gear and all interior connections are accessible.

The brush gear has completely vibration proof terminal connections and controlled brush travel to prevent damage to the commutator.

Hammer mechanism runs in an oil bath and filler plug is provided for topping up.

When motor is switched on the mechanism operates without striking until tool is applied to the work.

"M" TYPE HAMMER (HEAVY)

A powerful model, recommended for the following work :—

For Drilling holes from 1 in. to 3 in. diameter in concrete and other tough materials.

Breaking down solidified chemicals.

Heavy cutting away with point or chisel on concrete or other tough material.

Spade work—a spade is available for occasional use.

Electrode driving for earthing purposes.

Silage and hay cutting on farms, etc.

An alternate Kit of tools to the value of the standard Kit can be supplied to suit special purposes.

SPECIFICATION

Number of blows : 1,800 per minute. Length : 23½ in.
Consumption : 750 watts. Weight : 23 lb.

STANDARD VOLTAGES

42, 50, 110/115, 120/130, 200/250 volts. A.C. single phase and D.C.

STANDARD KIT OF TOOLS AND EQUIPMENT

1 Cruciform Drill holder.
1 1 $\frac{1}{16}$ × 12 in. Cruciform Drill.
1 1 $\frac{1}{8}$ × 12 in. Cruciform Drill.
1 Ejector.
1 15 in. Point.
1 15 in. Chisel.
1 Instruction Sheet.
1 Allen Key
1 1 ft. Adaptor Lead for connecting to any fitting.
1 Comb holder.
3 Coarse Combs.
1 Tin of Kango Oil.
1 Catalogue.
1 Metal Carrier Case

PRICE .. .. £84 0 0 complete

"K" TYPE HAMMER (MEDIUM)

For Drilling holes in concrete, brick, breeze, etc., from $\frac{5}{16}$ to 2 in.
Rawldrilling holes in similar materials from $\frac{1}{4}$ in. to $\frac{1}{2}$ in.
Medium cutting away on concrete, brick, breeze, stone, etc.
Chase cutting in brickwork and concrete for conduits, etc.
Bush hammering on concrete, brick and stone.
Vibrating and tamping concrete and pre-cast stone.
Hacking for keying purposes. **Plugging** in brickwork.
Dressing stone after quarrying.
Light spade work. A light spade is available for suitable applications.
Removal of old rendering, pebble dash, etc.
Flooring cleaning. Wide blade tools are available for cleaning off deposits from floors that have become coated with dirt, grease, etc.

An alternative Kit of tools to the value of the Standard Kit can be supplied to suit special purposes.

SPECIFICATION

Number of blows : 1,950 per minute. Length : 22½ in.
Consumption : 625 watts. Weight : 20 lb.

STANDARD VOLTAGES

42, 50, 110/115, 120/130, 200/250 volts. A.C. single phase and D.C.

STANDARD KIT OF TOOLS AND EQUIPMENT

1 Cruciform Drill holder.
1 $\frac{11}{16}$ × 8 in. Cruciform Drill.
1 1 $\frac{1}{16}$ × 12 in. Cruciform Drill
1 Ejector.
1 12 in. Point.
1 12 in. Chisel.
1 Instruction Sheet.
1 Allen Key.
1 1 ft. Adaptor Lead for connecting to any fitting.
1 Comb holder.
3 Coarse Combs.
1 Tin of Kango Oil.
1 Catalogue.
1 Metal Carrier Case.

PRICE .. .. £54 0 0 complete

"L" TYPE HAMMER (LIGHT)

The light hammer. Ideal for all classes of overhead work where a heavier hammer might be too cumbersome to operate. This hammer has also been particularly designed for all types of boiler and ship scaling and its lightness makes it specially adaptable for this work.

For Drilling holes in concrete, brick breeze, etc., from $\frac{1}{4}$ to 1 in.
Rawldrilling holes in similar materials from $\frac{1}{4}$ to $\frac{7}{8}$ in.
Chase cutting in brickwork and concrete for conduits, etc.
Light cutting away and hacking.
Scaling, particularly on ships and boilers.
Light vibrating and tamping.
Brick raking and plugging.
Bush hammering on concrete, brick, stone, etc.
Millstone dressing with chisel or special bit.
Woodworking with wood chisel.
Fettling castings.

An alternative Kit of tools, to the value of the Standard Kit, can be supplied to suit special purposes.

SPECIFICATION

Number of blows : 2,100 per minute. Length : 19½ in.
Consumption : 400 watts. Weight : 15 lb.

STANDARD VOLTAGES

42, 50, 110/115, 120/130, 200/250 volts. A.C. single phase and D.C.

STANDARD KIT OF TOOLS AND EQUIPMENT

1 Cruciform Drill holder.
1 $\frac{11}{16}$ × 8 in. Cruciform Drill.
1 Ejector.
1 Rawldrill holder.
1 Tin Kango Oil.
1 Instruction Sheet.
1 Allen Key.
1 1 ft. Adaptor Lead for connecting to any fitting.
1 Comb holder.
3 Coarse Combs.
1 Catalogue.
1 Metal Carrier Case.

PRICE .. .. £45 0 0 complete

By the time the SWCC made a fresh assault on Sinc-y-Giedd in 1982 the old Kango had gone AWOL and we hired a later model: a Kango 950. This was a much more modern 110V device that had a rotary and percussive action and only required one person to operate it. We were able to run cables all the way underground to the 'sharp end' and once again commence 'drill and blast' operations. The 950 was driving a 1" diameter drill into solid limestone to a depth of 2 feet or so and these holes were charged with 7/8" cartridges of Gelamex 80% gelignite.

Kango 950 of the sort used at Sinc-y-Giedd in 1982

A rather knackered ½" star drill of the type we used to drill experimental holes by hand

At about the same time I began to experiment with blasting using small diameter holes and much smaller amounts of explosive[8]. This was a concept that ultimately would prove very important, but I was trying to run ahead of the technology. Drilling even small-diameter holes was the sticking point.

We experimented with self-drilling anchors (Spits) as disposable drills and used star drills. Bill Little loaned me a 'Rawlplug Mechanical Hammer' which I attempted to motorise, using a scrap windscreen-wiper motor run from a car battery and some crude linkages. The thing worked, just, but it was of no real use for our purpose.

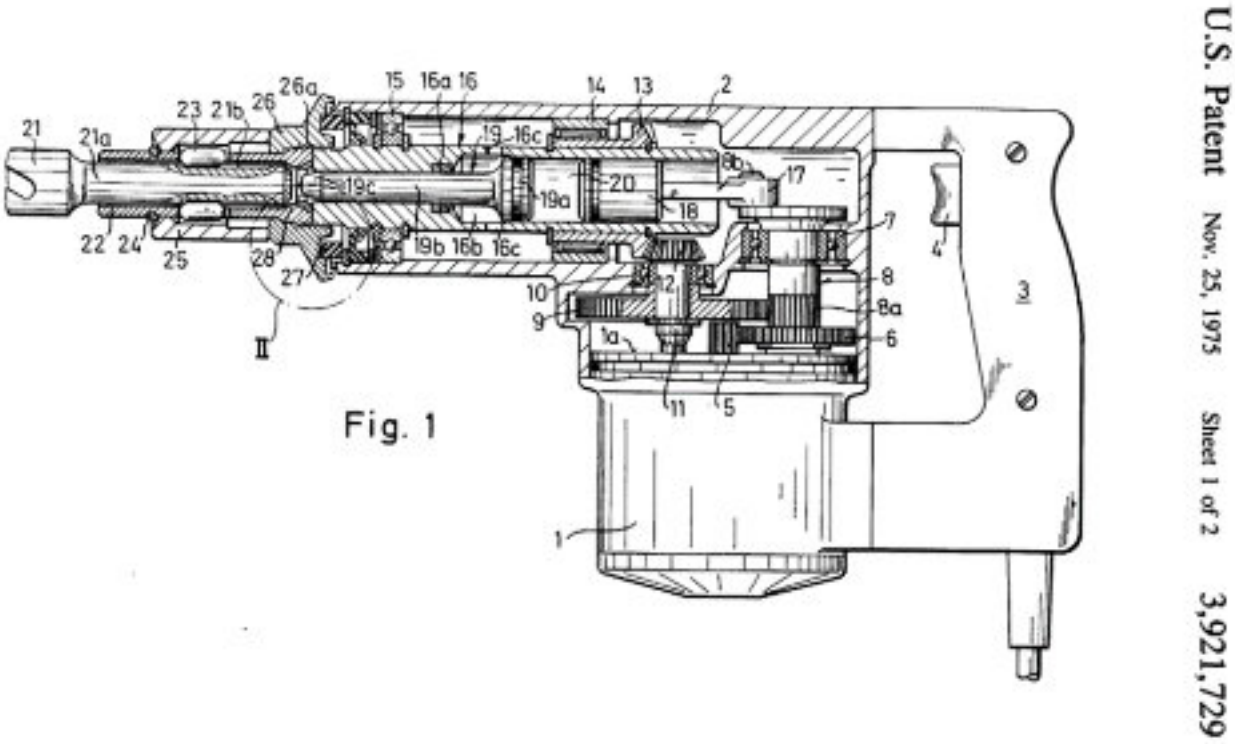
A Rawlplug Mechanical Hammer of the type I experimented with in the early 80s. And the modified version, complete with windscreen-wiper motor!

At that time, cordless hand tools were beginning to make an appearance but the limitations of both the battery technology and the primitive 'hammer-drill' concept rendered these useless for anything beyond putting up shelves and hanging pictures. (These early 'hammer drills' used some form of cam to make the entire chuck assembly, drive shaft and bit move backwards and forwards rapidly. Repeatedly accelerating this mass in opposite directions was incredibly wasteful of energy and ineffective.)

A much more effective type of mains-powered percussive drill had come into being in the 1970s employing the electropneumatic concept. This diagram from Hilti's 1975 patent gives the idea. The motor drives a piston (part 18) which compresses air in a cylinder (part 20). The compression of this air accelerates a striker (part 19) forward so that it strikes the bit-holder (part 21). This is the forerunner of all the drills we use today. There are several animated films on YouTube illustrating this principle[9].

However, cavers still had to wait for this ingenious engineering to become truly portable. The breakthrough came in 1984. A 2019 press release by Bosch sets the scene:

> Bosch set the next milestone in 1984 with the world's first professional cordless hammer drill – the GBH 24 V. By bringing battery technology to the hammer drill, Bosch was able to meet the needs of professional users and continued to expand its position as a battery pioneer. The cordless hammer drill represented the only way to carry out certain work far away from power sockets, for example, during installation work in the revived prefabricated house construction industry. Scaffolders needed the cordless tool to drill holes in the wall high up while electricians required it to affix antennas and lightning conductors. The GBH 24 V offered professionals the flexibility they needed while maintaining high performance and capacity. The basis for this was a dry battery containing 20 nickel-cadmium cells, whose internal resistance was more than one third lower than that in conventional batteries and thereby ensuring high level efficiency: With one battery charge, professionals were able to drill over 60 holes.



Key to this advance was the combination of the battery technology described in this extract, the electropneumatic concept and the SDS bit/chuck combination. SDS chucks allow the drill bit to slide to and fro whilst simultaneously being rotated. Thus, only the mass of the bit itself need be accelerated. At much the same time there were advances in the design of the bits themselves and low-voltage electric motors were becoming lighter and more powerful as advanced magnetic materials came into use.

Needless to say, it did not take long for cavers to adopt Bosch drills. And it is equally needless to say that it did not take them long to start adapting them too! Typically, the adaptation involved connecting the drill to a much larger external battery pack using whatever battery technology was available, usually lead-acid gel types or sealed NiCd cells.

Jon Jones picks up the story:

> "*The Dryan Diggers (as an example) used a Bosch GBH24 VRE drill modified to be powered by a 4 Ah Clansman battery from an Army radio pack. The battery weighed about 3.4 Kg and drilled a limited number of 10 mm holes. It was used mainly for capping with 8 mm holes where it allowed progress to be made.*
>
> *Dragon Caving made Hilti TE5a drills and NiCad battery packs available. The drills were an improvement, but the battery packs were not very robust: the drills were all sold with the ability to use external battery packs. The Hilti NiCad battery packs did not have the longevity required for cave exploration and many users reverted to Yuasa sealed 12v lead acid batteries used in series to generate 24v.*"

Now, thirty or more years down the line, there have been relatively minor tweaks in the drills and bits but a massive advance in battery technology. We have seen NiCd batteries more or less vanish for environmental reasons, nickel-metal-hydride batteries come and go, and various lithium technologies become firmly established. However, for the caver bent on doing some home-brewing this raises some issues, as **Ben Stevens** explains:

> "*Li-ion or Li-polymer batteries offer impressive energy to weight ratios but come at a price: if they are over-charged or discharged, or subjected to over current conditions, they can have a pretty spectacular exothermic reaction which generates some potentially dangerous by-products such as hydrogen fluoride.*

As a result of this the batteries have to have battery management system (BMS) circuitry built in which is a bit more susceptible to damp and since the circuitry and the drill 'talk' to each other it makes it more complicated to get home built batteries to work with modern drills.

There are a couple of ways to get round this:

- Buy ready-made batteries, either OEM or aftermarket

- Cannibalise failed batteries from eBay for the circuitry

- Spend a long time with a multimeter and see whether simple resistor voltage dividers can generate the correct voltages to persuade the drill to run.

If building battery packs for drills utilising Li-ion or Li-po cells then a BMS must be used to prevent over / under charge and over current situations. This must be measured on each cell by the BMS and the BMS should have a balance function as well, in order to maintain access to the full available battery capacity. BMS do not work to prevent issues when building the battery pack so additional care must be taken.

Given the issues with Li-ion batteries anyone building batteries may wish to consider LiFePO4 (Lithium Iron Phosphate or Lithium Ferro Phosphate) cells. These offer slightly lower energy to weight and still require use of a BMS but have the advantage that they do not suffer from the runaway exothermic reactions that Li-ion do (LiFePO4 will very quickly lose capacity if abused but will not burst into flames).

I built 2 10Ah 36v LiPo packs for use with a Hilti TE6A drill. I believe that this drill was sold with 36v NiMh battery packs so simply needed the two connections onto the battery to run. Battery wise we learnt that the balance function on BMS circuits are not all equivalent and more to the point need to be connected to the charger for a long time to work their magic - this led to one of the battery packs quickly providing almost zero useful capacity."

We are now at the point where at least six manufacturers of high quality, professional cordless hammer drills offer products attractive to the potential digger. So, what does one choose?

Ben Stevens was faced with this question when the Club's 'Premier Dig' consortium needed a new drill. His comments are as follows:

"*We bought a new SDS drill and we used the following criteria:*

1. *Drill power: in using the drill for digging we often put in long holes and the drill bit binding will slow the drill, and as the drill slows more energy is wasted as heat in the motor windings. A higher power drill slows less as the drill bit binds, so counterintuitively can actually lead to better battery life. Current Bosch offering, their GBH 36V model is 600W.*
2. *Impact Energy: the impact energy is quoted in joules and is a measure of how hard the SDS hammer action hits each time. The harder it hits the quicker the drill bit progresses. The Bosch GBH 36V delivers 3.2J/impact.*
3. *Overall cost of drill and any additional battery capacity: At the time our consortium was buying we ended up with a Hitachi DH36DAL (2.8J impact energy, 600W) since this was available at a good price bundled with additional batteries and offered ~£250 saving over the equivalent from Bosch. Its performance in the dig suggests this was the correct decision. (This model is now listed as unavailable and has seemingly been replaced by the DH36DBL/JE delivering 3.3J/impact.)*
4. *Brand reputation: This was really a case of canvassing opinion from anyone I knew who used these drills, either for digging or commercially.*

   To these I would add the following:

5. *Voltage used. The higher the voltage the lower the energy loss due to resistive heating in motor windings etc. For digging 36V is typical but De Walt now offer a 54V option which may become popular. Smaller, less powerful, 18V SDS drills are OK for bolting but are not really up to the demands of digging.*
6. *Battery capacity. This is quoted in either Ah (Amp-hours) or Wh (Watt-hours). If you plan to use the manufacturer's batteries the biggest size they offer is a significant consideration.*

Alongside the advances in drill and battery technology, **Jon** adds, "*The other major advance was in the design of the SDS drill bits. Initially, these were very expensive and occasionally suffered from carbide insert (cutting edge) failure. Hilti then released their 'SDS-Plus' range of 'CX' bits that featured 4 cutting edges. More recently a plentiful supply of cheap, 'disposable' SDS plus bit have been available. Whilst these are not to the same*

quality as the Hilti CX products, they are cheap enough to enable grit stone to be drilled if necessary. (But throw the drill bit away after drilling 300 mm of 10 mm hole!). When using high explosives or blank ammunition (Hilti caps) most diggers drill 8 or 10mm diameter holes which matches the effective capacity of the drill-battery combinations that are available. Be aware that 'SDS Max' drill or chisel bits will not fit SDS or SDS-Plus drills."

Contemporary Options for Rock Removal

Towards the end of the nineteen-eighties the UK government began a process of reviewing the law that controlled the manufacture, transport, storage and use of explosives. Despite strenuous representations on the part of the caving community in Britain, the law changed and the stringent security requirements for storing explosives that were introduced made it impracticable for most cavers to continue to keep explosives at home.

At much the same time the massive contraction in the coal industry reduced the demand for explosives nationally and corporate changes saw manufacturing capacity in the UK contract and imports become more common. Explosives technology was changing too, with nitroglycerine-based explosives being largely replaced by safer, more modern alternatives, principally emulsion explosives.

Cavers were forced to work around the new circumstances, and this led to a very different approach to digging. This revolves around the routine use of the cordless drills discussed above.

***Jon Jones**, one of SWCC's most experienced diggers and a professional explosives engineer has contributed much of what follows.*

Explosives have been available to cavers since the first manufacture of dynamite in the UK. The major changes have been in the quality of the products, our ability to use less and produce a better result more safely, and the increase in legislation required to use them. Whilst it is relatively easy to obtain an 'acquire only' licence it is expensive to obtain an 'acquire and keep' one.

Using detonators alone

In South Wales we have been fortunate to be able to source zero delay detonators at reasonable prices. This has allowed a technique to be developed where detonators only are used for removal of boulders and small amounts of solid rock. As a detonator contains 0.7 gram of explosive the detonation produces relatively little smoke and can be fired in the vicinity of the dig if basic precautions against fly debris are taken. This effectively means that boulder chokes can be tackled in real time. The use of detonators requires an 8 mm diameter hole to be drilled. The fume associated with the detonation of a detonator can be reduced by filling the hole with water prior to firing the shot if appropriate. Multiple holes can be fired by connecting the detonators in series. Care needs to be taken to ensure that the exploder has enough capacity which will depend on the number of detonators and the length and diameter of any connecting wire.

Using detonating cord

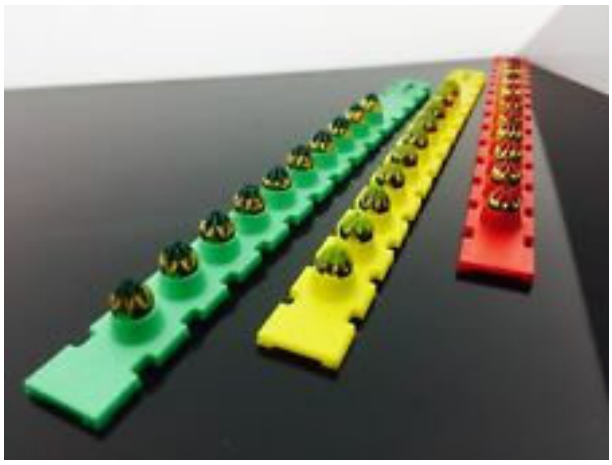
Detonating cord consists of a reinforced plastic tube containing PETN powder explosive. This is available in several diameters containing different amounts of explosive per metre. When initiated by a detonator the cord explodes at very high velocity.

Detonating cord of approximately 40 g/m fits very well in a 10 mm hole. Holes can be easily drilled up to 1 m in length and multiple holes can be linked with 12 g/m detonating cord. When a softer, less shattering shot is required 2 or 3 strands of 12 g/m cord can be placed in a 10 mm drill hole. Detonating cord produces large amounts of fume (in comparison to detonators) and appreciable air blast. This means that detonating cord should preferably be initiated updraft (better from outside the cave) to ensure toxic fumes are not encountered. Detonating cord should be cut with appropriate tools. An approved technique being to use a sharp Stanley knife, cutting against a wooden block. The PETN core load is both friction and impact sensitive and cutting with shearing tools like scissors is dangerous. It is important to be aware that dry detonating cord cannot be guaranteed to initiate wet detonating cord when lengths are knotted or taped together.

Other Explosives

Other explosives which have been used by diggers include commercial emulsion explosives displaced into a blast hole from grease guns. Chemically gassed emulsion explosives can be desensitised by this handling and may have sensitivity issues caused by the small diameter of the hole being used. Were the SWCC ever to engage in full-scale shaft sinking or similar projects again it is probable that packaged emulsion explosives would be the blasting agent used in place of the gelignite of old. In fact, nitroglycerine products like gelignite are becoming rarer and have to be imported, but their modern replacements make the use of explosives in caving safer.

Hilti Caps come in a range of strengths



Alternatives to blasting

For diggers who do not have the appropriate licences there are a number of alternatives, none of them ideal. Some cavers have used 'Hilti caps' to crack boulders or split off flakes of solid rock. Hilti caps are sold for use in nailing guns such as the Hilti DX460 and are essentially much the same as .22 blank cartridges. No licence is required to purchase Hilti caps. The technique of 'capping' is best learned in the field although there is a sound guide to the procedure on the Braemoor caving website[10]. This is not a technique authorised by Hilti! The risks and disadvantages are obvious – not least the need to be right next to the object you are seeking to destroy! Gloves, ear defenders and eye protection are the minimum PPE.

Another option is to use 'pyrotechnic compositions'. These are classed as 'fireworks' as far as UK law is concerned. Most are manufactured in diameters and charge-weights too large for typical cave-digging applications. A number of manufacturers market products in this category, including Royex (Sweden), Nonex (UK) and Autostem (South Africa). A product in this category that is sometimes mentioned in the caving press are referred to as 'Snappers' but enquiries suggest that they are no longer available. These pyrotechnic products perhaps come closest to conventional blasting and have the advantage of remote, electrical initiation. SLB mentioned earlier also fell into this category, but is believed to be no longer in use.

A purely mechanical method which has its origins in antiquity is the use of opposing wedges, generally referred to as 'plug and feathers'. They are available in sets from Amazon at no great cost.

Finally, most professional cordless hammer drills have a hammer-only setting and these can be used with a pointed steel or chisel to chip away at rock mechanically. Good luck!

These methods either have limited effectiveness or require relatively large holes to be drilled and in many cases do not remove the digger from the danger zone if there is unplanned rock movement.

It should be remembered that all explosives systems, including Hilti caps and pyrotechnic systems, produce after-detonation fume. Typically, it can be assumed that 1 gram of explosive composition produces 1 litre of fume. Fume typically consists of water (as stream), nitrogen, carbon dioxide, carbon monoxide and nitrogen oxides. Care should be taken to ensure that the fume characteristics of the products used are understood and exposure to the fume is minimised.

Getting Started with Explosives

Within SWCC there is a wealth of expertise. As already mentioned, Jon Jones is a professional explosives engineer, and a number of the Club's diggers are experienced explosives users. Ask around and you will find people to give you guidance. Indeed, if you are lucky, you may have the opportunity for some hands-on experience – perhaps at the price of an arduous carry of heavy equipment over the mountain or deep underground!

Beyond the resources of the SWCC the best advice is to get in touch with the BCRA Explosives User Group. The following is taken from their website[11].

The Explosives User Group was set up in 1991 to act as a forum for the benefit of cavers using explosives for cave exploration and rescue.

The principal objectives of the Group are as follows:

- *To create links with the Police, the Health and Safety Executive, and with other authorities in order to demonstrate to them that cavers using explosives are competent and present no safety or security risks.*

- *To provide the authorities with a means of communication with the caving community for the purposes of consultation and to represent the views of cavers when necessary (e.g. during the drafting of new legislation).*
- *To organise meetings and publish a newsletter to allow Group members to give one another the benefits of their experience in using explosives and related technology, and to keep members informed of developments and changes in legislation where possible.*

In addition, the Group attempts, where possible, to give individual advice to members on matters related to explosives such as the design of stores, application for licences and the installation of security systems.

The Group is formed as a special interest group of the British Cave Research Association and is thus part of a registered charity. It has developed links with the Health and Safety Executive, the Police, the Institute of Explosives Engineers and with manufacturers of explosives.

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Chapter 9: Practical Considerations

Where to Dig: Surface Digs

One approach is to consider the question, 'where should there be cave?', or, perhaps, 'where might there be cave?' This ties closely to questions of hydrology: the location of sinks and risings, and of geology: where are the strata that may contain caves? Much of the Greensites Project[1], alluded to in the introduction, was concerned with refining how we might identify locations where cave might be found. Some of the ideas to be considered include geophysical methods such as resistivity surveying, dowsing, identifying surface temperature anomalies such as places where snow melts in winter and so forth.

Most readers will know of 'really good sites' that are 'bound to go' if only the effort were to be made to push them! There may be well thought-out reasons for digging at a particular site, or the choice may verge on the illogical, being based on little more than the whim of the digger.

Commonly a dig is started for a number of reasons, some more rational than others, but the outcome is as likely to depend on human and logistical factors as on geology and hydrology. There is no doubt that many digs have been pursued with skill and determination by diggers who excel at their craft and are unconcerned that their efforts fail to bear fruit. Such diggers tend to choose sites with an eye to technical perfection rather than through any real hope of a rapid breakthrough into new cave. This aspect of digging has been mercilessly lampooned by Keith Ball[2], among others.

It is not sufficient that a dig should have good prospects, if it is to be anything more than an afternoon's scratching, then matters of ethics, access, manpower, supply of materials, cost, safety and technical skill all become considerations. The most promising site in the area will come to nothing if no-one can be persuaded to help dig it, the landowner is aggressive, it needs blasting and explosives are not available, and you can't afford the necessary scaffolding. A site must be chosen that one has a chance of being able to dig!

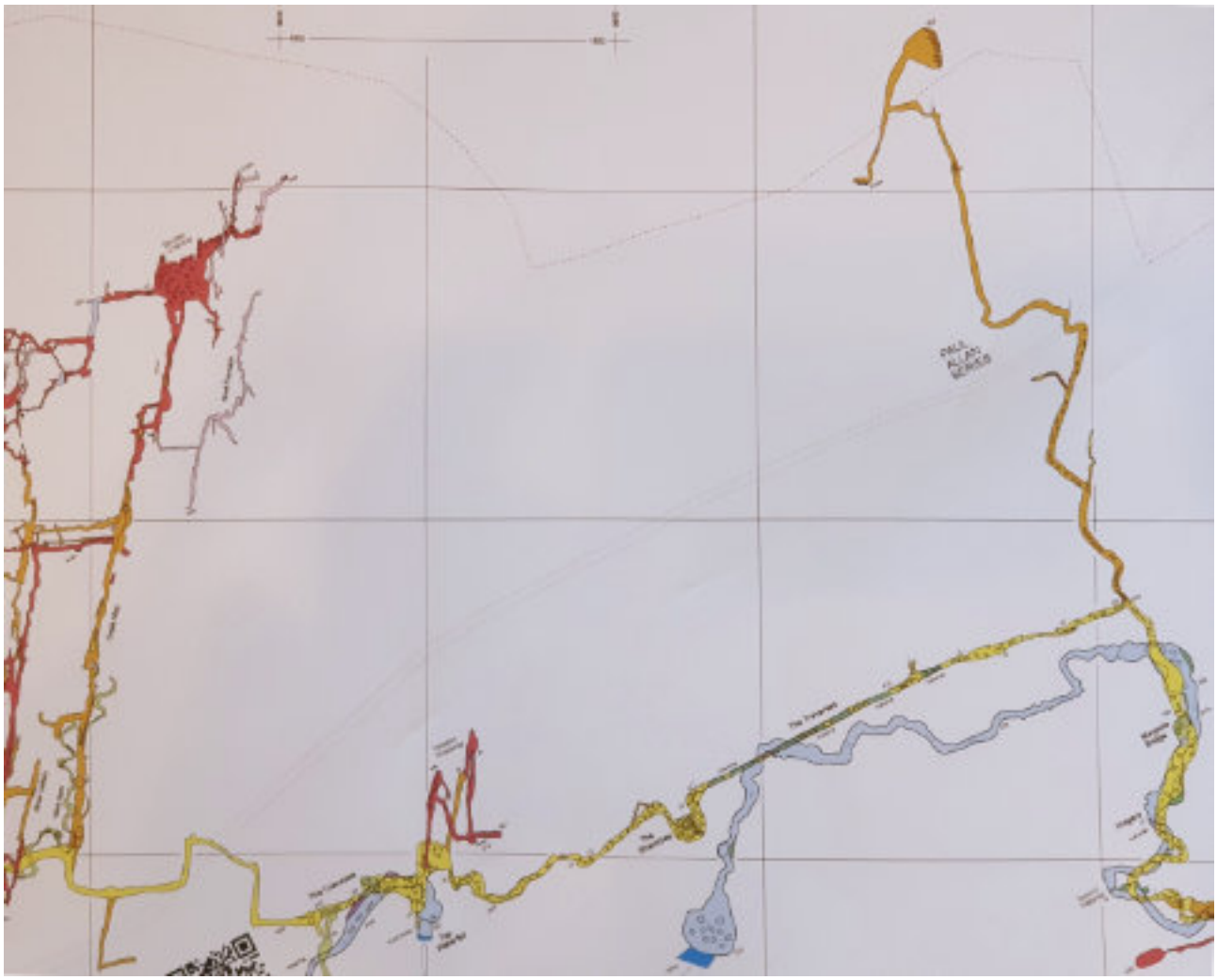
I very much hope that the huge scope of the preceding chapters has given you, dear reader, both a flavour for where digs have prospered and some clues as to where there may be unfinished business or fresh prospects awaiting a digger's crowbar.

Where to dig: Underground Digs

Overarching hydrology is generally less relevant in this context – but 'following the water', upstream or down, may be a sound reason to dig.

'Following the air', in other words a draft, is a well-recognised approach and if nothing else a stonking draft indicates some kind of connection to something!

Where should there be cave? Studying a survey and the guiding geology may indicate a blank area where you might suppose cave should exist. I have long been tantalised by the blank area on the OFD survey that lies north-east of Creek Alley and north of the main route to OFD3, see image opposite. Indeed, back in the 1970s I dug in one of the passages leading off Boulder Chamber and, in company with Shropshire Mining Club friends, discovered the small 'Wrekin Roadway' series by climbing. The area is begging for renewed attention!



Surveys may indicate that two caves, or two parts of a cave, connect. It should be remembered that passages shown on a plan as meeting may be at different levels. Such information may be backed up by 'radio location', smoke or dye tracing or even by sound contact between passages. In more recent years 'cave to cave' electromagnetic devices have been employed.

The reasons for digging in such circumstances could vary from establishing a 'dry' route past a sump to the joining of two caves to form a major system. The ethical questions that are raised must be fully considered.

Boulder chokes in 'fossil' cave systems have yielded considerable new ground. Under this heading may be included chokes that terminate largely phreatic passages where they intersect faults, chokes in large 'breakdown' passages where a more or less continuous boulder choke on the floor finally meets the roof, and chokes in all kinds of passage which approach the surface and have become blocked through glacial action. Survey data, and a look at the detailed geology may decide whether a particular choke is worthy of attention. In the absence of flowing water, the presence of a draught is often taken as a promising sign. Here some form of objective measurement such as the effect on a candle flame, the speed with which smoke moves or a properly measured air flow figure is preferable to a subjective 'feeling' that there is true air circulation.

Sumps that have failed to yield to divers may be dug. Provided that it is a shallow affair it is possible to remove rock from the roof by blasting and drive a through-route above water level. A project of this nature may involve full scale mining technology but may have the advantage that at least some of the spoil lands in the sump and need not be shifted. More often the presence of a sump is a challenge to diggers to find a bypass, with or without knowing what lies beyond. In this case all the other 'indications for digging' should be considered.

Passages blocked by mud and sand must be as common as boulder chokes. They are more likely to be found in smaller, phreatic passages than a boulder blockage. The difficulty with sand and mud fill is its ability to produce a draught proof seal. My feeling is that a blockage of this type is worth a short period of digging but

only a sustained assault if there are good reasons for believing the passage involved to be more than a minor tributary to a system.

Permission to Dig

We live in an increasingly regulated world and digging to discover cave, or to gain access to known cave, will rarely escape some degree of that control. There are some who rail against such constraints on their freedom, and it is easy to have some sympathy with those of 'libertarian' or 'anarchistic' persuasion, but for the most part we have to operate in the real world and navigate the regulatory landscape as best we can.

Constraints on digging activity, whether on the surface or underground, may derive from any combination of the following (not exhaustive) list:

- The wishes of a landowner.
- The matter of mineral rights and who owns these – not always the landowner.
- In our area, The Brecon Beacons National Park Authority.
- Constraints imposed by Natural Resources Wales (NRW) who have a wide-ranging remit that includes matters such as environmental impacts on rivers.
- The fact that a site may lie within a Site of Special Scientific Interest (SSSI). In Wales, such sites are administered by NRW, and it should be noted that even activity OUTSIDE an SSSI might fall under NRW's regulatory remit if it is thought to pose a threat to an SSSI. An example might be digging in a catchment that could cause pollution to streams flowing into an SSSI. (Be aware that many sites discussed in this publication do lie within SSSIs)
- The existence of National Nature Reserves (NNR) in areas where caves exist. These too are managed by NRW. In addition to NNRs there are also local Nature Reserves such as Allt Rhongyr and Craig y Rhiwarth which bring further sensitivities to the equation.
- The fact that a site may lie within, or adjacent to, a Scheduled Ancient Monument such as the Cribarth Limestone Quarries and Tramroads Monument in the area under consideration. These fall under the control of Cadw in Wales.
- The rules established by 'access-controlling bodies' often acting on behalf of the landowner or in some cases a statutory authority.
- In some instances, the fact that water from cave systems is used as a water supply.
- The laws pertaining to wildlife, most particularly bats, although issues involving other animals are possible. For example, Mary Rogers[3] informs me that Razor Pot, "*…is an established badger sett as I met some of the family one evening this summer.*"

  So, it would be a criminal offence to disturb these residents with blasting and lewd 'skip-hauling' shanties!
- The yet-to-be-resolved, and contentious question of 'Access Land'.

So, tedious and tiresome perhaps, but not totally avoidable. These are the skerries and shoals we must negotiate as responsible diggers.

If you feel a bit hemmed in and hedged about after reading the preceding paragraph, I don't blame you – but I would be failing in my purpose were I not to be forthright. Please also bear in mind that the SWCC has worked hard in past decades to bring about the creation of the OFD NNR and to encourage the extension of local SSSIs. In doing so we have often been able to establish agreed procedures for obtaining permission to carry out digging activity. We should therefore welcome these protective frameworks that protect the very caves we hold dear.

Material Resources

Unless the aspirant digger happens to be the proprietor of a mining company, (as at least three members have been!), they may not have ready access to the tools, equipment, plant, and consumables that they may need. Fortunately, as SWCC members, we are blessed with access to a useful stock of tools and other items with which to 'furnish' a dig. In addition, the committee may well be willing to support projects by purchasing equipment or materials that are not already in the 'digging stores'. That said, diggers have often been self-financing to a degree and it would not be unusual for a consortium to spread the cost of a project between them.

Some items might be thought of as 'personal equipment' in digging circles, and hand-tools of the sort illustrated below would be typical of these. The crowbar on the right is one I bought almost exactly fifty years

A selection of typical personal tools for digging. (©Bob Hall)

ago, and it has seen duty in countless digs since. It is, in one sense, my 'lucky bar' as I haven't lost it – but maybe not so 'lucky' as a talisman, since using it to prise boulders apart has yet to reveal those missing miles!

It is also worth remembering that SWCC has always excelled at 'sourcing' materials at little or no cost, so it's always worth asking around the membership. Sniffing around building sites that are nearing completion, nosing in skips and getting on good terms with my local scaffolding contractor has certainly worked well for me in the past. So, too, has eBay, which almost always has listings of stuff useful in digging. If all the above fails, hiring plant such as a generator, pump or compressor is always an option and one you might find supported by the committee.

The matter of battery powered drills is one that needs a special mention. Since the adoption of this technology 30 or more years ago, SWCC made one or more drills available to members together with large home-brewed batteries and charging facilities. These arrangements continued for many years through several iterations of drills and battery technology, but the point was reached when the committee of the day called time on this policy. Drills had been signed out for extended periods, abused, and left dirty, whilst batteries were not reliably charged and sometimes mislaid. As a consequence, no more drills were purchased, and diggers had to make private arrangements. During 2019, the committee revisited and then reversed this decision, and a drill was purchased in early 2020. It is envisaged that use of this drill will be more tightly controlled than hitherto, so this valuable asset is not abused.

Human Resources

The recruitment and retention of a team for a digging enterprise is very much a matter of personality, yours and theirs, whilst the success of a dig is dependent on people remaining motivated. When access is easy, conditions are comfortable and progress fast, morale will be high. An arduous approach, whether over land or underground, saps energy and enthusiasm and easily leads to a limited exercise. Wet, dirty, contorted or dangerous conditions have a similar effect. Such problems can be tackled by providing compensating pleasures such as food, hot drinks and comfortable conditions in which to rest between shifts. (A principle taken to the extreme in the photograph below!)

Babysitters' Dig. (©Chris Grimmett)

Leadership may be important, but help is unlikely to be forthcoming if a 'diggers and slaves' approach prevails. Indeed, a 'leaderless' approach, with a team sharing responsibility for decisions and motivating each other through camaraderie and good-hearted badinage, may be what evolves amongst friends.

Everyone deserves a turn at the more interesting jobs, including a spell at the 'sharp end'. All must take their share of the drudgery. A sensible pattern of rotation should avoid excessive boredom and fatigue. The size of loads needs to be maintained within readily manageable levels and the pace of work adjusted so that nobody is overworked. In 'drill and blast' digs I have found that firing large rounds results in a huge, overfacing pile of spoil that becomes very dispiriting. Smaller rounds mean shorter periods of shovelling between drilling, loading and firing.

When reporting a dig, it encourages further support if all those involved get a mention and a team identity is established. There is a natural tendency to shoot a line about how 'hairy' a boulder choke was or how a slurry run-in nearly caught you last trip. Boasting about one's exploits over a pint is all part of the fun. This can of course backfire – the more lurid the tall tales, the fewer the new recruits. If the dig is really as bad as your stories imply you could be simultaneously faced with a diminishing workforce and a recruitment crisis.

We should not forget another aspect of 'Human Resources' – that which derives from the huge depth of experience that exists within the SWCC membership. Besides the Club library and archive, internet resources, maps and so forth, the most valuable resource available is the accumulated wisdom of Club members. I have had several recent experiences of this during my research for this publication. Inconsistencies and obvious errors in publicly available sources were readily corrected by talking to the original diggers, so together we were able to set the record straight.

My point is not just concerned with oral history: members can advise on methods, techniques and technology and help with sourcing scaffolding and skips, pullies and pit-props and all manner of other useful materiel. Members with explosives licences can sometimes be persuaded to help with a dig, as can those with four-wheel drive vehicles. Of course, you will be aware that our members are a funny lot and you've no idea what they keep in their sheds and garages. I've a Sylvester in my shed; you can borrow it for your dig if you want. (Google, 'Sylvester mining'!) The lesson: ask around, you will be amazed what folk will come up with!

Members also have a great deal of experience in liaising with organisations such as Natural Resources Wales and the National Park Authority and in some cases have established fruitful working relationships with key individuals. Thus, faced with the need to seek permission before digging at your favoured site, it would be prudent to seek the support and assistance of these members.

Information Resources

There is no companion volume to 'South Wales Caves' cataloguing cave digs, but for surface sites there are three indispensable points of reference. These are:

- Cambrian Cave Registry (cambriancavingcouncil.org.uk) which is very comprehensive and includes a great many minor and abandoned digs. Its great strength is in the referencing of published material related to sites.
- http://www.ogof.org.uk/ This is Brendan Marris' site and whilst less comprehensive than the Registry it is very user-friendly with mapping (based on Google Earth) which is very easy to use.
- OFD Area Cave Sites Survey 2020 (swcc.org.uk)

Here you will find a very comprehensive catalogue of sites of speleological interest lying between the A4067 and the eastern boundary of the OFD National Nature Reserve. A great many digs are carefully recorded in this catalogue. Its author, Gary Evans, introduces it below.

I cannot recommend these three resources too highly.

Otherwise, for the area covered in this publication, SWCC Newsletters, WSG Journals, Croydon Caving Club Publications, Cambrian Caving Council Newsletters and UBSS publications contain a wealth of material, much of which is available on the web. Of particular note is a six-part series by Allan Ockenden dealing with the caves of the Mellte Valley published in Pelobates Issues 51 to 56. The Cave Diving Group Newsletter is another valuable resource but not freely available in the web.

Similarly, Descent and BRCA publications are important sources, and for delving back into the past, the defunct publications, 'British Caver' and, 'The Speleologist' may prove useful as might Cave Research Group Publications.

It is also possible to post questions on the UK Caving Forum but wear a thick skin if you do.

The SWCC library carries a comprehensive collection of the material listed above and much else besides. In addition, we have an archive which includes Club logbooks in which past digging adventures are recorded. As BCA members you also have access to the British Caving Library and the Librarian, Mary Wilde, is very knowledgeable and happy to help with enquiries: cavelibrarian@gmail.com

For a more general and theoretical background to the area we have covered, *Limestones and Caves of Wales*[4] remains the definitive work. Although published in 1989 and therefore somewhat dated, it is very comprehensive, authoritative and is an invaluable point of reference. What is more, the 2011 paperback re-print edition can sometimes be purchased quite cheaply second hand.

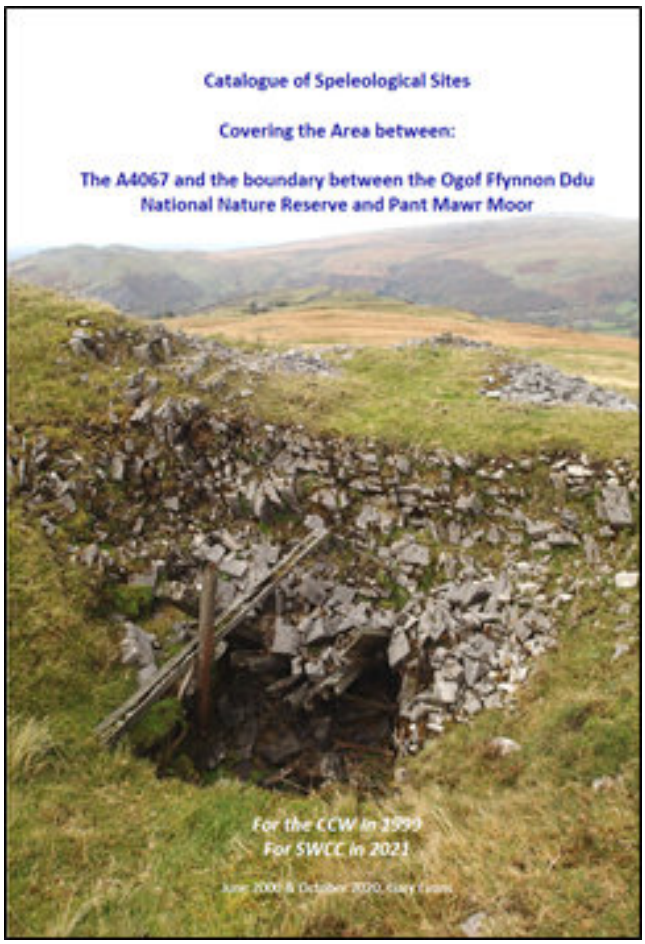
As mentioned above, Gary Evans now introduces the latest, most up-to-date version of what is now titled a '**Catalogue of Speleological Sites**'. If you have ever wondered which dig is 'Chas Jay's Old Dig' or where the Gwyn Arms Rising is situated, this Catalogue is for you!

OFD Area Catalogue of Cave Sites 2021

By Gary Evans

The 2021 version of this OFD Area Catalogue of Cave Sites is an update of the 1999 Version which currently exists as a printed document, a copy of which can be found in the SWCC Library. That 1999 version played an important part in the development of the cave site information currently available in Wales:

- The first systematic, fieldwork-based survey of sites prior to the modernisation of the Cambrian Cave Registry was the Black Mountain Cave Sites Project in 1997 – a four-part printed project held in the SWCC Library and the BBNPA Library.
- The 1999 OFD Area Survey was undertaken for CCW (now NRW) and focussed primarily on cave and dig sites on the OFD Reserve.
- Data from both these projects were then used when Gary Evans became Cambrian Caving Council Registrar in 2003. All that existed for the registry at that point was typewritten sheets for the whole of Wales going back to 1966, which all had to be retyped to digitise them, as OCR tools couldn't read them. The data already created for the Black Mountain and the OFD Area became the most detailed part of the Cave Registry at that time and most of what is in the registry now for those sites was written then.
- When Brendan Marris took over from Gary in 2008, he obviously took it a step further with the excellent ogof.org.uk as well as making improvements to the Registry and site listings across South Wales.
- Martin Laverty, as the current Registrar, has worked hard to modernise the database, provide a mapping system, and aligning the Registry with ogof.org.uk. He has brought the number of sites listed in Wales to nearly 2000.



This version of the OFD Area Catalogue of Cave Sites is now by far the most detailed look at a single area, with many new sites added, and it includes the resolution of some inconsistencies in the online databases. The project covers all known caves, digs, sinks, risings and notable holes in the ground between the OFD Reserve boundary with Pant Mawr Moor and the A4067.

Many days of research and field work were undertaken to provide up to date photographs and find sites that have been lost for some time. Grateful thanks are due to those who have helped with queries and in particular to Toby Dryden who assisted with all the field work and access permissions on private land, and to Bob Hall who resolved numerous historical inaccuracies and provided sound advice throughout the development of the catalogue.

A printed version of the project will be available in the SWCC Library, but it can be downloaded by anyone who would like a copy from:

https://swcc.org.uk/joomla-swcc/images/Documents/odds/OFD_Area_Cave_Sites_Survey_2020.pdf

References cited in Chapter 9

(*References relating to Keith Ball's article which follows are listed at the end of the chapter*)

1. Clive Jones et al, 1990, Greensites, SWCC Newsletter 108, SWCC; Clive Jones et al, 1991, Greensites, (in) SWCC Newsletter 109, pp 5-31, SWCC
2. Keith Ball, 1970, Dig This, SWCC Newsletter 67, pp 18-22, SWCC
3. Mary Rogers, 2020, Personal communications by email, October and November 2020
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The Geological Backdrop

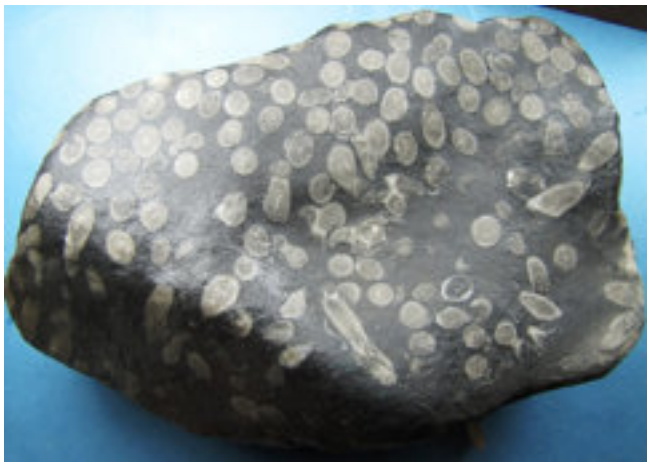
- By Keith Ball

Geology and hydrology are frequently referred to throughout this publication and in the many earlier publications referenced. It is an inconvenient truth that as geological science has evolved over the 75 years of the SWCC's existence, so has the way in which our beloved limestones have been described and classified. This creates difficulties for the lay reader who may find that a site of interest is described as being in the S2 limestone in a 1965 publication but in the Dowlais limestone in more recent works. To make matters worse, if they stray a few tens of miles east or west, beds of the same chronological age may have a different name! To assist readers in unpicking these issues, Keith Ball has very kindly written the article presented below. (Many readers will not have had the privilege of getting to know Keith personally: he is a professional geologist who has been active with SWCC since the 1950s. Keith has contributed very considerably to the SWCC's theoretical understanding of limestone geology but has also been an endless source of original thought and stimulating and challenging ideas. Introduction by Bob Hall

Penwyllt Limestone - What's in a Name?

In about 1880 the basic geological map of Great Britain was published and classified our limestone simply as the 'Mountain Limestone' or the 'Main Limestone'. Development in limestone petrography and in particular the recognition and development of zone fossil information in the years since 1880 meant that there was scope for substantial revision of the geological map, and this was first undertaken by George for the limestone area of Gower in 1940. He recognised that there were limestones and limestones, and on the basis of appearance, the nature of the rocks, and the presence of fossils such as coral and bivalve species, was able to subdivide the limestones into zones which were reasonably extensive. The specific fossils used were the corals: Cleistopora (K zone), Zaphrentis (Z zone), Caninia (C zone) and Dibunophylum (D zone) and the bivalve Seminula (S zone). It was later discovered that the name Seminula had already been given to a butterfly and this had priority. The bivalve Seminula was subsequently called Composita but the term Seminula Limestone was retained. The Swansea sheet was re-mapped by the Geological Survey of Great Britain in 1948 and this map also reflects the greater knowledge and methodology developed during the intervening decades.

The geological map by George in 1940 may be regarded as the first to assemble the data, describe the distribution of the fossil zones within Gower and to sort out the complex structure.



Many members will be familiar with chunks of limestone such as this containing Lithostrotion fossil coral. (©T. Bolton, via avonrigsoutcrop.blogspot.com/2012/06/lithostrotion.html)

The later mapping by the British Geological Survey (BGS) in 1947-48 built on this but for the Swansea sheet only. This sheet covered most of Gower but not that part west of Llanrhidian. There are, not surprisingly, differences in interpretation and the geological survey map differs in some respects from that published by George. The main difference is that whereas George distinguished, as mappable units, the lowermost zone of the main limestone and was able to divide this into the Z and lower C1 biozones, the Geological Survey grouped these together into a single formation: the Penmaen Burrows Limestone. George had pointed out, however, that the distinction between the two biozones was only possible based upon the fossil evidence and that in practice it was difficult to

distinguish between the two zones on appearance only. For an excellent review of the rationale, various methods and reasoning behind the splitting of stratigraphic column into 'Biozones', 'Formations' and 'Stages' see Lowe (1989). Lowe also described the distribution of rock types within the Carboniferous Limestone succession and described in some detail the equivalence between the variously assigned biozones and Formations.

Table 1.

Gower Succession from George (1940)	Biozone	BGS Classification
Upper Limestone Shales	D_3	Oystermouth Beds
Main Dibunophyllum Zone	D_1 - D_2	Oxwich Head Limestone
Seminula Zone	S_2	Hunts Bay Oölite
Upper Caninia Zone	C_2 - S_1	High Tor Limestone
Modiola Phase	???	Caswell Bay Mudstone
Caninia Oölite	???	Caswell Bay Oölite (Gully Oölite)
Lower Caninia Zone	γ C_1	Penmaen Burrows Limestone (Black Rock Limestone)
Zaphrentis Zone	Z	Penmaen Burrows Limestone
Lower Limestone Shales	K	Cefn Bryn Shales (Lower Limestone Shales Group)

Penwyllt Succession (BGS Merthyr Tydfil Memoir)	Biozone	Also Known As
Upper Limestone Shales	D_3	
Penwyllt Formation	D_2	Oxwich Head Limestone, Llandyfan Limestone
Penderyn Oölite Formation	D_1	Light Oölite
Dowlais Limestone Formation	S_2	Seminula Limestone, Cil yr Ychen Limestone
Lower Limestone Shales	C_2 - S_1	

Formations may be regarded as mappable units characterised by a similarity in appearance, fossil content or even chemistry and mineralogy. They vary in thickness from a few centimetres to several hundred metres. Let us take for example the Dowlais Limestone Formation in the Penwyllt area in which are developed our main cave systems. Isolated exposures make it very difficult to determine where in the succession an exposed bed, or group of beds sits. The rock throughout is a formation which remains boringly uniform. There are, however, some marker beds near the base e.g., about 13m above the base is a bed or group of beds consisting of the colonial coral Lithostrotion, and slightly higher in the succession is a pair of dolomite beds. These are latterly extensive and can be recognized over and underground from the Nedd Fechan to the Twrch valleys.

Comparison of North and South Crop Limestones

The succession at Penwyllt is somewhat different to that of Gower. Whereas in Gower the succession is over 1000m thick, that in our area of the North Crop of the coalfield it is only about 150m, and only comprises the upper biozones (S and D).

There seems at times to be a regrettable tendency when geologists survey a new area to wish to express their individuality by renaming rock units and formations. Sometimes this is justified because in the new area there

may be better exposures or other information which justifies the change in nomenclature. The geological succession of the sheets covering part of the North Crop (Carmarthen, Sheet 229, Ammanford Sheet 230 and Merthyr Tydfil Sheet 231) illustrate how the thinking has evolved through time. For the Carmarthen Sheet (published 1967) the limestone succession is given as the Main Limestone sandwiched between the Lower and Upper Limestone shales. Halfway through the Main Limestone lies about 10-15m of light coloured oölite.

The Ammanford Sheet (1977) exhibits about the same thickness of Main Limestone but divided into several sections or formations. The Lowest is the Cil-yr-Ychen Limestone overlain by the Llandyfan Limestone Beds, in which and near the base is a light coloured oölite.

The Merthyr Tydfil Sheet (1979) uses the same nomenclature, but this is superseded by the Merthyr Tydfil Memoir (1988) in which the titling of the formations is changed as a result of the much better exposures shown in the quarries at Dowlais, Penderyn and Penwyllt. In comparison with the reasonably complete succession in Gower, the main limestone unit (the Dowlais Limestone Formation) is within the S2 biozone and is only about 100m. thick. This is underlain by the Lower Limestone Shales, ascribed to the C2 S1 biozone, and is overlain by about 30m of D zone limestones. It will be seen that it is only towards the top of the succession that there is some comparison. The lowermost formations have no lateral equivalents in our part of the north crop although there are some representatives as one proceeds further east towards Brynmawr. There are still some instances of non-deposition amongst the more complete succession in Gower. Notably there are unconformities between the Penmaen Burrows Limestone and the Caswell Bay Oölite; between the Caswell Bay Oölite and the High Tor Limestone; and finally, between the Hunts Bay Oölite and the Oxwich Head Limestone. The Caswell Bay Limestone in particular shows an eroded upper surface and is overlain by a rather thin but easily recognisable series of impure limestones and shales: the Caswell Bay Mudstone. This passes sharply but conformably upwards into the High Tor Limestone.

The Cefn Bryn shales are poorly exposed and although originally thought to contain Silurian fossils have since been shown to be Carboniferous. They are overlain by the rather uniform limestone described by George as a dolomitic crinoidal limestone (the Penmaen Burrows Limestone) which is estimated as not less than 300m thick. The distinctive Caninia Oölite (Caswell Bay Oölite) is about 60m thick and is immediately overlain by the Caswell Bay Mudstone a few metres thick but widespread and easily recognised. The High Tor Limestone (= Upper Caninia Zone) is up to 100m thick. The Hunts Bay Oölite (= Seminula Oölite) is 160-200m thick.

The Oxwich Head Limestone is about 100m thick, in the middle of which is a number of cyclothems mostly comprising limestones, shale and seat-earths, one of which has a thin coal developed upon the seat-earth and is thus another useful marker band. The Oystermouth Beds (30m) are the lateral equivalents of the Upper Limestone Shales of the North Crop and similarly comprise interbedded limestones and calcareous shales. Usually, the limestone units are only a few centimetres thick but on Gower they may be up to 30cm. The western and remaining part of Gower is covered by the Worms Head Sheet (BGS sheet 246, 2002) in which there is a mysterious change in nomenclature for the Lower Zones (in parentheses in Table 1 at the start of this article).

Conclusions

It is natural when you have discovered that wonderful new cave or passage to wish to put it in its geological context. The first call, of course, would be to locate the area on the geological map, and then to place it in its stratigraphical position. The succession for the North Crop using the classification outlined in the Merthyr Tydfil memoir, would be a good start. There has, however, been an even more recent change in the terminology with, in particular, the Penwyllt Limestone being replaced by the Oxwich Head Limestone (The BGS Lexicon of Named Rock Units). Whereas the term Oxwich Head Limestone is more than adequate for the Gower area, there are some differences with the succession in the Penwyllt quarries which suggest that the term of Penwyllt Limestone could be retained, at least for our speleological purposes. In both areas the limestones are siliceous with chert bands and nodules being common. In the type area on Gower, e.g. the quarries at Ilston, a number of well-developed cyclothems (seat earths and coal streaks and even thin coals) along with the presence of dolomitic pseudo-breccias, are exhibited, which are not common in the Penwyllt area. However large cave systems are not frequent, so far, in this formation. The main cave environment is where the Basal Grit of the Namurian rests unconformably on the Penwyllt Limestone to the east of the Nedd Fechan.

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Glossary:

Cyclothems: From coal geology. A repeating sequence of beds in the form of sandstone, mudstone, seat earth and often coal.

Seat earths: A clay bed often underlying a coal bed, being a former soil.

Pseudo-breccias: In these cases, normal limestone beds are partly dolomitised giving the impression of angular calcitic fragments in a dolomitic cement.

Editor's Note: In the Conclusion, above, Keith mentions the BGS Lexicon of Named Rock Units. That exists as a searchable online resource here: BGS Lexicon of Named Rock Units - British Geological Survey

Chapter 10: The Ethics of Digging

I can imagine the inward groan when you turned the page and read this title! It would be easy to mock, but a good deal of ill-feeling in the caving community might be avoided if cavers developed a little more ethical awareness. I make no apology for including this short chapter.

Much of what follows draws heavily on material I contributed to the 1991 BCRA publication, Caving Practice and Equipment[1]. Revisiting my words thirty years later I am struck by how little has changed.

Conservation Considerations

The act of digging for caves has the capacity to cause permanent damage to the natural environment and for this or related reasons may provoke angry responses from others. It is necessary for the intending digger to be sensitive to the ethical implications of a proposed dig.

Conservation aspects should be obvious. In an underground site a digger may feel justified in causing damage that would be unthinkable to a sporting caver. Mud banks may be ruined, formations broken or dirtied, drainage or draught altered, and the cave polluted with festering wood and other debris. Is such damage really necessary? Do the ends justify the means? How will the action be viewed by a future generation of cavers? Would the current local consensus opinion support such desecration? These are all questions that must be resolved, and the issue of conservation should temper every decision. Similarly with a surface dig, a caver may feel justified in causing damage to a moorland environment that would leave a rambler gasping with disbelief. The use of a vehicle to transport material chews up grass, spoil heaps are unsightly as are the winches and other impedimenta of a miniature mine. The invasion of a quiet shakehole or swallet can disturb nesting birds and other wildlife and the noise of compressors, generators and blasting disturbs the peace. Diggers share the use and enjoyment of the countryside with others, and it is by no means self-evident that the prospect of discovering new cave absolves us of the responsibility to adhere to the 'countryside code'.

Publicity vs Piracy

Diggers are understandably jealous of the potential of their chosen sites and are concerned that 'pirates' may make the final breakthrough and claim the credit. This has happened and is a sad reflection on the ethical standards of some cavers. The response of diggers has sometimes been to be secretive. This is unsatisfactory on several counts. Firstly, there is a danger of a rescue being seriously impeded if a digging party is overdue from a 'hush-hush' location. Secondly the action may be counterproductive. If the dig has been well reported by named individuals, the caving world will know who did the work and pirates can claim no credit. Thirdly, if, as often happens, a dig is abandoned inconclusively, future generations of cavers will have no data on which to assess the worth of another attempt.

Writing the above thirty years ago I went on to suggest that "*One compromise that deals with the first two points to a certain extent is for a trusted individual to act as a 'registrar' of current digs.*" The current Registrar for the Cambrian Registry, Martin Laverty[2], wrote on this subject in a 2019 CCC Newsletter and implied that he is entirely willing to act in such a capacity. It is also worth noting that the CDG has operated a 'secret file' system for diving projects over many decades.

Another Entrance?

Occasionally a cave is found to come close to the surface and the possibility of digging an additional entrance is mooted. Several reasons may be advanced for such a course of action. It may be that the far reaches of a cave are remote and this impedes further exploration. With a new entrance more discoveries might be made. It may be pointed out that rescue would be easier if a crawl were to be bypassed. The difficulties over access at the old entrance may be cited. It is easy to find advantages. What of the problems? From the viewpoint of sporting caving a second entrance has several effects. It enables the satisfying 'through trip' to be undertaken and this is seen as an advantage by many cavers.

On the other hand, it devalues the remote and inaccessible parts of a cave and may reduce the challenge and objective danger of a system just as much as a Land-Rover track up a virgin peak. What may have started as a project with clear advantages for rescue may turn out to have the opposite effect. Through trips are notorious causes of rescue callouts. Easy access to previously remote cave encourages parties to be less careful and the number of trips increases. All these factors may generate more incidents.

On the conservation front a new entrance may be little short of a disaster. Remote cave tends to be well conserved whereas easy access promotes visits and consequent damage. In short, any digger contemplating opening a new entrance should, as a matter of courtesy, consult widely with the local, regional, or even national caving community before taking such a step.

These last few paragraphs were written long before the controversies surrounding Ogof Draenen, but nothing has changed their validity, I would suggest. It is also interesting to note that the debate is a long-standing one. There is an important group of articles from the early 70s kicked off by Martyn Farr[3] in NL72 followed by responses from Paddy O'Reilly[4] and myself[5] in NL74. These provide a fair depth of analysis.

Interpersonal Ethics

My impression is that diggers may be jealous of their digs for at least two reasons. Both can give rise to the secrecy alluded to above. On the one hand there is an element of wanting to be able to claim the credit or recognition for a discovery. On the other there is the desire to 'be there when it goes' and thus experience the thrill of entering untrodden cave. Both of these sentiments are entirely understandable. Both can arouse strong feelings. For example, a member writing of somebody 'pirating' a section of cave he had been working in, expressed his feelings thus:

"*I must have mellowed with age. Since this incident I have not been caving with Trev, whereas only a couple of years ago I would have put him in hospital.*" (Names, have, as they say, been changed...)

It is easy to sympathise – it would indeed be very galling to invest all the time, effort, pain, and discomfort, not to mention cost on occasions, in a project, only to be pipped at the post by an interloper.

Any solution to this challenge is difficult. Ideally, we would appeal to individuals' better natures. In a perfect world pirating someone else's dig would be unthinkable and nobody would dream of doing such a thing. Bump! Returning to reality: there is an uncomfortable truth: some cavers are ruthless. In fact, ruthlessness does seem to run in the blood of some of our pushy, hardcore, exploratory cavers. Appealing to the better side of some individuals is unlikely to succeed. Thus, it is unsurprising that we get furtive, secretive digging. But that approach, of itself, gives the pirate a get-out clause – without a published record of activity, a pirate can readily say, "*Sorry mate, didn't know it was your dig, thought it was abandoned...*"

If a dig proceeds on a collegiate basis with a large number of participants, as many Club digs did in the past, then these highly personal emotions are possibly much diminished.

Interpersonal ethics also come into play when a discovery IS made. Compare these two quotations. The first is from the same member I quoted above, "*...we had dug for 4m along the streamway, until we were nearly through. I had problems with my light and Bri offered me his for the breakthrough, but I said that when we broke through, we would do it together and left the cave.*" (Names, have, as they say, been changed, once again...)

The second quotation illustrates a different approach from another member, "*Now, I've never really subscribed to the "let's explore everything together as a team" school of cave exploration – if you want to walk down virgin passage holding hands with your mates that's fine with me; bond away to your heart's content. Personally, I prefer to take each situation as it arises – it isn't always possible to have everyone who has been involved in a particular project at each and every breakthrough point. I would never expect anyone to hold back from pushing a lead just because I wasn't present...*"

Pete Francis[6] sums up the conflicting emotions beautifully when writing about a breakthrough in Ogof Gwynt yr Eira:

> "*One Wednesday night, crowbarring away at the bottom, suddenly a boulder dropped and there was blackness – a chamber beyond. I felt terrible! It was Ian who had made all this possible and now that a breakthrough had come, he was two hundred miles away. Without his unshakeable belief and enormous work excavating the crawl none of this would have been possible and now, like thieves in the midweek night, we were stealing it all from him. It was the worst 'find' I'd ever made. It was impossible to hold everyone back, we had to see what was there. But an agreement was made that after a short recce, if it 'went', we'd wait until the weekend to begin exploring in earnest.*"

In a similar vein, Martin Groves describes the quandary he found himself in, having gained entry to new cave by climbing an aven in Ogof Fawr:

"*Exploration fever struck, and the adrenaline started to pump.*" (Martin chose to push on alone until he met a stream at which point he considered his position). "*I was hugely tempted to follow the water, but I briefly sat down to assess the situation; this had been my first significant involvement in the cave, and I felt like an interloper, stealing all of the glory from those who had done all of the hard work. In caving, comradeship and shared experiences always outweighed personal gain in my opinion, so I decided to head back and to inform the others.*"

Those final few lines from Martin sum up my ethical standpoint to perfection.

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Chapter 11: The Diggers

Who, or perhaps what, are diggers? What motivates a digger? What inspires a digger? What gives a digger strength in adversity?

These are difficult questions, and it may well be that the answers are unique to individuals. But "what motivated me?" may be a question I can answer. So, in the hope of encouraging others, here goes.

Bob's Story

What motivated me to become a digger? Thinking back well over fifty years to when I was a fifteen-year-old visiting the SWCC, unaccompanied, being invited to join a digging group seemed to provide a route to acceptance and 'belonging'. I was hard-working, keen, and practical, and was thrilled to be involved in the 'real work of the Club'. 'Playing with the big boys' was motivation enough. At that stage I don't think I really thought much about it. It was exciting.

The year following, after the divers had discovered OFD2, there was a lot of effort expended in trying to find a way past Dip Sump. This was a true Club project with a great many people mucking in. I remember particularly a trip with Hywel Ball ferrying lengths of 4x4" timber from Y Grithig to Starlight Chamber and onward to the dig beyond Coronation Aven where Clive Jones and others were very close to digging through to Dip Sump Series. There was a buzz in the air: how could one not be part of a community enterprise this big? A year passed and May 1967 saw Paddy and his party discover what was then called the 'Clay Series' and the hunt for a Top Entrance was on. Once again, a Club-wide effort was rolling and I was busy in Engine House Dig, a cog in a rumbling Club machine.

Soon afterwards came the dig I mentioned in my Introduction, in Hangar Passage. My first experience of a breakthrough! Now I was hooked.

Waun Fignen Felin 1970: 'Boys toys and camaraderie' – Bob Hall with 'Kango' and Nigel Ellis. (©Alison Maddocks)

A summer camp at Waun Fignen Felen followed. Boys toys, blasting, camaraderie. Jem has told this story elsewhere. [Volume 2, Part 2, Ch. 6, p200]

Yes, blasting. Now, 'banger' was always an interest, and once I had a car and my own flat, I could get a licence. So, digging became an excuse to blow things up! Although there WAS always the hope of finding new cave and the teamwork, challenge, and stimulation of a collective enterprise remained a big part of the picture. This was especially true at Sink y Giedd ten years after Waun Fignen Felen and the Chasm.

So, to summarise, and to be honest with myself and with you, dear reader, I have concluded that the human aspects of the digging experience were probably what I valued most. By that I mean the 'belonging', the fellowship, the craic, even the ego-driven aspiration of achieving the status of being a 'Digger'. Certainly, finding new cave and playing with all the hardware suited my temperament and interests, but being an accepted part of a club, which lived by digging, in those years, was paramount.

Enough, then, from me. What of the other diggers? Here follow some random quotations from some of them, or in a few cases comments about them.

Clive Jones: "*The place is a place of rare fascination – a joy for ever. Who could ask for more: a dig that goes on and on and as yet goes nowhere.*"

Bill Clarke: "*The motive so far as I was concerned, was compulsive curiosity which continues to push me on even when I would rather not.*"

Nig Rogers: "*With the discovery of Ogof Diwedd Yr Enfys under our belts we were keener than ever; the hunger was upon us in those days*."

Martin 'Lump' Groves, about Tony Donovan**:** "*I was in awe with how Tony postulated that there was a mud choked bypass to the obvious immature passage. It looked like a solid wall to me; did the guy have x-ray vision?*" (It went!)

Ann Mason Williams (writing in 1961)**:** "*How the scheme originated is lost in the mists of time and the fumes of alcohol, but mad, impracticable ideas have a way of being made to work, especially it seems in the SWCC.*"

David Eason: "*Without the drive for discovering the unknown, we would be nowhere.*"

Clive Jones: "*This was to be our final battle but who is to say when the battle is over. Who cares when you are enjoying the fight?*"

Simon Lacey: "*Nietzsche said life is a choice between suffering and boredom. Why not enjoy both at Railway?*"

Gwyn Thomas (Hon. Sec. 1965)**:** "*At the moment 90% of the digging is being done by 5% of our members; this is not a very satisfactory position and we must rectify it.*"

Tony Baker: "*Quarter to five. The sun is setting as they leave, listening eagerly to transistor radios for news from elsewhere. Sometimes their step has an optimistic spring in it, their hearts gladdened by a successful afternoon. At other times their eyes are downcast, subdued voices analysing what went wrong. In any case, they'll be back next time, their expectations raised once more as they dream of that day – maybe not next month, maybe not next year, maybe not for several years - when all the bad times can be forgotten, when the ultimate prize will be theirs…*"

Pat Hall: "*This place is shittier than Shitty the Shitehawk's shittiest shit-coloured shirt.*"

David Eason: "*…when things start to look interesting, "diggers fever" takes over…*"

Ian Alderman: "*…the unparalleled filth did not register, we were a team, 'at one', and hell-bent on beating nature…*"

Chris Duroe: "*Nig was very good at organising other people to do the hard work for him. Whether this be pulling out the larger rocks or even just carrying the heavier gear! My overriding memory is of his endless enthusiasm. No matter how tired, or how late in the day, Nig would always be keen to have one more go at something. Or, more accurately, persuade his companions to have one more go!*"

Clive Jones: "*This is going to go; I can feel it in my water*."

Nig Rogers: "*Terrific, I thought to myself, my enthusiasm rapidly draining away as my fatigue, both physical and mental, increased. Cramp finally struck in my left calf midway through a pile of wedged rocks, at a point where an awkward twisting move upwards is necessary. The weight in my stomach felt heavier than ever. This would be a good place to give up, to turn around and run away. But if I did that I probably wouldn't ever come back. I pushed up into larger passage.*"

Brian Parkin: "*Good old Railway, never ending, changeless, always there when you need something familiar, like the herpes virus…*"

Clive Jones: "*Digging is an addiction and those inflicted with it must have at least one good dig on the go at any one time. Without a regular fix they become nail-biting bewildered beings*."

To conclude, there is, to my mind, a theme of a digger being almost helplessly in thrall to their project, so compelled to carry on regardless. Indeed, Clive has just described digging as "an addiction." These lines from the Merle Travis song, "It's Dark as A Dungeon", which we used once to sing in the Gwyn Arms, come to mind:

Like a fiend with his dope
or a drunkard his wine
A man may have lust
for the lure of the mine

Perhaps we diggers also have a 'lust for the lure'….

What follows now is a unique document from Ian Alderman. He has ingeniously told the story of Ogof Gwynt yr Eira through the voices of a dozen or so diggers, really getting to the nub of what digging, and the digging experience is all about. Whilst, incidentally, getting the last laugh on Tony Baker whose many iterations of 'Club Premier Digs' have yet to reveal much cave, Tony having once coined the name 'Dead Horse Dig' for this site! Friendly rivalries such as this being part and parcel of the 'digging game'!

Herbert's Odyssey - an enduring journey of pain, gain, muck, yeuk and slither

"Was this it? Was this really finally it? The date, 9th December 1995, and few boulders can claim that their first interaction with the human race was to have my backside sit on them. But this one was lucky; for a few precious moments it carried so much more than just me, it carried the hopes of an entire digging team. It was faint but real; as from the unexplored darkness to my left came the sound of flowing water; a streamway. Were we finally about to get our reward? Was this really finally it?

The physical trials and tribulations of the Gwynt yr Eira dig have been part-covered in previous newsletter articles by Pete Francis, the thoughts and memories of those who took-on this epic digging challenge have not. Written in a chronological order of events and in quotes of those present, this article gives voice to a fantastic and close-knit group of SWCC members, mates, who over a twenty-year period at this dig endured more than any article can realistically tell. Cracked ribs, partial blindness, unavoidable soakings, relentless frustration and a group burial - some minor negatives for sure, but the digging team's collective belief in the site would also create laughter, camaraderie and the best thing of all, new cave.

From Little Acorns…

Pete Francis: *It was typical Club weather, damp and miserable, hardly anyone up there so we decided to go home, but the thought of going home just to sit around sounded miserable so we went to Herbert's Quarry.*

14th April 1985, a new site, a small team, the Gwynt yr Eira story had begun.

Pete Francis: *We decided to look at the holes on the sides of the road rather than go up the hill. We found a large shake hole there with water going in, we thought that was promising. We dug down about 20ft in this hole, got about 3 or 4 people into it to haul stuff out, then sideways to a chamber but there was no obvious way on.*

Toby: *Me and Jim thought 'sod that', so we went over the road and saw a stream flowing down a hole.*

It was a large sinkhole situated on a major fault; its water reappeared four miles to the West at the impressive Llygad Llwchwr resurgence. Exceptionally quick flow-through times were revealed from dye tests conducted by Bill Gascoine at sites located on this part of the mountain, this then was a site worth pursuing. Digging began, a recess in a rock face at the back of the sinkhole, and from it, the excavation of peat and small boulders:

Pete Francis: *There was no below-ground entrance at all, we were digging completely from the surface.*

People's attention soon faded from the site but not mine, I was hooked. Accompanied by a new team of Steve and Helen Richardson, Vaughan 'Plops' Clark, Richard Roberts and Toby, within a year the recess would become the top of a 4m deep, mined shaft. This in turn led to a low damp bedding plane. Pete Francis resisted the site.

Pete Francis: *I'm looking at the bottom and a miserable little bedding plane was going off, and thinking 'shit', we'll be here for ever, it's not going to work. I stopped digging it then. Ian carried on, he didn't get much support really, with all else thinking it was a lost cause.*

Three more years and a reduced team, often comprising of just me plus one. The bedding plane was enlarged; after 2m it intercepted a 20cm diameter hole to the right which clearly took water, we turned and followed it. Progress was slow, a further 4m of sharp floor in a wholly mined space had made for tough going. It was hard. It was exciting, but it was by now, hardly inspiring. By June 1989, I'd made 90 return trips from the Club to the dig, or 3000 miles; the equivalent to crossing the Atlantic Ocean, and a figure that would be dwarfed over subsequent years.

Did Someone Just Say, 'A Lost Cause'?

1992, and with three years at college behind me, time to re-engage with the dig, it felt good to be back! Vaughan was now gone, but interest in the site was growing from elsewhere. The dig needed a high-impact opportunity to attract the diggers it required; a call was made. Soon, manned by owners John Harvey and Paul Taylor, the industrial might of a towable air compressor gave us our first and due reward.

Steve West: *I was amazed by everyone who turned up with all this digging kit, a compressor and airlines; it was something totally out of my zone.*

John Harvey: *You'll never get better than a drilled hole with banger in it. We were drilling using my large breaker drill, the water was dripping on me, on the drill, getting me and everything wet.*

From 4m down, a huge blast, dense clouds of toxic fumes soon drifted out from within. Back to the dig face, and there, through gaps in the shattered right wall, tantalising glimpses of darkness, and excitement all-round. Progress was swift, our prize, a 4m-deep natural shaft with a boulder floor. It felt good, really good; at last, we were in natural cave.

Pete Francis: *We suddenly thought we were in, we didn't have a ladder but we free-climbed it, timber was put in later…this was much better than the other side of the road…*

The shaft's top edge was loose. A call went out, and Sam Moore went in. He did a good job.

Sam: *Ian reminded me that I helped him to timber the first natural shaft in the dig in its relatively early stages. He says the timber is still there, which is always good news.*

The shaft proved stubborn, the way on lay below its boulder floor. Progress was slow but spirits were high, as were the risks involved with exiting the shaft.

Paul Quill: *I remember John Harvey being there, I remember him almost losing his head one day. I don't know if it was me or someone in front of me, there were two of us going up this shaft, John Harvey had his head sticking out of the bottom looking up the shaft and this f***** big rock peeled off, and I shouted BELOWWW!!! He just pulled his head back, and this flipping rock, it would have taken his head clean-off.*

We emerged one day to discover Clive Jones conducting resistivity runs above the site.

Pete Francis: *Clive's results were finding stuff to the North, but we didn't want to be finding stuff to the North, but much later we found passages going North.*

Back down below, an unexpected collapse. With diggers leaping from the floor to the walls, the floor drops a further 2m, but it didn't matter, the slump had revealed a way into a new chamber. A low ceiling, and a floor of large boulders; where now from here? A group decision is made, and we head downwards against the back wall. But the cave wasn't happy, again it protested; access to its secrets below was again denied by another significant collapse.

Pete Francis: *The whole thing moved. We all retreated back into the chamber; it was too loose, too dangerous to do any more there.*

A solution was beyond us, but not John Harvey and John Lister; their plan, a scaffold cage suspended on steel wires.

John Harvey: *It was our scaffold from my building works, we just built our way down through it. Jammed some verticals in, and then some ones at right angles, well perpendicular, and just braced it. Chucked boards behind, drilled out bits of rock, chiselled them out behind with the Bosch, and suspended the cage using wire from a building job. Scaffolding bars - they need just common sense when you look at them and you can see what they are going to do. Timber is a bit more variable.*

Pete Francis: *I felt comfortable because two mining engineers had put the cabling in.*

It worked, progress through the choke was enabled. It was slow but methodical; it had to be, our shared desire to reach old age depended on it. 3m down into the choke and things looked bleak; a period of wet weather had passed through, the bottom of the shaft was now under half a metre of water. The tried and tested cure for dampened digging-spirit - Paul 'Quilly' Quill - was put to work.

Paul Quill: *I went down and had a look at it. I've been in several situations where digs seem absolutely hopeless, and you can hit a rock or hit something, and a hole opens up and everything changes. We had a 6ft bar; I said, "pass me the bar." Everyone said, "forget it," it's a non-goer. And I hit the floor of the pool two or three times with this bar and stirred it round as you would if it was a big spoon. All of a sudden, gush, and a rumble, it had gone into a small chamber. Then another new chamber - we had two breakthroughs in one day. You may think a dig is hopeless, you may think it's going nowhere but nobody on this planet really knows…*

Paul had broken into "Double Pots", the dig finally had something with its own name. For the upbeat victors of two tough years spent defeating the choke it felt good. But joy was short-lived, and so began a period of near-complete immersion in a cold, tight, water filled tube. With no other obvious leads, we literally and metaphorically took a two-year plunge; the most spiritually draining and uncomfortable period of the dig's entire history had begun.

Toby: *There was this tube that was full of mud and water. We were just drilling and blasting, it was cold and uncomfortable. Because of the cold it was quite painful on the muscles; you were stretched as well, muscle cramps kept coming in, it really drained physically.*

Steve West: *It was an absolute nightmare.*

Pat Hall: *It was horrible, I spent quite a bit of time there getting wet.*

Pete Francis: *It was solid rock, and it wasn't huge. It was digging muck out of the floor, but we felt we were out of the crumbly unstable stuff; you couldn't avoid getting wet, you couldn't stay in there very long.*

With 23m below the entrance, and after nine intense years of slog, the team are flat out in a tight, flooded phreatic tube where wetsuits were mandatory. Slide-in feet first, shoulders resting on the tips of the boots of the person behind you, drill shot holes in the ceiling just above your face. Evacuate…detonate…remove the blast debris at the start of the next trip using heels alone to drag it back under arched backs; if this wasn't total dedication to a cause then what was. March 1995, and Swansea University's finest arrives at the Club. "Come try our dig Rhys!" Not quite a case of in at the deep end, but none the less, into the tube he went.

Rhys Williams: *My first trip was with Ian and possibly someone else. He let me have a go at drilling; I managed to get the drill bit stuck because I never cleared the hole.*

Eighteen months in and smiles were inevitably turning to frowns in our tube; time then to call again upon our friendly mining engineers. 13th August 1995 and the compressor returns…

Rhys Williams: *Ian got a grant from the Club to pay for the compressor; it was over a weekend, two trips, one on the Saturday, one on the Sunday. We laid a phone line down to where we were working, we laid the air pipes a long way down, through the scaffolding and "Double Pots." We drilled big shot holes, it was a big bang, John Lister's face was a picture…*

More noise, more fumes, more debris and enthusiasm, oh, the energising effect of proper bang! The frowns were gone, but where were the grins? The blast had revealed all; two laborious years of wet misery had led to nothing more than a small calcite ledge with water trickling over it into the tiniest of holes. But suddenly, a welcome and unexpected intervention of fate was to cross our path; I only wished it had done so two years before. 3m back from the entrance of the hated tube and what we had assumed to be a solid wall was in fact anything but. Between trips and without prompt, a letterbox sized slot had developed in the wall. It's the 11th November 1995, and the future direction of the dig was to literally land on our lap.

Rumble Rumble But No Real Grumble

Rhys Williams: *Stevie mentioned about this letterbox that opened up on the side just above the end of the cave. We all had a peer into this little black letterbox and thought "there's definitely a passage through there." It didn't look particularly unstable; it was a sort of sand wall, it had like a lintel kind of rock forming the top of the letterbox.*

Steve West: *In my enthusiasm, I was pulling stuff out, levering boulders out using a crowbar, but I wasn't looking at what I was doing. Things started moving, creeping, but I wasn't aware of it.*

Toby: *On the way in, Ian and Stevie had noticed this small hole on the right-hand side. I sat there watching Stevie dig at the boulder in the roof. I remember saying, "don't attack the roof, attack the floor." I had this feeling that something big was gonna happen, so I said I'm going back this side of the choke.*

Rhys Williams: *We dug out under the lintel; I was the first one to get my legs through, but my waist didn't fit. I left the lintel rock intact; I came out and let Stevie have a go. Toby was starting to get a bit spooked by it, so he backed out. All hell broke loose, Stevie had levered the lintel rock out and that had been holding up all the stuff above.*

From Toby, a holler, "*GET BACK, IT'S GOING*", a gigantic wave of sound, rock and slurry poured out of the ceiling, three diggers made a hasty retreat. The lintel - it had been the key stone supporting the entire contents of a large rubble filled shaft above us, how could we have known?

Toby: *I stood up on the other side; all hell broke loose and the whole choke came down. We agreed, I was to quickly make my way out, I was to wait for an hour. If they hadn't come out, I was to go and get help.*

A careful half hour of self-exhumation, and ten minutes later a shaken team of diggers surface with an urgent last mission, to stop Toby from raising the alarm. Oddly inspired by Rhys's tale of near group burial, his student mate Alan joins the team.

Alan Braybrook: *It was one of my first times down a proper dig that was going to do something exciting, instead of scratching around on Gower. It was very exciting, it felt like it should go into something, it was a grown-up cave where there were no other caves.*

For me alone, our near interment wasn't over. The only copy of 'Descent' that my mother ever bothered to read, inevitably featured an article on the collapse; and there, in print, my name. She saw it, and for the first time ever, mum took her rage to the 'incandescent' category; 'unhappy' was an understatement. After listening to her insistence that I give up caving, I quietly returned to the dig, where things had reached an altogether higher gear. Revealed beyond the collapse, was a downward sloping passage with few features except for a small innocuous boulder-filled arch at its bottom, which did grab our attention.

48m down from the entrance, the date, 9th December 1995, the arch is breached, and with it the dig finally hits the big-time. Our first major discovery, a two-stage shaft of at least 30m in height, with twenty of those glorious metres dropping away below us. The "Drop The Dead Donkey" pitch was with us, and ours for the taking.

Pete Francis: *I was the first down to the ledge, I then called Ian down. It was really exciting; it was a steep slope and we were on loose rock. Every time I kicked one it would rumble down the shaft, you could hear it booming.*

Rhys Williams: *It was a matter of getting through the restriction, the boulders were cleared to get through a little archway, and then there was the shaft, it was massive. It was quite a dangerous place, very loose and feeling a little bit exposed, but yeah, it was huge and had to go somewhere. Dropping down to the first ledge, and then down the free-hanging pitch it was just amazing, we thought we were in, it's probably the most exciting breakthrough trip I've been on.*

Joining Pete on the ledge, amid a hail of small debris, I climbed the next ladder down to the base of the shaft.

Pete Francis: *I put a bolt in and hung a ladder from it, Ian went down it and disappeared out of sight.*

Initially the shaft seemed blind, its floor, a sea of large blocks. Free of the lifeline, ten minutes of rolling boulders around, and a third and free-climbable 8m shaft was exposed. It was an unforgettable descent; dropping below the floor of the shaft, emerging into a new passage, its walls peppered with mud flowers. Of greater significance, from out of the darkness, the sound of a moving water; a streamway. This new passage also had a lucky boulder, on to which I lowered my backside…

Leaving my boulder friend behind, with every step forward, ancient darkness became light, and the sound of flowing water drew slowly nearer. The passage stopped at a ledge. Looking down, there it was, a new streamway, and at that moment it became the most beautiful, most important cave streamway in all the UK. Flowing from right to left, was this the way into the mountain's main stream, the untrodden subterranean super-highway to Llygad Llwchwr? Was this it? Was this really, finally it?

Pete Francis: *Ian came back, and he said we had a streamway. It was wonderful, we were in the big stuff now.*

A reconvened and rightly jubilant team, with hopes soaring high, it was time to enter our prize, and this time, getting soaking wet was going to be the best thing ever.

Rhys Williams: *We lowered a rope, and all went down. We were all thinking, we're just going to follow this now, but downstream round a couple of bends, it got gloopy and that was it.*

Pete Francis: *We went upstream which didn't go far, there were lots of avens, but we couldn't see anything really that was going.*

Frustration had reached new heights, our despondency a new low. Now at a depth of 71m, the cave had beaten us again. Downstream soon ended in a sump; it might be dive-able but not by any of the team. Our fast-track dream to the Lwchwr shattered; it was the bitterest of blows. A later and determined effort by Gavin Newman to breach the sump was also dashed, the sump itself was too tight. Aware by now that seemingly solid walls aren't always what they appear to be - ten violent minutes with a crowbar just 2m back from the entry point to the streamway, revealed a passage running parallel with it, a sump bypass, and ours for the taking. The passage led to a chamber beyond the sump and frustratingly to where the streamway entered yet another sump. Above us, an aven which was attracting Pete's attention.

Pete Francis: *There was an aven going up, there ought to be something above. I went up the left wall and then traversed across the aven at the top, it went up another 10 or 15ft. At the top of that there was a crawly traverse going over the aven which took us to walking passage…*

Numerous leads, an impressive 10m-deep shaft, and a fevered search for a high-level sump bypass, but where was it?

Jules Carter: *We found "Pitch 10"; I was behind Miller on that trip, he dropped a rope down and we were all super excited looking at this good pitch, but it didn't go anywhere. It was fairly typical of that cave.*

A low passage was located at floor level just beyond the aven Pete had recently scaled. At first sight it had a seemingly solid mud floor, this was to prove short lived. Within minutes it had become the muddiest place I've ever been. A passage of crouching-height, bulldozing armfuls of liquid filth backwards through thick, bad air was our only option. Despite the sadism of the environment, at some point, work ceased as the most delicate of operations was undertaken.

Steve West: *My face got splashed with muddy water and my contact lens popped out. I was searching round for it with one eye closed and the other eye open. My light reflected off the edge of it, my light had caught the contact lens and I could see it, gleaming. I put it in my mouth to clean it. I asked Ian Alderman to help put the lens back in. After cleaning the lens with my saliva, Ian actually aimed the lens back to my eye.*

Pat Hall: *At the end of the muddiest part of the cave it looked like there was a muddy sump.*

The passage had indeed led to yet another low, seemingly impassable sump. Our despondency proved short lived, on exiting the cave we encountered a gleeful Ian Millar and Toby. Their surveying of the upper series passages had revealed more than simply measurements. Less than a month after our discovery of the pitches, exploration was once again the word of the moment. Iain and Toby had inadvertently found the way into a significant section of new cave.

Pete Francis: *Ian Miller was surveying while we were down the pitch; he'd noticed that from a choke on the right, there was a draft.*

Iain Miller: *We just sort of sat there while the others were messing around at the bottom of the pitch. It was a bit messy, Toby was pulling bits and pieces out, gardening if you like, and I sort of sat there and thought "there's a stonking draught here." Toby was putting stuff on this shelf, why were we filling this substantial hole up when there was a stonking drought coming out of it? We pulled most of the rocks out that we'd already put back in, and then there's a sort of passage, and you think, it's got to be worth looking at this.*

A New Horizon

They had discovered the "Alaska series", itself leading to the aptly named "The Squalors". Two horizontal sections of cave with potential leads in the floor, walls and roof; we were spoilt for choice, but the risks weren't gone. Having wisely foreseen and avoided the earlier collapse, it was only a matter of time before the cave came after Toby. Luckily, I've long since understood that where there's a Toby and a life-threatening collapse, there's also a way on.

Toby: *I was digging at floor level and suddenly this big block just came across my back. It bridged the passage, so I was buried underneath. I couldn't move till Pete removed the rock.*

Pete Francis: *Toby just crawled along, and this slab just came off the wall onto him. He must have brushed it, and it just slowly went across him, but it pinned him down. He couldn't move. Had I not been there he'd have been stuck. Once we'd dropped it, there was a slot going down, so we went down and that led us to the passage that led to the next pitch.*

Jules Carter: *"The Squalors" lives up to its name. It's a horrendous, shitty, crappy - fairly typical cave. It's never given up its secrets.*

The slot unearthed through Toby's near miss widened to a 2m-deep pot; on its lower right side, a slot into which a trickle of water flowed. On 13th January 1996, after several further trips, a breakthrough was made.

Rhys Williams: *It was a narrow rift passage taking a little stream away from us, it was clearly a good lead to follow, it was quite draughty. On one occasion it got to the point where I thought I can probably squeeze through there, I shuffled into it, and it was pretty tight. I had my helmet and my belt off to enable me to get through. It widened out and got into walking passage, so I shouted back that I'd got through. I carried along at roof level, clambered down and got to a point where I was laying flat-out. I pushed this stone forward in front of me and it dropped off an edge. You could hear this echoing noise, rocking going down into the distance.*

Tantalisingly close, the drop was just beyond reach. Chemically persuaded, the restriction is enlarged to a flat-out squeeze. The drop, a shaft of ten clean metres of brand-new darkness. Beyond, a 2m climb, a sandy floored rift, and a major discovery. A significant length of mature fossil passage, immediately reminiscent of anywhere in OFD2, it was an immense find; it also brought a novel aspect to the cave; finally, somewhere we could actually stand upright.

Toby: *Rhys pushed the awkward stuff at the top, we dropped down and got into the "Road To Nowhere" and thought this is it, we've broken through. It was a quite dramatic passage compared to what we'd spent the last few years stuck in.*

Pete Francis: *I was really buzzing then; we were into nice big passage, it was obviously on the fault but heading North, the wrong way. I was excited but aware it was going the wrong way. My big feeling was that we were out of the shitty entrance series and into better beds.*

It now seemed that Clive Jones's resistivity readings were correct all along.

Paul 'DT' Thornton: *We had hit exciting times; it did feel like, every time we went up there, we went a bit further or found a bit more, we'd leave with renewed hope.*

Rhys Williams: *The road to nowhere is the finest passage in the whole cave really, a really nice big canyon passage; really tall, quite pretty, a really beautiful piece of passage.*

Paul 'DT' Thornton: *Being small, I was on the far side of a boulder choke, Tony Donovan was still in it as it moved. His light cable was cut so he was in darkness, but being a strong man; he's a powerhouse, he could wrestle with this boulder choke and cope with the weight, so I got to him and was out. It was one of those exciting things.*

Despite exhaustive efforts pushing this passage's numerous leads, all went nowhere. "The Road To Nowhere" was just that.

Martin 'Lump' Groves: *It's one of those deceptive things isn't it, you think it's gonna go on all the way, but then it doesn't.*

Attention now focused at the bottom of a large boulder choke. Weeks of 'worrying' work, and a perilous upslope void through large boulders is dug. A hole in the left wall is revealed, leading from it, a sandy passage, and soon a left turn, and a plunging slope to a sizeable rift. At floor level on the left-hand wall, a low muddy arch packed with boulders, pinched at its furthest point but with black space beyond; my bang licence was put to good use. A team of just two, me and Stevie; three holes drilled and charged, a retreat to the top of the upslope choke. BOOM! the pressure wave, the noise, the echo, it was incredible. Exploder now packed away, it was time to go, but all wasn't good. The black space we'd blasted our way into was in fact the way in, soon to be our way out. And there was more, the black space, our target, was the heart of the boulder choke itself; this then, a qualified concern. With lungs inflated like never before, into the choke, two head-first, high-speed manic chest slides down through a dense toxic airborne soup... Echoing Paul DT's earlier sentiment, "It was one of those exciting things…"

Two weeks later the same air is clear. Back to the sandy rift beyond the blast site, and the excavation of a challenging, 3m-deep sand shaft down through the floor into more new darkness. Fifty pitch-black metres of it; low, sharp and wet, straws and calcite adorn the ceiling, but a blockage. Halfway along, a truly awful thixotropic swamp; bailing revealed a low arch and a tight letterbox squeeze at floor level. After months of bailing slurry, the letterbox was passed. Standing up, I drained the floor from within my sleeves. Then fortune once again crossed my path: Rhys was back on the scene.

Rhys Williams: *Ian had been digging down there quite a bit over the years since I'd stopped, so I joined him on a trip. We dug a collapse out, got to a little place where you could see black space beyond. It was only ten minutes digging or something; we slithered up this inclined crawl, it opened into a chamber, a 10m aven going up. It just goes to show that this place is a honeycomb, that every little corner or alcove can have passage in or beyond it…*

In At The Deep End

By 2005, time and exhaustion, mental and physical, had taken its toll, so with despondence all-round, the dig was quietly mothballed. Six years later, December 2011, a small but rejuvenated team is back. A dedicated assault on the lower sumps begins:

Martin 'Lump' Groves: *I reckon I've done a dozen dives in the sump; me and Rhys midweek, we were digging in the tubes, we broke through into fresh air; I can still picture that night, it was the first bit of cave I ever found.*

Jules Carter: *Martin was digging out the sump, and I just thought, where is this all going? Martin was pushing the sumps; he was a diver worth supporting. I enjoyed his ingenuity, he used worn-out disk brakes from cars. He'd worked out that because of the sediment on the floor, these would make great anchor points for the dive-line by being sucked into the mud. They had the weight and the surface area; they were ideal to attach a rope too. They were miserable trips, but they were a laugh. It's how Martin works, "here's the problem, how do I solve it?"*

Martin 'Lump' Groves: *Me, Jules and Krysia were down there quite a lot, filling sandbags with gravel and shit and bringing them out, we pulled a hell of a lot out of that sump. I had some really dodgy diving kit. We decided to take a cylinder down; it must have been in the summer the water level was really low, and the first sump had dried up. We could crawl through into what was usually an air bell, the water levels were down by a metre to a metre and a half. I then tried to squeeze myself into a hole, but the water started building up; Ian had a sense of humour failure.*

Rhys Williams: *The tube carried on; me and Lump eventually broke through, but the air was getting bad, it was pretty horrendous. We popped through into another chamber with another sump; it was the two of us for much of the time; the conditions were pretty poor down there because it was obviously very close to the sump level. These were pretty wet, muddy, grim digging conditions, lying there in a wetsuit, dragging buckets of sandy liquid mud back. On one occasion the air cleared as we pushed a hole through, I thought "Good, we're off again." I pushed a load of mud forwards; you could hear it rolling down a bank the other side; we did break through. It went to a small chamber with an upstream and a downstream. But it didn't go.*

Ultimately, the sumps were to beat Lump and his crew. Once more, the cave had succeeded in keeping its secrets intact. Every single one of this dig's breakthroughs was hard-won; over two decades we'd hammered, rolled, blasted and wallowed our way down into the mountain. Defeat was a hard pill to swallow, yet we were beaten. Individual exploits and achievements re-lived through this article, itself a short ten-minute read, in reality took weeks, months or even years to complete. This text is the verbal testimony of the project's major players; I should acknowledge that many others would dig alongside us from time to time but do not appear in this article. My apologies to those who did but are not represented.

The Llwchwr system, one of the UK's largest caves, a vast unclaimed prize. Sink to resurgence, 4.6 miles - more than double that of OFD, a vertical range of 1000ft - the largest of any cave system in the UK; the rewards for whoever does eventually find it will be massive. Although not the dig site's discoverer, without my own perseverance for the first three years of its life, the cave as it is now would probably not exist. That said, and despite being the dig's chief motivator over its two decades of development, it is, in its current form, testimony to a massive, dedicated team-effort. This is clear and evident in the quotes of those who I interviewed for this article.

In terms of human and physical resources committed to the site, Gwynt yr Eira is probably the most prolific digging project in the SWCC's history. In total number of digging hours, miles driven to and from the dig, smiles created, and hopes dashed, it reigns supreme. I undertook more than two hundred visits to the dig, and from them, came many of the most exciting, memorable experiences of my life. A cave in its own right, the 80m of depth and 700m of surveyed passage are a telling legacy of a mammoth Club effort.

Gwynt yr Eira will forever remain an epic SWCC undertaking. It, and similarly ambitious rival Club digging projects above Dan-yr-Ogof stand as running testament to the fantastic, healthy SWCC digging scene of the 1990's. I'm far from alone in thinking cave exploration is amongst the most exciting thing imaginable. Today, 2020, and some twenty-five years after the events described in this article, it is essentially those same diggers keeping this significant Club activity alive. The SWCC is surrounded by hills containing partial or completely undiscovered major cave systems. How much juicier does dig-bait need to be? Who will replace the venerable and now 'not so young' SWCC diggers when they are finally too old to bend? Where has the SWCC's sense of exploration vanished too? With past discoveries of international significance made by the SWCC in the very valley on which its headquarters sits, the complete demise of local digging exploration would be a tragic loss to the Club. It should concern us all.

And A Few Final Thoughts…

Alan Braybrook: *My ongoing memory of the place is "will I ever be clean again?" I want to go back and have a look to see if anything has changed over the years. It always felt like the key to the mountain, I couldn't see a better doorway in.*

Martin 'Lump' Groves: *What got me so interested in digging was the write-up on the Road to Nowhere. I think you've got to follow the water, there's some big old fragments of cave, but my view is that you need to get through that sump.*

Pat Hall: *The breakthroughs that we made weren't always in the obvious places, they were always hard-won. It suggests there could be further hard-won breakthroughs to be had. The water was all disappearing away somewhere, we know what direction it's heading in, we know its limestone all the way, it's in the right place to have potential, but it was such a struggle to make the gains that we did. I think more work and attention similar to what we gave it in the 90's would yield more.*

Pete Francis: *Every time we had a little breakthrough, it could have been the big breakthrough. If you think of Draenen and things since, we could have had another Draenen, it's there somewhere.*

Jules Carter: *It's typical isn't it, cos you look at the time and effort that's gone into that cave and the number of times it's kind of said to us whoa, that's got to be it, that's got to be into the master cave, only for it to shit out in some sort of way. It's an intimidating place, it's one of the key sites that we know of in the Western Beacons.*

Rhys Williams: *I've done sixty-five trips down Gwynt yr Eira since the mid-90's, and it just draws me back time and again. All the niggling doubts of leads and things which nobody else is looking at, no-one else is there, no-one else is looking at it. It's sitting there waiting, it just needs a concerted effort. That cave probably is the key for getting into the Llagad Lwchwr system, we just haven't found the way on yet.*

Iain Miller: *I still think the area above the sump has potential, whether it's a feasible amount of work is debatable. It has potential, geologically it's going to be challenging. It doesn't mean there isn't a way through it, it means it's going to be challenging. It does have places that haven't been looked at seriously enough.*

Paul 'DT' Thornton: *I reckon I made twenty-five trips over two years to the dig, it was kind of oppressive but inspiring at the same time. We had hit exciting times; it did feel like, every time we went up there, we went a bit further or found a bit more; we'd leave with renewed hope.*

Toby: *Coming out of the cave wet, totally wet, slogging up on to the road there; it's only a couple of metres, but it's snowing, and it's blowing a gale, or it's absolutely chucking it down, and trying to get out of your wet suit or caving suit and sitting in a car to warm up. I will always remember this.*

From my perspective, *it's unlikely to be usurped as the greatest demonstration of teamwork I'll experience in my life. The essential levels of trust and understanding established between the team members over the years spent at this site exceeds anything a conventional human-friendship could ever extend too. Gwynt yr Eira none the less remains a deep and personal frustration; how close are we actually from accessing the master system? It's down there, it's there, it's somewhere, but we've somehow missed it."*

Cast in Order of Appearance

Pete Francis

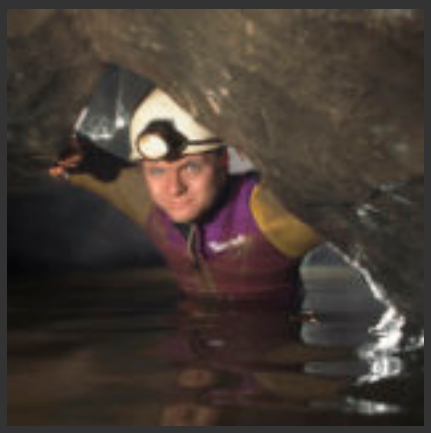
Toby Dryden

Steve West

John Harvey

Sam Moore

Paul Quill

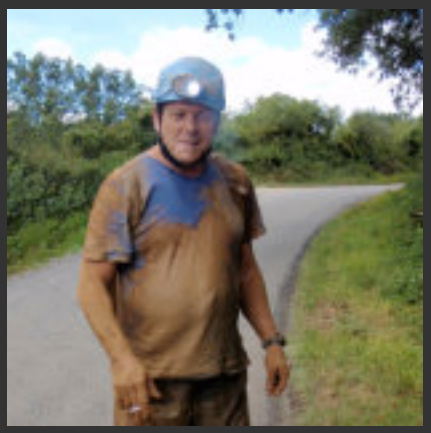


Pat Hall

Rhys Williams

Al Braybrook

Jules Carter



Iain Miller

Paul 'DT' Thornton

Martin 'Lump' Groves

The Author: Ian Alderman

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On Mynydd Du

Amidst twilight's gloom I stand, December day dying around me. Thin strands of mist scud across the whale-backed ridge of Carreg Las to my right, whilst on my left the bulky outline of Moel Gornach lies silhouetted against a deepening sky. Stillness and silence cloak all, broken only by a chill north wind.

This is the heart of Mynydd Du, the Black Mountain. Alone, no other living thing within sight, I feel at peace here, content, as one with the vast space surrounding me. This is where I want to be, where I choose to spend my time.

My ears now cold, I take off my helmet, remove the balaclava from within and pull it on over my head. Breathing in deeply, the cold air loosens the dust caked inside my nostrils. The smell of the cave remains, even here on the surface. Oversuit covered in mud, feeling clammy with drying sweat, it's time to get a move on. Temperature falling, darkness approaching, and still a two mile walk back to the road. The charge must be fired, the day's endeavours ended on a high a note.

Gloves removed, numb fingers fumble to insert the ends of the wire into the exploder‘s terminals. Flick back the switch and begin the long wait. Count the seconds into years, time dilated by contrasting feelings of expectation and trepidation. Always the chance of a misfire, of nothing happening, of having to go back to find out why. Although maybe, in a strange sort of way, the waiting is the best bit. Heart pounding, release of the switch is followed by the reverberation of a deep ‘Boom’ somewhere beneath me. Fist clenched, murmuring, “Yes", through clenched teeth, pervading satisfaction begins to take over. It still does it, still gives me a buzz, even after all this time. Perhaps the day to stop will be when it finally ceases to do so.

Nig Rogers

Afterword

So there you have it. The End. Y Diwedd.

In my Foreword I was determined to be positive, and I hope that I succeeded in so being. Here, I am finally taking the opportunity to mention some of the less positive sentiments that this project has aroused.

My voyage through developing this publication has not been without some negative emotions. Foremost of these has been the fact that some members have been extraordinarily active in digging, diving and exploratory caving in general but have published little or nothing. That is a great shame because it makes it hard for the next generation to build on their achievements. I have been particularly frustrated by the difficulties I have experienced obtaining reliable data on water tracing tests. Scientific work of this sort deserves to be widely and accurately reported. Related to this is the fact that some members have chosen to publish material in national or regional publications without making something available for publication in the SWCC Newsletter. I believe that as a member of SWCC you have a duty to publish in your own Club's publications.

In a way, what has been more worrying has been the hint in the background of some self-censorship or social censorship operating. Several members have declined to contribute material I sought from them because of the prevailing atmosphere on social media platforms. In effect, they were fearful of a backlash. That is an appalling state of affairs for the caving world to find itself in and stands in stark contrast to the wonderful spirit of cooperation I delighted in reporting in my Foreword.

To a degree, I regret that the scope of this section on digging has not extended from West Wales through Gower and onward, east of the A470, taking in the South Crop along the way. SWCC members have been active right across southern Wales and their stories, and the history, geography, geology, and hydrology of these areas is quite as deserving of attention as the part of our region I have covered.

I am similarly conscious that members are active beyond Wales, be it in Mendip, the Forest, or Cantabria. I am sorry my scope could not extend that far.

Related to my comments about publishing is the absence of a Club logbook. The lack of a logbook seems indicative of the extent to which the HQ has become a base for social and sporting caving rather than a base that facilitates exploration. People ARE digging, climbing, diving, rooting about and prospecting, but there is no record of this, in our faces, when we visit the HQ. At one time, a 'quick butchers' at the logbook to see what had been happening was the first thing one did after signing in on arrival. We have lost that engagement with exploratory work. We are selling ourselves and our successors short by not recording what we do. I have referred to logbook extracts of fifty years ago in this publication. Will the editor of our 100th Anniversary Publication be able to refer to the Facebook posts and blogs describing the activities of 2021? I fear not.

I fervently hope that this document will be seen as an effective 'call to arms', for that is what is needed! As I worked on compiling this material it became painfully clear that clubs smaller than ours have been doing more digging than the SWCC has. Loose associations of local cavers have been finding more cave than SWCC has. Frankly, we as a club have been resting on our laurels for a decade and more.

Finally, I am conscious of my own limitations. First and foremost, has been my lack of subject knowledge. I have found myself straying into areas, both historical and geographical, that were unfamiliar. I hope that has not been too evident and I have winged it successfully! I also regret that I do not possess the skills to produce polished graphics using modern technology but have resorted to tracing paper and pen and ink at times. And I am equally conscious of my limitations as a writer, not least my tendency to a somewhat ponderous style. I apologise and commend your patience!

Bob Hall, *February 2021*

Digs, Digging & Diggers

Part Two

Edited and Compiled by Tony Baker

The Search for the Missing Miles - 75 Years of digging on the Dan-yr-Ogof catchment

"It's all there. Waiting. In the dark. We haven't found it yet. No-one has. Perhaps they never will. But we know it's there. We weren't always sure. But now we know. Make no mistake, it IS there. Somewhere. Somewhere under the Black Mountain." That was the introduction to an article called *Somewhere Under the Black Mountain* that the late Nig Rogers wrote for the SWCC's 50th Anniversary Publication, Newsletter NL118, back in 1996. Twenty-five years on, Nig is sadly no longer with us, and no-one has yet found the cave system that he was referring to in that introduction. But it IS there, and we're still looking…

SWCC has, right on its doorstep, one of the catchments in the UK with the best potential to find significant amounts of cave. But despite numerous intensive efforts over our 75-year history, the missing miles of cave passage that must exist between the various sinks high on the Black Mountain and the resurgence cave at Dan-yr-Ogof remain elusive.

The last comprehensive review of Black Mountain digging projects was in SWCC Newsletter NL106 in 1990. Clearly, a lot has happened since then, and while younger members can peruse back issues of the Newsletter online or in the library, I thought that the 75th anniversary of SWCC was an appropriate time to provide both an historical overview and an up-to-date reference for the benefit of future diggers.

◀ *Tony Baker at Ogof Giedd dig, August 2018 (©Tim Lewingdon)*

1. A Personal Perspective

My first visit to SWCC was in 1982, when I was a student in Gloucester. My caving experience up to that point had been largely confined to Mendip, but membership of Gloucester SS had seen me take part in Wednesday-evening trips to the Forest of Dean and I'd also been to the further reaches of Otter Hole. Trips into OFD and DYO opened my eyes to a whole new and exciting world of caving. After leaving college in 1983 I stayed in touch with GSS friends, and Paul Taylor and I became regular visitors to Penwyllt. Before long I was a full member of SWCC and I took advantage of the access to caves that this conferred – back then, all full members of the Club had access rights to DYO as well as Top Entrance and Cwm Dwr. In the company of Malcolm Herbert and others, I learned my way around the trade routes of OFD and it didn't take long before we found our way to the Far North in DYO. The trip to the further reaches of DYO remains one of my favourites anywhere in the world.

One Saturday in the mid-eighties, then-SWCC Secretary Nick Geh recruited Malcolm and I to help with a dig site that he and others had been working on near Corbel's Chamber, in DYO's 1937 Series. After some work to clear spoil from the previous weekend's efforts, the three of us were the first to enter a short and rather uninspiring section of 'virgin' passage that ended with sand fill. But this was a revelation to me – here, relatively close to the showcave and only just off the familiar route through the cave, was cave passage in which no-one had ever set foot, and it had taken only a modest effort to get into it. My knowledge of the geology and hydrology of the DYO system was still limited, but my eyes had been opened to the possibilities.

By 1988 I was on the SWCC committee, and Bob Hall proposed the idea of a one-day conference to discuss the potential for new cave in the DYO catchment; I volunteered to assist with this. The event was held in the Copper Beech on the 8th of April 1989 and is written up in a special edition of the SWCC Newsletter, NL106. Among a number of outcomes from the day's meeting was the setting up, at Clive Jones's suggestion, of the Greensites project, which was intended to look at 'alternative' means of locating caves, using biological indicators, dowsing, infra-red aerial photography or new technology. The Club's resistivity equipment was designed and constructed off the back of the conference. The Greensites initiative was also the subject of an edition of the Newsletter, NL108, and there is more in NL109. Aside from Clive's input, Bob had lined up speakers with knowledge of the possibilities for finding cave both from within DYO and on the surface. Martyn Farr spoke about the diving that had been done in Mazeways, Nig Rogers talked about the prospects in DYO2, and Bob recounted the efforts made by himself and others over the years at Sinc-y-Giedd. But more than one speaker mentioned the potential of the sink at Twyn Tal-Draenen and the very next day Malcolm and I, with others of the SWCC 'regulars', started digging at the sink, continuing efforts made by others in previous times. Our initial efforts were sporadic and tended to take place only on sunny summer days, largely because just getting to the site involves a walk of around ninety minutes from the DYO car park. But since that start I have walked up onto the Black Mountain many hundreds of times, most usually in pursuit of some digging project or other. By far the majority of those trips up the hill have been in the company of my fellow Black-Mountain-digging obsessive Martin Hoff, and Tal-Draenen was for many years our joint passion. Looking for the missing miles of cave has been the main focus of my caving activities for more than thirty years, and I'm still looking.

The author on a digging trip in Ogof Twyn Tal-Draenen (©Martin Hoff)

Ben Stevens shows the joys of carrying scaffolding on to the Black Mountain (©Martin Hoff)

The author and Ben Stevens on one of many walks up to digging projects (©Martin Hoff)

This pool, next to the track and close to the Afon Giedd, serves as a swimming pool on hot sunny days, as here in August 2020 (©Carlo Ryan)

Spring

Summer

The Afon Giedd through the seasons (©Martin Hoff)

Autumn

Winter

Aerial view of Sinc-y-Giedd in dry conditions (©Andy Freem)

2. The Hydrology

Understanding the hydrology involved here is relatively straightforward. The water that emerges from the river entrance at DYO goes underground across a series of sinks on the mountain above the cave. The most significant of these is Sinc-y-Giedd, some three miles' walk from the car park at DYO, where the Afon Giedd disappears, but numerous other sites have been dye-tested to DYO (see table p177) and all of them have been dug by cavers, to some extent. The sinks at Carreg Lem, Twyn Tal-Draenen, Rusty Horseshoe, Roaring Hole, Waun Fignen Felen and elsewhere have all seen determined efforts from SWCC members and others, over many years. It's important, though, to appreciate that there are two distinct routes taken by water that sinks across the mountain above DYO. Water from Waun Fignen Felen, and other sites in the vicinity, has been dye-tested to the Great North Road. But the water that goes underground at Sinc-y-Giedd, Twyn Tal-Draenen, Rusty Horseshoe dig, and other sites further west than Waun Fignen Felen, first appears in DYO in the Mazeways area (accessible only by cave divers), and then reappears at The Washing Machine. So 'the big prize' awaiting a fortunate digger is the so-called 'Giedd Series', with many miles of cave waiting to be found between Sinc-y-Giedd and Mazeways. Meanwhile, while a breakthrough at Waun Fignen Felen would no doubt be an exciting prospect, the distance between there and the known cave at the Far North is much smaller. Closer to DYO is Pwll Dwfn; the sump at the bottom of pitch 5 has also been dye-tested to DYO.

For those with an interest in dowsing: in SWCC Newsletter NL109 John Wilcock describes dowsing a track from the sinks beyond Sinc-y-Giedd (Wilcock, 1991) that suggests the water from SYG travels a long way south-west before turning east under Cribarth and entering the DYO system from a southerly direction.

Reference

Wilcock, John (1991) "*Dowsing Dan-yr-Ogof and Pant Mawr*", *SWCC Newsletter* 109, pp.10-11.

Fluorescein dye being mixed and added to the pipework system in Ogof Giedd, 5th Jan 2020

Fluorescein dye being put into Ogof Giedd (©Martin Hoff)

Jem Rowland placing a charcoal detector at the Dan-yr-Ogof resurgence (©Martin Hoff)

Charcoal detector, in protective sleeve, going into the river at the Dan-yr-Ogof resurgence (©Martin Hoff)

Jules Carter at Sinc-y-Giedd in flood, 16th August 2019. This volume of water just disappears underground with very little backing-up; there must be something massive under there! (©Tony Baker)

A summary of water-tracing in the Dan-yr-Ogof catchment. Compiled by Jem Rowland

Date	Who	Tracer	Quantity	Where Inserted	Conditions	Result	Timing	Ref.	Comments
21 March 1948	Peter Harvey	Fluorescein	~1 Kg	Sinc y Giedd (SN 81040 17920)	A lot of water flowing in.	Visual at DYO	52 hours	[1,2, 3,4]	36oz. (~1Kg) Appeared at DYO about midday on Tues 23rd. (reported as 52 hours) and flowed for about 15 hours. Flowed for about 15 hours.
Pre 1963	Dai Hunt	Fluorescein	?	Waun Fignen Felen main sink (SN 82565 17667)	Very wet	Visual at DYO	8 hours	[3]	
1968	Alan Coase	Fluorescein	?	Waun Fignen Felen main sink (SN 82565 17667)	Moderate flood	Visual in DYO	24.5 hours to resurgence	[5,6, 7]	Visual in DYO: in Great North Road (GNR), Lake 1 and resurgence; 8.5 hours to top of GNR, 11 hours halfway down GNR, 24 hours Lake 1 Ref [6] wrongly states on page 263 that the dye was introduced into Sinc y Giedd. Page 307 correctly states that it was put into Waun Fignen Felen sink, as confirmed in ref [7], along with a detailed discussion of throughput rates.
1968	Alan Coase	Fluorescein	?	Sinc y Giedd (SN 81040 17920)	Heavy Flood	Visual in DYO	36 hours	[7]	
12 April 1968	Christopher & Bray	Fluorescein	100g	Pwll y Wydden (SN 83013 15763)	?	Visual at DYO	< 5 days?	[8]	Visual at DYO on 17th. Detectors at DYO Washing Machine and Highway Rising positive on 20th. Visible all day. May not be the result of this test. Bad methodology. Conflict between Pwll y Wydden and Pwll Dwfn tests – both used fluorescein at overlapping times.
12 April 1968	Christopher & Bray	Acid Scarlet	250g	Dan yr Ogof Highway Rising	?	Negative		[8]	

Date	Who	Tracer	Quantity	Where Inserted	Conditions	Result	Timing	Ref.	Comments
15 April 1968	Christopher & Bray	Fluorescein	350g	Pwll Dwfn (SN 83322 16491)	?	Visual in DYO2	2 days?	[8]	Visual at DYO on 17th Detectors at DYO Washing Machine and Highway Rising positive on 20th. Visible all day. May not be the result of this test. Bad methodology. Conflict between Pwll y Wydden and Pwll Dwfn tests – both used Fluorescein at overlapping times.
16 April 1968	Christopher & Bray	Rhodamine B	350g	Waun Fignen Felen main sink (SN 82565 17667)	?	In DYO	< 4 days	[8]	Detectors at Washing Machine and Highway Rising
16 August 1968	Christopher & Bray	Fluorescein	500g	Minor sink near WFF	?	In DYO	2 days?	[9]	Dye seen in Dali's Delight in DYO on 18th Aug and in Tawe at Pen y Cae and Abercrave on 19 August. All detectors in the cave and the resurgence were negative! Strange! Problem with detectors?
Sept 1969	?	?	?	Sinc y Giedd (SN 81040 17920)	?	?		[10]	"Unsuccessful"
Sept 1969	?	?	?	Pwll Dwfn (SN 83322 16491)	?	?		[10]	"Unsuccessful"
May 1970	?	?	?	Waun Fignen Felen main sink (SN 82565 17667)	?	DYO	?	[10]	Proved connection to LH series in Dan yr Ogof Far North
May 1970	?	?	?	Sinc y Giedd (SN 81040 17920)	?	DYO	?	[10]	Proved connection to DYO
March 1970	Paddy O'Reilly	Fluorescein	1.4 Kg	Sinc y Giedd (SN 81040 17920)	(typically) Damp	DYO	~35 hours	[4]	Tawe from Dan yr Ogof to Abercrave bright green 3 lb. Easter

Date	Who	Tracer	Quantity	Where Inserted	Conditions	Result	Timing	Ref.	Comments
April 1970	Paddy O'Reilly	Fluorescein	1.4 Kg	Waun Fignen Felen main sink (SN 82565 17667)	?	DYO	24 hours to resurgence	[4]	3 lb. Weekend after Easter Showed connection to LH series in DYO Far North Compare with Dai Hunt's 8 hours!
14 August 1982	Bill Gascoine	Magenta Lycopodium Spores	1 Kg	Ogof Twyn Tal Draenen (SN 80756 19116)	?	DYO	< 48 hours	[11, 12,13]	Large number of spores recovered, at Dan yr Ogof resurgence.
14 August 1982	Bill Gascoine	Methylene-blue Lycopodium Spores	1 Kg	Ogof Carreg Lem (SN 80584 18059)	After heavy showers and thunder	DYO	< 48 hours	[11, 12,13]	One spore recovered at Dan yr Ogof resurgence. Problem with torn net.
14 August 1982	Bill Gascoine	Malachite-green Lycopodium Spores	1 Kg	Lost Valley Sink (SN 826 156)	After heavy showers and thunder	DYO	< 48 hours	[11, 12,13]	Spores recovered at Dan yr Ogof resurgence.
14 August 1982	Bill Gascoine	Safranine-orange Lycopodium Spores	1 Kg	Ogof Diwedd yr Enfys (SN 79741 19233)	After heavy showers and thunder	?		[11, 12,13]	No spores recovered at either Ffrwd Las (SN 7739 1638) or DYO.
14 August 1982	Bill Gascoine	Bismarck-brown Lycopodium Spores	1 Kg	Banwen Gwys Sink (SN 79831 18254)	After heavy showers and thunder	?		[11, 12,13]	No spores recovered at either Ffrwd Las (SN 7739 1638) or DYO.
22 August 1982	Bill Gascoine	Magenta Lycopodium Spores	750g	Ogof Diwedd yr Enfys (SN 79741 19233)	Flood conditions	?		[11, 12,13]	No spores recovered at DYO. Ffrwd Las not monitored.
July 1991	Gareth Jones	Fluorescein	250g	Roaring Hole (SN 82141 17968) near WFF	?	DYO	< 72 hours	[14]	Detector at DYO Washing Machine 'probably' positive. Detector at the Rising negative. Dubious result because of 'peat staining'.

You will notice from the table that all the tests using fluorescein that have produced a definite positive result have relied on using a large quantity of the dye and observing a strong green colour at the resurgence (and for some distance down the valley). Nowadays this approach is not acceptable from an environmental point of view. Consequently, much smaller quantities of the dye have to be used and so visual detection at the resurgence is not possible and detection has to be done by using activated charcoal detectors from which the accumulated dye is subsequently extracted chemically. In many situations this approach works well, needing only an ultra-violet torch to detect the fluorescence from the low concentration of fluorescein in the extracted liquid. Unfortunately, our recent tests, from the Giedd to Dan-yr-Ogof, and related control tests, have shown that there is a contaminant in the water entering Dan-yr-Ogof from both the Giedd and Waun Fignen Felen that is absorbed by the charcoal detectors and, when extracted, fluoresces green with a UV torch, just as fluorescein does. It is assumed that the source of this contaminant is the peat. We conclude that successful use of fluorescein for water tracing on the Black Mountain is likely to require access to a laboratory with a suitable high resolution fluorescence spectrometer so as to be able to distinguish between the green fluorescence produced by the contaminant and that produced by fluorescein.

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3. The Dan-yr-Ogof Catchment - Why Geology Matters

Andy Freem

You would think geology is the one of the least complex sciences – after all, rocks are simple, right?

The Carboniferous limestones central to our interests on the east and west of the Tawe valley were not created from one simple homogeneous lime-mud sedimentary material. Variations led to '**facies**' each with subtly different chemical and granular make-up (**lithology**). Some are more and some less favourable for responding to cave creation (**dissolution**) processes.

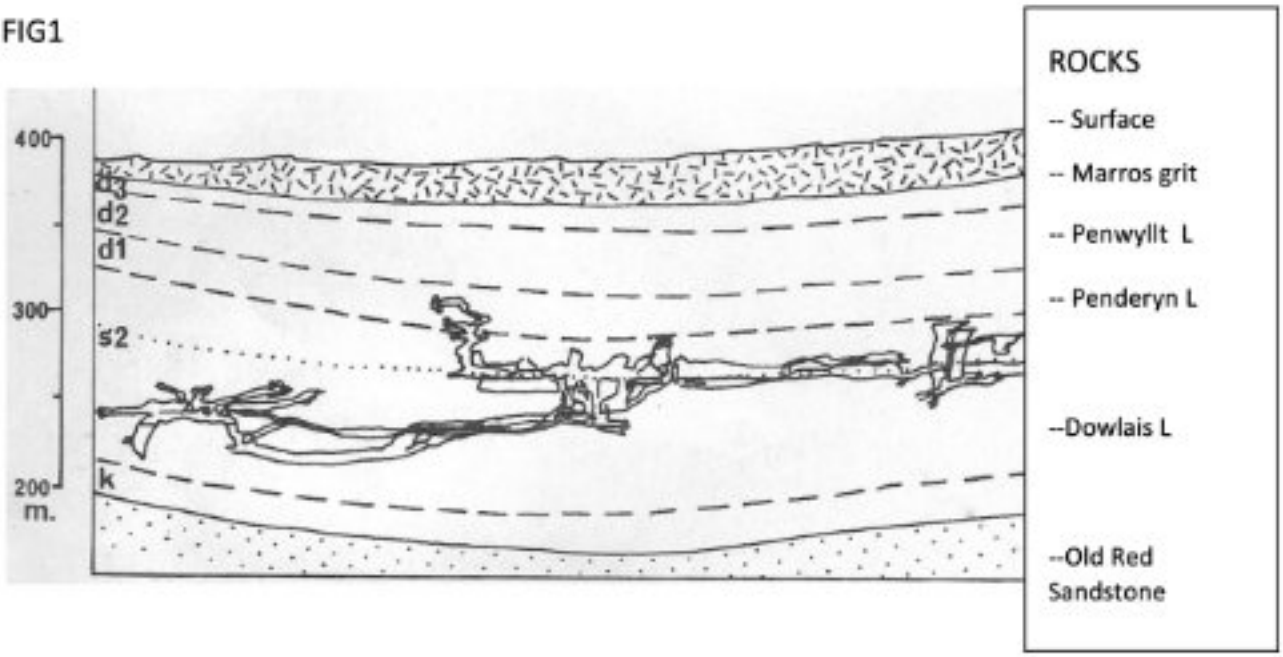
For us cavers and cave discoverers, this is critical in our understanding of where to look. We need to identify for those '**inception** layers' that have proven to be the focus of cave development.

A second aspect of fundamental importance is **structural geology**. This is the configuration of the rock layers, rather than what they are made of. **Faults**, **dip**, **folding** and **joints** are really critical in influencing where water percolates downwards and then concentrates as piped (**conduit**) groundwater, moving in any direction to the point at which it can **resurge** onto the land's surface.

Alan Coase wrote his PhD thesis on Dan-yr-Ogof in the 1970s and used the-then current terms for the important limestone facies that have encouraged, contained and constrained the cave. Locally they still serve us cavers well.

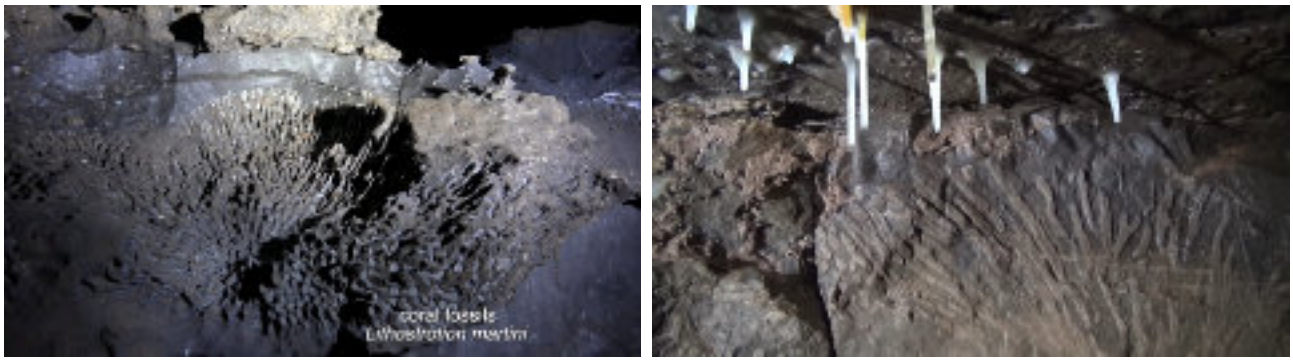
Coase identified that the limestone that favoured cave development in DYO is the S2 beds – also locally known as the Dowlais Limestone. The massive jointing and the dark bituminous, acid creating, sulphurous content make dissolution processes very efficient; 99% of DYO and OFD passages are found in this.

FIG1



Section through DYO2 from A Coase's survey, showing passages almost entirely in the S2 (Dowlais). The cave is isolated from the surface by the Marros grit and less cave-favouring limestones d1/2/3.

Coral Fossil close-up in Dan-yr-Ogof (©Jem Rowland)



Coral Fossils in Dan-yr-Ogof (©Andy Freem)

The base of the S2 contains a remarkable Lithostrotion coral fossil bed. The DYO passages follow these beds right down from the Far North Choke, at the current far end of the cave, to the floor of the resurgence cave under the showcave entrance 3km away.

It stands to reason that we would expect 50km, possibly, of unexplored parts of the cave (predicted on the basis of 10km of passage for every 1km of surface distance) to follow the Dowlais Limestone S2 beds also.

This is where structure has dealt us some cruel cards. Complex faulting in the Variscan mountain building period, (centred during late Carboniferous and early Permian 300-290 m.y. ago), fractured the Dowlais to the south west of DYO2, setting the scene for the creation of huge, horrendous chokes when the cave developed through them over the last few hundred thousand years. Some of these chokes probably go right up to the glacially eroded, glacial debris-plastered surface. If underground access to this area of the cave was easy, these chokes would have been subjected to Mendip-style assaults, but flood-affected lakes, the Long Crawl and some near-death digging experiences have got in the way.

So, what about access from the surface straight down? Well, the cards have been unkind again. Above the S2 and its marker bed, the Honeycomb sandstone, are the Penderyn Oolite and Penwyllt limestones and these are dissolution friendly, with less bituminous sulphur, tighter jointing and less superficial shale bands to acidify the water. So, although the water gets through, cave development is inconstant, unstable and hell to dig through. Even worse is a well-jointed capping of Marros grit and rottenstone deposits over much of the expected route of the hypothesised 'Giedd Series'. The former is near impossible to drill, and, where the limestone below has subsided, the grit blocks have fractured like huge sugar cubes and slid down into the shakeholes. This superstitial subsidence karst is great for fox lairs but near hopeless for cave exploration.

So, the final option is to try at the various sinks that do combine underground to create the tremendous river that emerges from structural chaos in DYO2 and Mazeways.

These are remote places where investigation consumes time and energy and money. Sinc-y-Giedd does drop down through S2 beds (I believe), but regular mega-flooding events wash tons of bedload down into the constricted passages, reversing all clearance attempts.

Other digs near Sinc-y-Giedd have found the Honeycomb marker that is the top of the S2 beds, but a rapid but complicated descent through the S2 to the lower beds can be expected. But to crown it all the geological cards have been rigged again. The surface Giedd river flows into a zone of north-south oriented sub-parallel faults, much loved by water movement but frequently geologically chaotic and less structurally sound.

So, all diggers who venture here deserve respect for their intentions and sacrifices. It will be a great day when a way in is found, but a long walk back home after what could be the exploration into the largest British cave discovery of the 21st century.

4. Sinc-y-Giedd

SN 81020 17850. Alt 435m Length 183m

If you have never seen Sinc-y-Giedd in flood, I can recommend a walk up there when the conditions are right. Several consecutive days of heavy rain are not uncommon in south Wales, even in summer (the two occasions on which I have witnessed SYG at its most impressive have been during the month of August), and to see the full flow of the Giedd in spate quite literally disappear underground is a sight worth seeing for any would-be digger. Sinc-y-Giedd was, inevitably, the Black Mountain site that first attracted the attentions of cavers. Peter Harvey wrote that: "*Bill Weaver told me that he had examined this swallet before the war [WWII] and had managed to get underground where the water sank and reached quite a large chamber. As he was alone he had not prospected any further.*" (Rowland (ed), 2009.) Peter then comments, cynically: "*For all his knowledge of the area, I always regarded Bill as [a] great story teller.*"

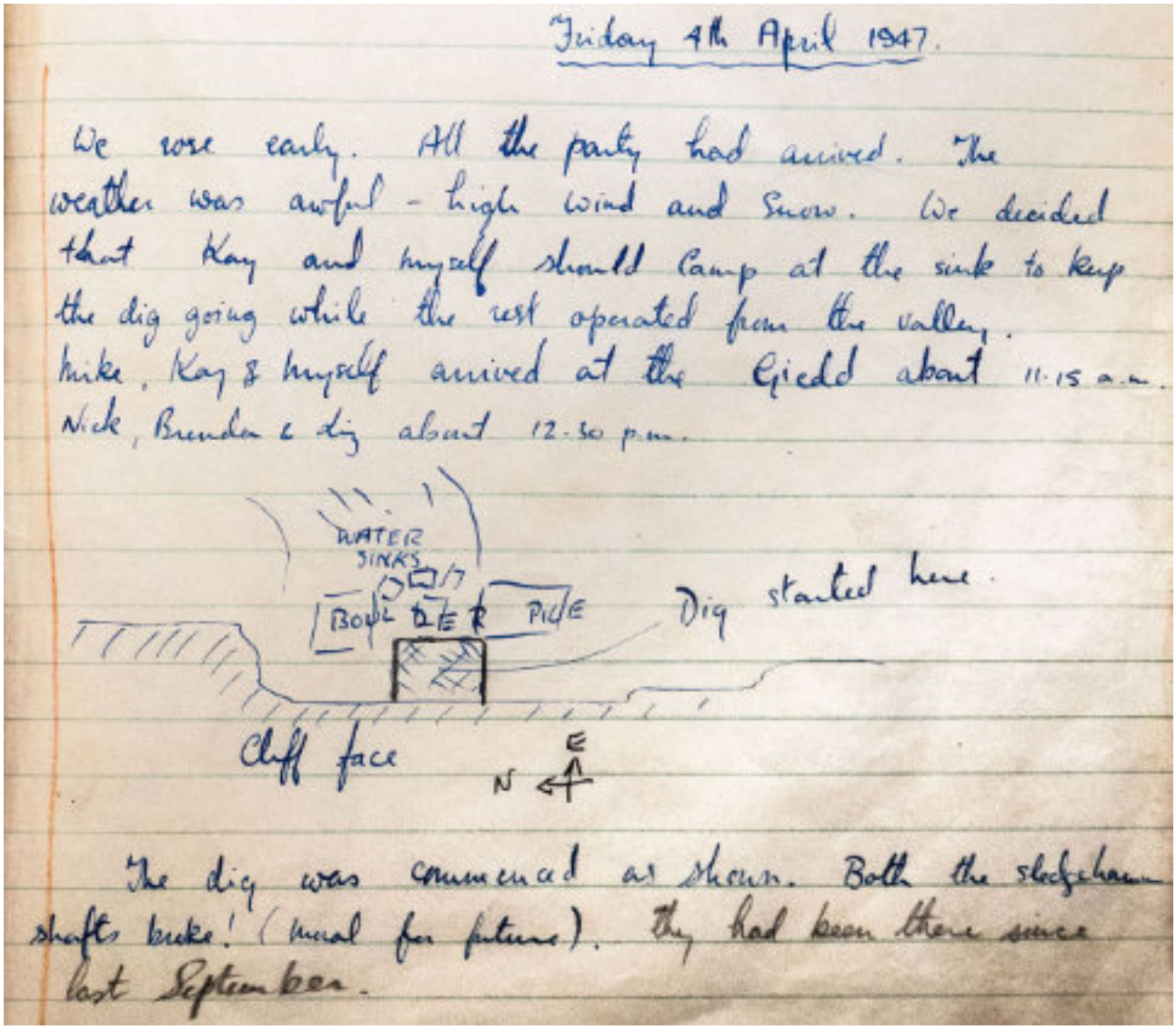
Peter continues: "*We obtained permission to dig on the mountain from Mr. Ward, Lord Tredegar's agent. This took rather longer than we expected because Mr. Ward got the idea we wanted to open a show cave two miles from the nearest road! Ian* [Nixon] *and I decided to start digging this sink at Easter 1947 by camping at the site in the Giedd Valley. We had visited Sinc-y-Giedd several times during the winter of 1946/47 and had examined a number of small holes in the vicinity of the sink but we never managed to find the hole Bill had found. We uncovered one small bedding plane which looked quite promising as it obviously got bigger inside…Unfortunately there was only 100ft [30m] of bedding plane and nothing else, so we decided to dig at the main sink where Bill claimed he had some success.*"

At Easter 1947 the intention was for a team to camp at the sink, but poor weather led to a change of plan, with Peter, and Kay Dixon, camping while others went up and back from the Gwyn Arms each day. They made a limited amount of progress, but heavy rain eventually led to the project being suspended in the hope that the weather at Whitsun might be more amenable.

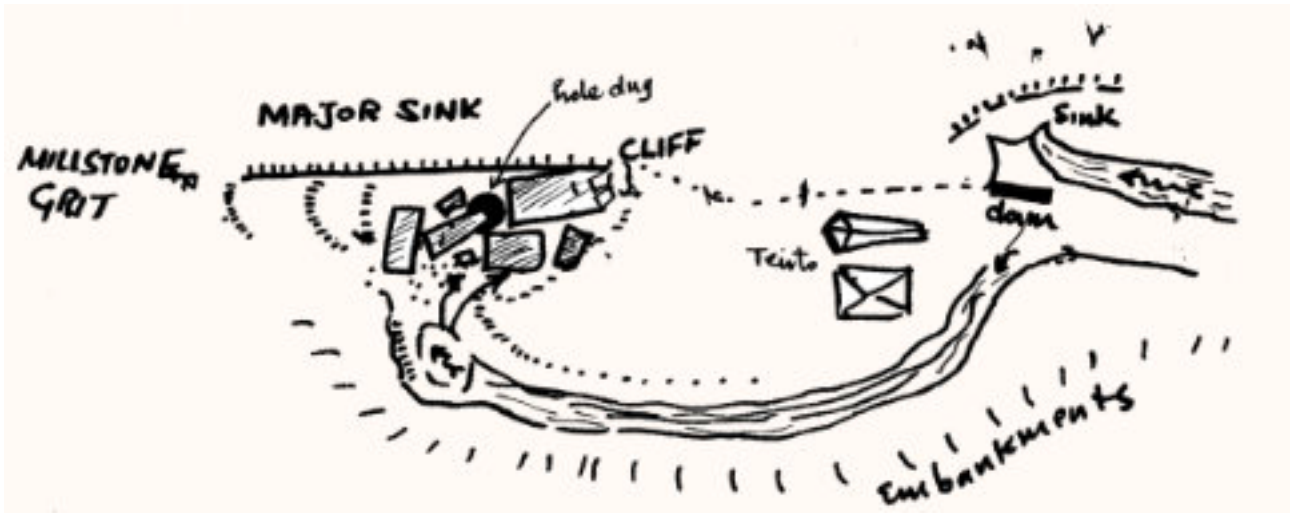
At Whitsun Peter, with Mike Gummer, managed to get as far as the top of a pitch, but having no ladders with them they left and planned a return in August, when they intended to camp for a week. Yet again the weather interfered, but after a delay spent looking at other sinks in the area: "*...we returned to our sink after midday and found that there was much less water going down. We went underground and laddered the pitch which we had looked down last time - about 45ft* [14m] *of nice easy climbing. At the bottom, the rift went north and south. There was not much to the north, as the passage gradually closed down, but to the south there was a high passage which closed down to a bedding plane to the left. This opened out into a number of walking passages but all of these became too tight after a while. As the prospects of getting into the Dan-yr-Ogof system were now looking rather slim, we decided that it would be best to look for somewhere else to dig. At the bottom of Sinc-y-Giedd we were something like 100ft* [30m] *underground. The rock was black water-washed limestone with flood debris in all the cracks, just as we had found in the entrance passages. This gave me the impression that there would be no easy route into the main Dan-yr-Ogof system. Reluctantly, we called it a day, removed our tackle and returned to the valley.*"

A positive dye-test from the sink to DYO was made by Peter Harvey in 1948 (Harvey, 1948). Writing in 1963, Clive Jones reported that: "*The entrance to the cave has been blocked and re-opened a number of times since 1947*" (Jones, 1963), and that there was little enthusiasm for digging at sinks in south Wales as "*they are probably of recent origin and lead only to narrow bedding-plane systems*." Hence the cave then seems to have been largely ignored until Paddy O'Reilly and his team re-opened the 'lower' sink at Easter 1970.

Scan from Peter Harvey's logbook, 1947

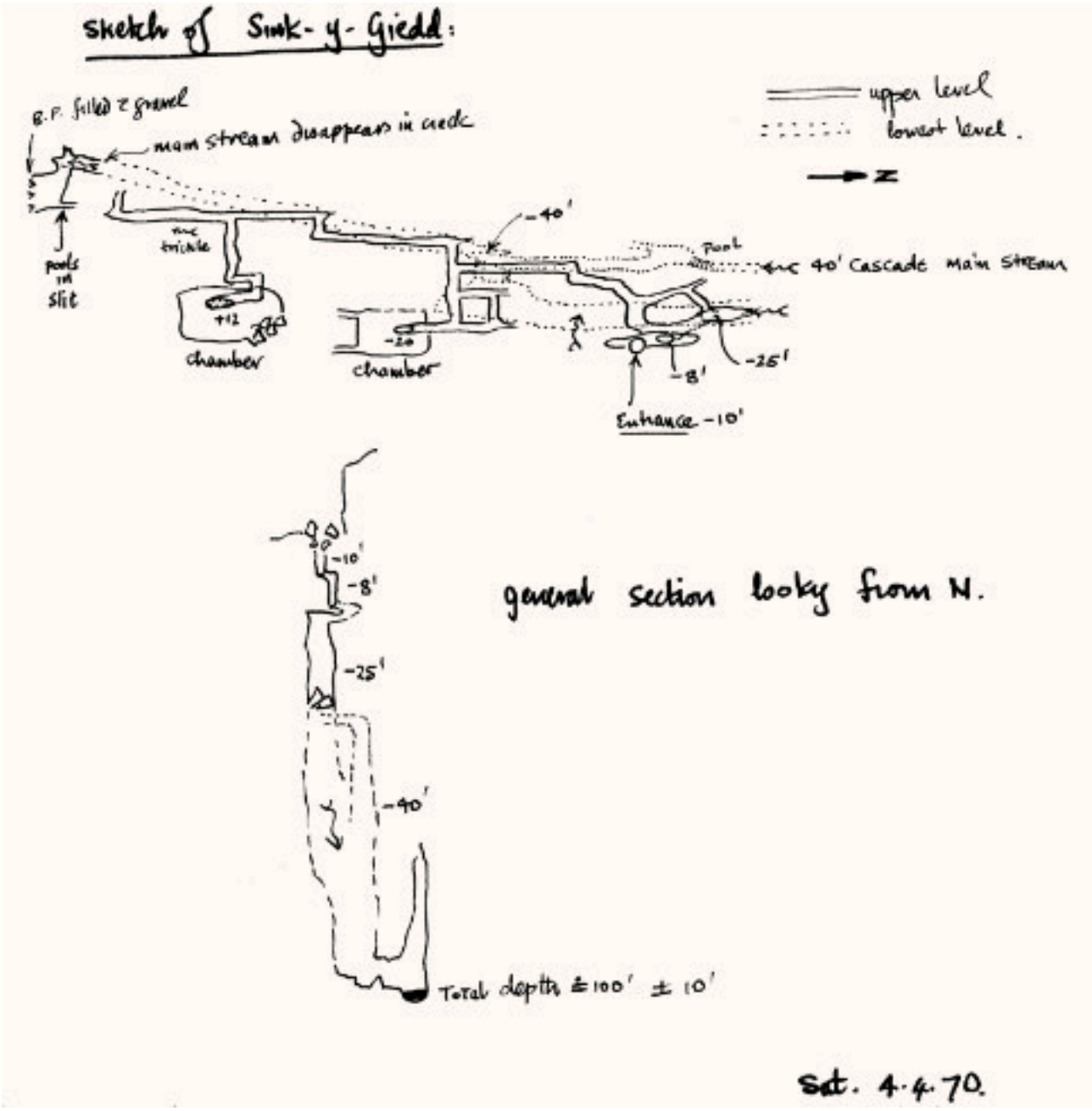


Paddy and team used pack horses, hired locally, to transport tents and equipment up to SYG for an Easter camp. Arriving on a bitterly cold Good Friday, 27th March 1970, Paddy's logbook records: "*Our first look at the place didn't give us much encouragement because it was taking water at the cliff and there was no obvious entrance that we could see. Peter Harvey had described his mental picture of the place as he remembered it years ago – also Pete Ogden had been down it once and had an idea of where we should dig.*" They set about diverting the stream, spent a freezing night camping right next to the entrance, and next day set about digging their way in. Despite some struggles with boulders – "*Sue* [Paddy's wife, Susan] *got cut by a falling boulder*" – they managed to open the cave, but everyone was a bit reluctant to go in, as everything around was so loose. Eventually Paddy went in to assess the state of the boulders and ascertained they were pretty securely wedged in a rift. Pete Ogden went in next and explored '200-300 ft' (60-90m) of passage: "*There was a fairly large chamber, some smallish passages and the whole thing bore evidence of flooding.*"



Sketch of Sinc-y-Giedd and campsite at Easter 1970

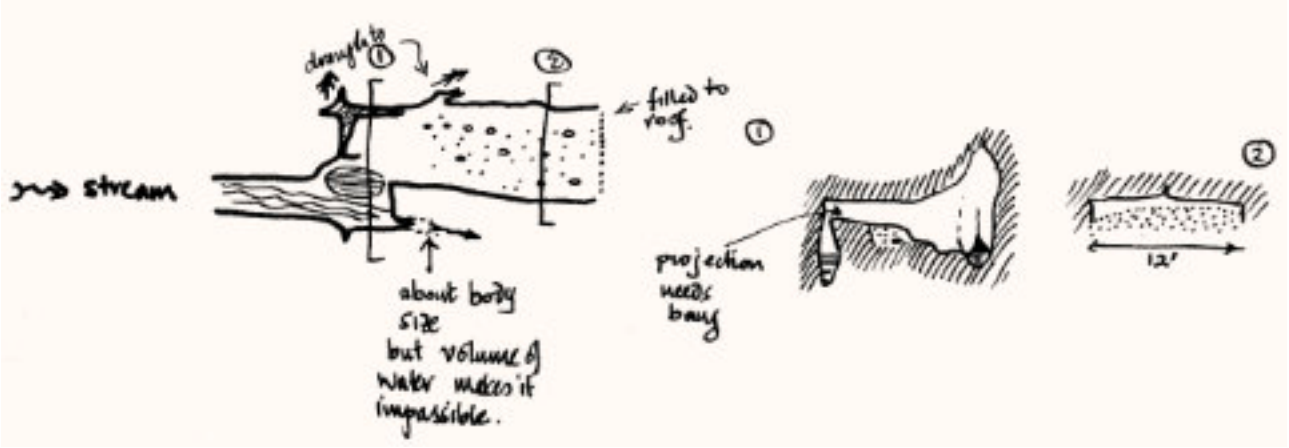
Wind and heavy rain overnight almost blew the tents over, and the stream was going into the entrance again. After some intense damming operations, the cave was once more accessible, but lower down there was water flowing everywhere and attempts to explore further were thwarted. The wet weather continued and in the end the team struck camp and returned to the valley, having first put 3lbs (1.4kg) of fluorescein dye into the sink. This turned the Tawe bright green some 36 hours later. With some people having returned home at the end of the weekend, Paddy returned later in the week with Alan Coase, Mick Day and Martyn Farr. Despite the still-damp conditions Paddy and Martyn worked for a while on a low, shingle-filled passage but the inescapable conclusion was that they needed to be working in drier conditions. "*Summertime will provide the answer*", reflected Paddy in his logbook.



Sketch of Sinc-y-Giedd, Easter 1970

Nonetheless he was back a week later, Sat 11th April, with Susan and with Pete Ogden. This time there was very little water in the cave, and as well as making a survey they spent some time pushing the bottom end: "*Pete got through the restriction that needs banging, but was afraid of not getting out again, so he didn't push it. I think he was wise,*" wrote Paddy. He was disappointed to record that the 'cleft' where a large volume of water had been sinking the previous week was "*barely body-size, and getting smaller,*" but they noted a "*very strong*" inward draught at the bedding plane and resolved that it would need chemical persuasion. They emerged at 9pm and walked back in the dark.

Sketch of passages at the bottom of Sinc-y-Giedd



At Whitsun 1970 they were back, intending to camp again, only to find that the Welsh weather and geology had intervened once more: "*All our efforts had gone for nought – the boulders had all collapsed in on each other and our once-nice entrance was too small to allow even Bruce Foster near it.*" Over the next couple of days, they worked to stabilise everything again, and Land Rovers (including Jem Rowland's) were "*loaded with kit, shovels crowbars and two pieces of timber, scrounged from an unrepentantly miserable Laurie Galpin*" and (later) "*committee-approved bags of cement.*" Having secured the entrance, they also set to work restoring a ruined bothy just above the entrance, for use as a bivvy on subsequent trips.

The Sinc-y-Giedd hotel

Later in June, "*we dug at the bedding plane for about two hours and got another 10ft* [3m] *along. We could see another 5ft* [1.5m] *but it looked pretty well blocked after that. We gave up and decided to do a bang on the slot downwards…it looked a better proposition altogether.*"

The next day they managed to enlarge the slot and descended another 2m down to a lower bedding plane. However, rain before their next visit washed cobbles into this bedding plane, and after some work with a crowbar Paddy was able to see into a side passage "*very draughty, and looking into black space beyond.*"

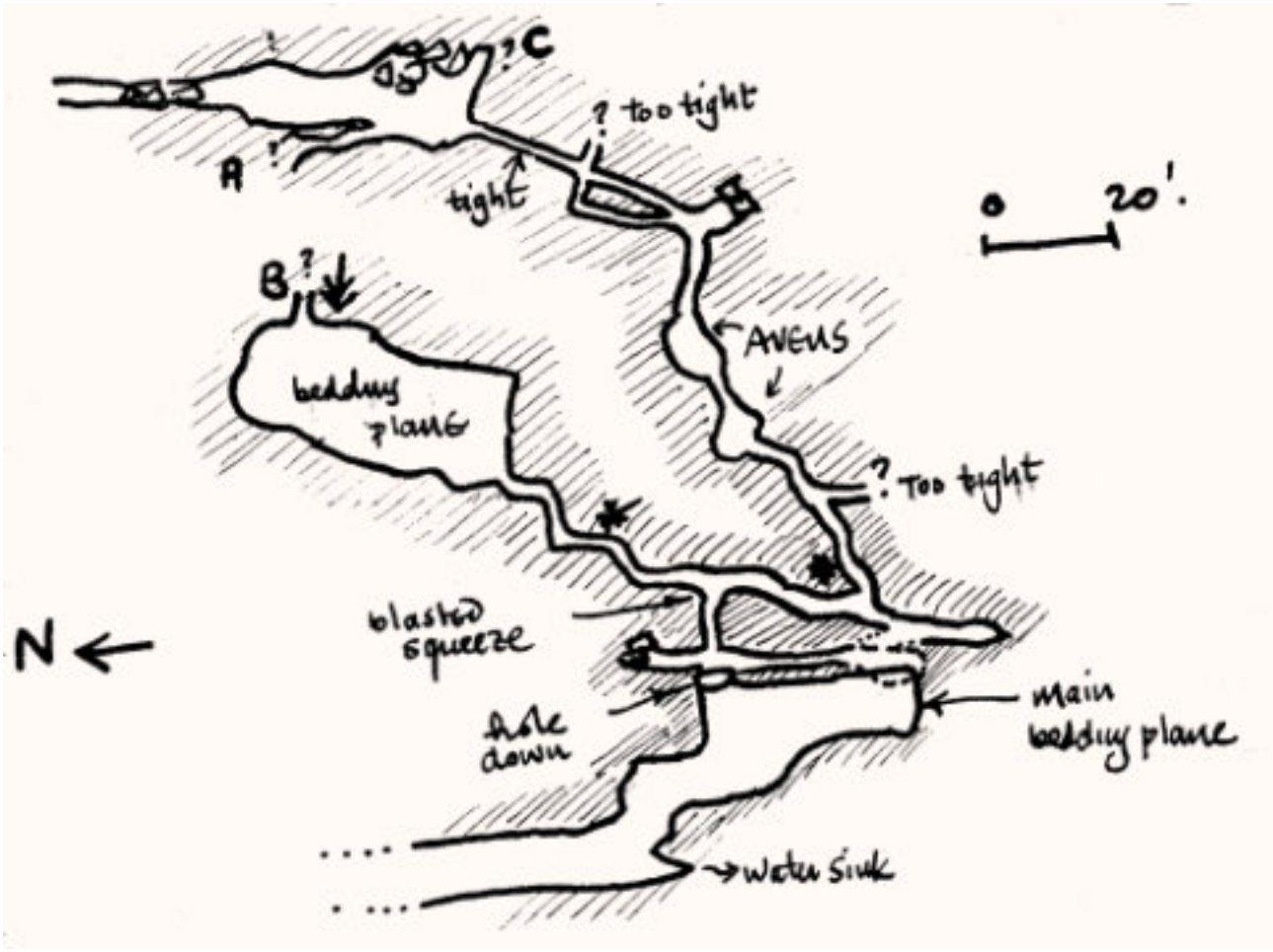
Yet again bad weather intervened, and it wasn't until late August that Paddy and Pete Ogden were back to place more charges. They gained access to a T-junction; the downhill route to the left was blocked but they followed a passage going uphill, with grass roots suggesting that the water flowed uphill here in times of flood. They passed two avens, eventually emerging in a "*fairly large chamber*" but with a feeble draught and no apparent way on. Both avens were found to be blind. Somewhat discouraged, they returned to the banged squeeze, looking at everything again on the way back. The draught appeared to be coming from a "*tight and awkward*" passage that "*might be bangable.*"

It was January 1971 when Paddy and Pete returned with Martyn Farr. They managed to complete a loop in the previously explored passages (points A-B on Paddy's logbook sketch over), and concluded that the draught was disappearing into a choke with a "*big black hole*" at point C.

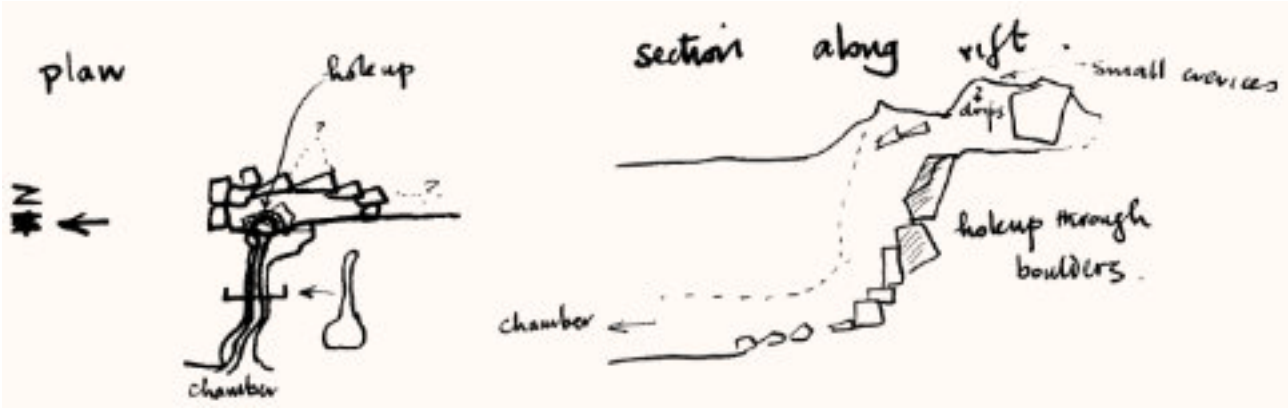
Later in the spring Paddy was back, and managed to get into said black hole, only to find that it was really just a sizeable gap between boulders, with no draught. He declared himself "*flummoxed*."

Thanks to more weather issues, it was July 1971 before any further work was done, with Paddy, Pete Ogden, Ken Maddocks and Alec Simpson abandoning the choke and deciding instead to concentrate on the

Paddy's sketch of the bottom from p.16 of his logbook scans



Sketch from p.22 of logbooks



southward-trending passage. On their next visit, in August, this was written off as being draught-free and needing a lot of work. However, while Paddy was retrieving a bang cable that had been washed into the base of the boulders, he noticed the draught emerging from the space below. He cleared this space out and Pete Ogden, who was wearing a wetsuit, squeezed in. The space was barely body-sized, but: "*…(Pete) asked us to be quiet for a moment - we all listened and we could hear a distinct RUSHING SOUND! Now whether it was water, air or our own blood was difficult to be certain – but this much is certain – it was not imagination. There are a few small crevices in the floor that might repay investigation…it would be good to visit in winter when there is a good bit of water around…but in any case, it's a dead cert.*"

Curiously, that's where Paddy's logbook entries on SYG end. As you may be aware, Paddy emigrated around that time and it seems no-one else went back for some years. In a recent email to me (O'Reilly, 2020) Paddy wrote: "*When you get to the end of my entries you will see why I am so certain we were almost there. I have a distinct memory of peering down vertically through several 2-3 inch cracks in the 'sandy' ('cherty?') limestone bed we had reached and seeing and sensing a passage beneath. And hearing that sound of water*

or air rushing. It was soooooooo tantalizing. And despite that certainty, life took over and I never returned until many years later, in the late 1990s and of course by then everything had changed around the entrance again."

It wasn't until the late 1970s that natural changes seemed to invite further digging at the sink. Ian Todd and others did some work at the upper of the two sinks, but this didn't come to much. Club members were interested again, and Bob Hall took a leading role. In September 1981 he supervised the building of a dam across the riverbed at the upper sink with the intention of preventing the repeated closure of the lower sink by material washed in during winter floods. The remains of the dam can still be seen (it's visible on Google Earth!) and it is still effective – water only reaches the lower sink in times of extreme flooding. In 1982 and 1983 a major mechanised assault was made at the bottom of the cave. The team borrowed a 240v petrol generator, from UBSS, that was used to power a Kango 950 rotary drill. 25mm diameter shotholes, 500mm deep, were drilled and the resulting spoil was hauled back into the main passage. The narrow rift they were following was clearly the route taken by the water in times of flood, and had a draught, but: "*the start of this would seem to be at a level some 3m above the bedding-plane referred to by O'Reilly and could well be the 7-inch crack of his survey*" (Hall, 1982).

At this point, it is worth emphasising the difficulty of reconciling the accounts made at different times of the state of play at the 'bottom' of the cave. In 1982 Bob's team managed to enlarge "*a cleft*" that they thought was probably Paddy's 7-inch crack, continuing for some "*4 or 5m.*" In 1983, they returned to the scene of their 1982 efforts and found that a side passage had opened up "*to the eastern side of the cleft. Crawling into this led to a tortuous series of nasty, tight passages which we imagined to be the series described by Paddy although the descriptions did not match our observations at all closely.*"

The situation changes all the time but Bob, writing in 1989, drew the rather discouraging conclusion that "*realistically the general picture is one of retreat: the indications are that Paddy got further than I did and that Peter* [Harvey] *got further than Paddy.*" (Hall, 1989).

The matter is further complicated by conversations I had with the late Nig Rogers, who was certain that he had passed beyond the limits of previous explorers, but Bob remained unconvinced.

The extent to which things change underground is illustrated by the fact that on one visit to the cave I was puzzled to see a bolt with a rope attached to it only a metre or so above a gravel floor. The rope disappeared into the gravel, and I couldn't see why anyone would put a bolt in such an odd place. A subsequent telephone conversation with Nig solved the puzzle – he'd installed the bolt and the rope at the top of a vertical climb down and subsequent flooding had filled the whole thing with gravel!

Bob Hall was kind enough to take Martin Hoff and I on a 'guided tour' of SYG some years ago, and for a while we visited regularly with a view to making progress, with visions of the vast quantities of water that the cave swallows fresh in our minds. The bottom section of the cave, at the time, ended in low passages that were clearly subject to frequent flood events and it was inevitable that any effort spent in digging out cobbles and gravel from the floor to make room to work would soon be undone after the next spell of heavy rain.

There is also an alternative entrance, at the base of the cliff adjacent to the usual entrance. Nig Rogers describes 're-opening' this in November 1990 and his crew were responsible for much of the work in there. Martin and I, with others, made a few trips into this in the early 2000s, eventually creating a through-route into the main cave. Be warned that the cliff entrance has become very much more constricted in recent years as the cliff collapses, and it's likely that it'll collapse altogether before long. You wouldn't want to be in that bit of the cave when it happens.

In Newsletter NL106 Bob Hall makes the point that SYG should be visited regularly, particularly after winter floods, because: "*nature may do our digging for us, and a spring explorer might just find an open way on!*" (Hall, 1989), and it is clear that, even on the surface, things change all the time. The photo of the sink on Page 19 of SWCC NL106 shows it looking very different to how it does today, and every time I visit the surface topography shows changes.

SYG is too promising a site to be left neglected for long, and in recent years Tony Donovan and others have re-started work at the site. Tony's approach is intended to solve once and for all the problems caused by the repeated washing-in of rocks and gravel, and anyone who has seen his efforts at Ogof Fawr (near Merthyr Tydfil) and elsewhere will believe that he may succeed where others have failed. However, to date he seems to have been thwarted. (Updates for this article are not available at the current time - please see Bob's Afterword for comment). Although accounts differ in who has been where and who has been the deepest, it seems unlikely that anyone has yet regained the limit of Peter Harvey's explorations. But keep going and checking, because one day…

Thanks to Paddy O'Reilly, who sent me scans of his personal logbooks, from which much of the above information was taken.

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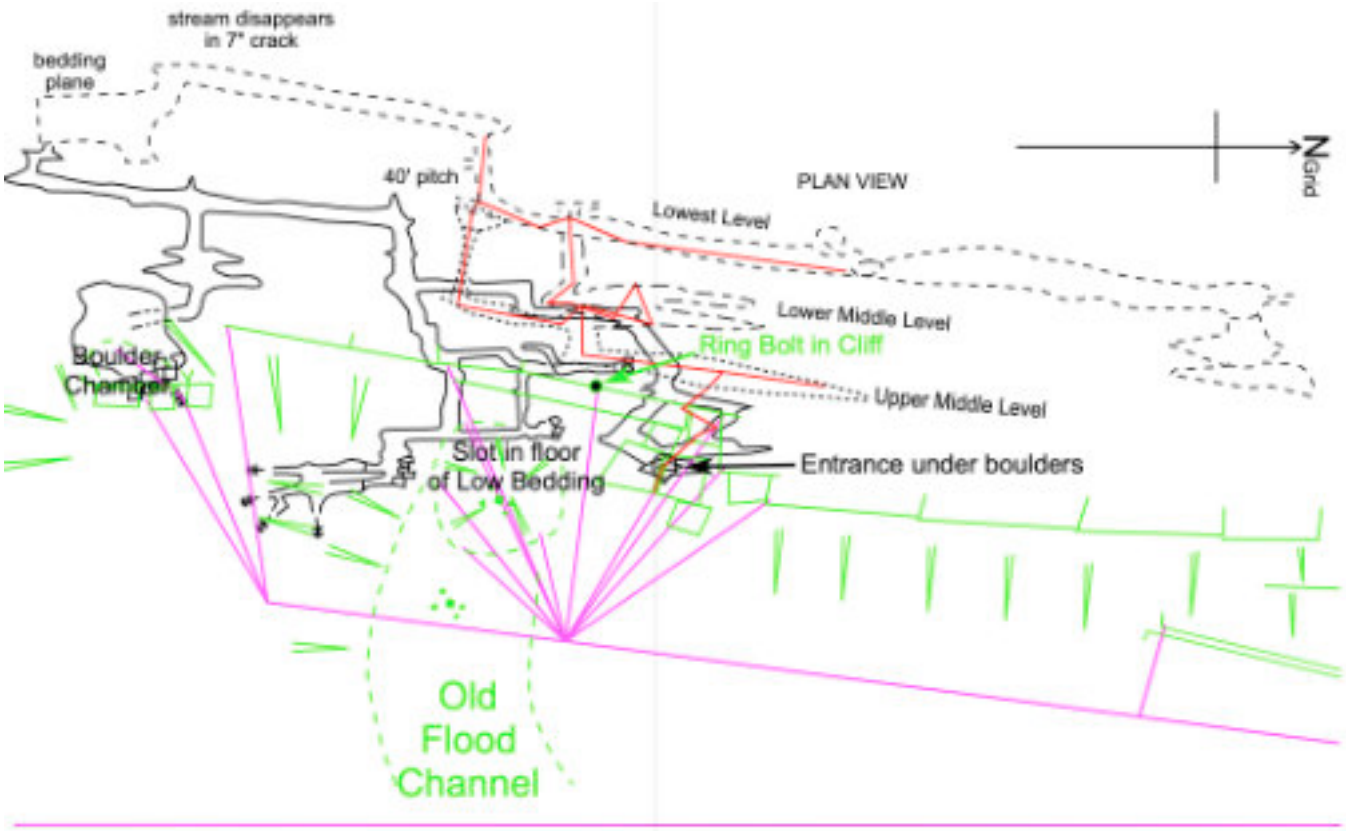
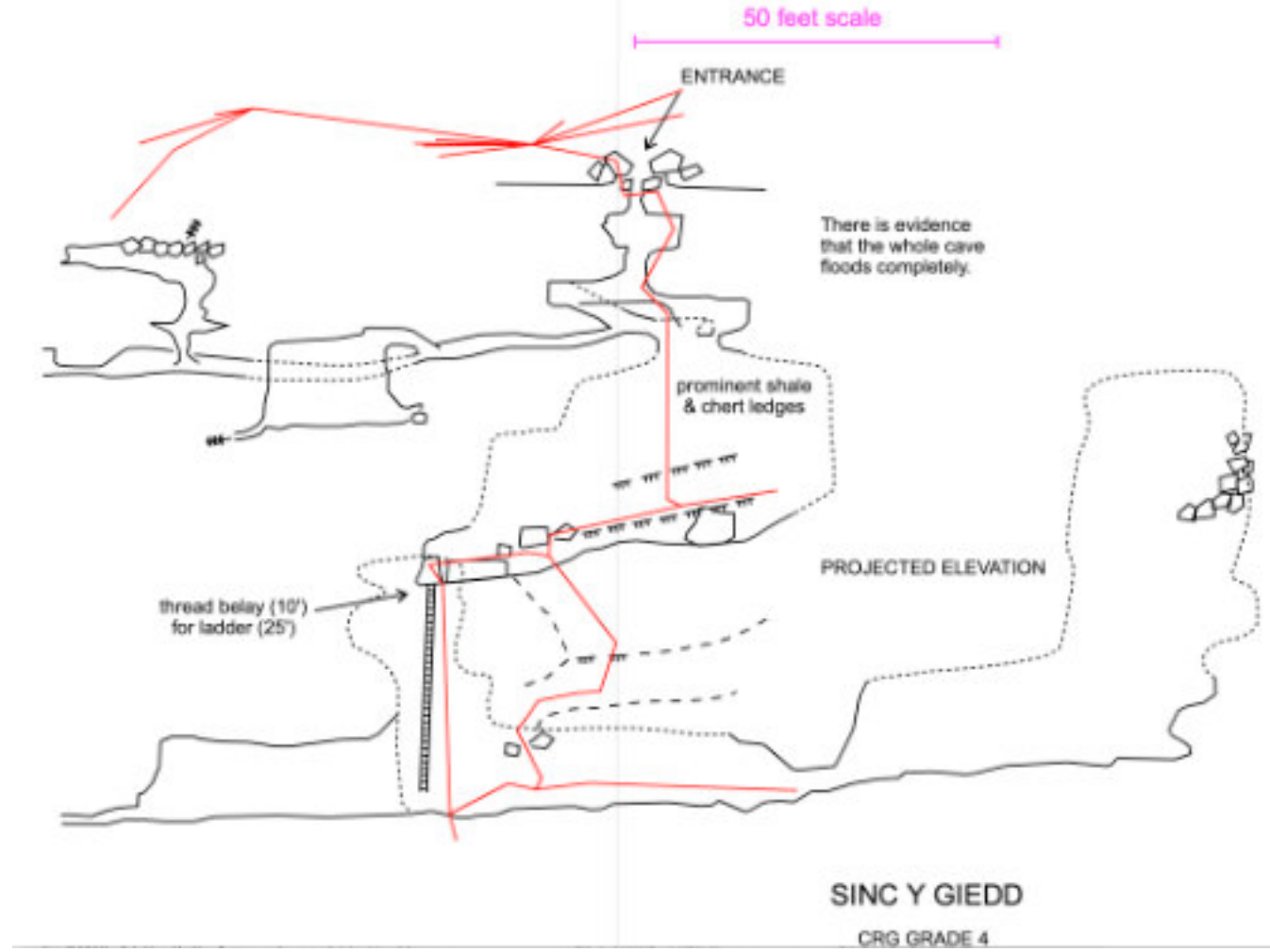
Bob Hall frightens baby Bridget. Sinc-y-Giedd 1983 (©Barbara Hall)

Sinc-y-Giedd in flood, 16th August 2019 (©Tony Baker)

Panoramic view of the lower sink in flood, 16th August 2019 (©Tony Baker)



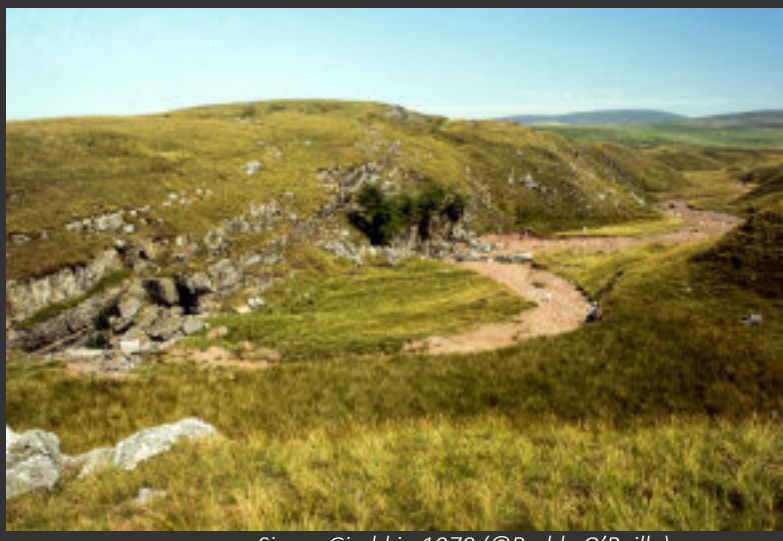


Survey of Sinc-y-Giedd compiled by Graham Christian, using some of Paddy O'Reilly's data

Caver descends Sinc-y-Giedd (©Pete Francis)

Work to build the 'megalithic dam' at Sinc-y-Giedd (©Pete Francis)

The late Rob Parker using a Tirfor winch, helping to build the 'megalithic dam' at Sinc-y-Giedd (©Pete Francis)



Sinc-y-Giedd in 1970 (©Paddy O'Reilly)

The 'upper sink' in flood, 16th August 2019 (©Tony Baker)

Pete Ogden at Sinc-y-Giedd in 1970 (©Paddy O'Reilly)

Sinc-y-Giedd in 1970 (©Paddy O'Reilly)

Sinc-y-Giedd in 1970 (©Paddy O'Reilly)

Pete Ogden at Sinc-y-Giedd in 1970 (©Paddy O'Reilly)

The bothy at Sinc-y-Giedd, c. 1982 (©Pete Francis)

Tony Baker in the cliff entrance to Sinc-y-Giedd (©Martin Hoff)

5. Ogof Carreg Lem - Gateway to the Giedd Master System?

SN 80584 18059 Altitude 444m Length 350m

By Jules Carter

Introduction, by Tony Baker: *In the 1970s, diving activity in Dan-yr-Ogof, including Martyn Farr's discovery of Mazeways II, rekindled interest in some of the surface sinks on the Black Mountain. One soaking wet day, Pete Francis and others that included Mike Ware looked at a sink to the west of Sinc-y-Giedd, where a large boulder precluded access (Francis, 1983). Mike had some 'bang' and an electric detonator, but an attempt to initiate this via an Oldham cap-lamp failed and the team trudged off the hill. In May 1981, Gareth Davies showed Pete "an interesting sink" that turned out to be the site of the failed charge. This time the boulder was removed manually and a small chamber was reached. The wet nature of the dig meant that it was not until March 1982 that further progress was made, this being a 'proper' breakthrough that included a 15m chamber. Over the next few weeks, the team made a further series of breakthroughs, exploring some walking-size passages and attaining a depth of 46m. However, Sam Moore and Steve West had a chastening experience when the entrance choke collapsed while they were in it, and, as well as closing the cave, this deterred anyone from pursuing the project until the mid-1990s. Jules takes up the story…*

Ogof Carreg Lem is one of the more remote cave sites found on the Mynydd Ddu and is one of the more significant speleological sites in the area, being one of the further sinks that has been positively dye-traced to the DYO system (Gascoine, 1983). The cave itself is considered a bit of a collectors' piece, due to the general sporting character of its tight and awkward passages between tantalising sections of walking passage. Geologically it sits in the Oxwich Head Limestone Formation beds – which lie above the main cave-bearing beds of Dowlais Limestone within which the DYO system has formed. The entrance area is also notable for fine exposures of what looks like *Gigantoproductus* fossils, potentially indicating that the geology here may be more intriguing than suggested by the broader geological mapping of the area.

Discovery and Loss

Active digging at the site began in May 1981 when Pete Francis was shown the site by Gareth Davies (Francis, 1983; 1990). Gradually, a precarious route was dug down through the entrance choke, which at around 12m depth, finally emerged into significant cave in March 1982. Progress was then made through a series of tight U-tubes, interspersed with roomier sections of cave, quickly extending the cave to around 450m in length and some 60m in depth. However, exploration was soon brought to an abrupt halt after a significant collapse in the entrance choke provided a very close shave for a couple of the dig team and sealed entry into the cave.

The Re-opening

Though enthusiasm for the potential of the site was regularly voiced by many of the original dig team, the logistics of digging open the entrance choke were daunting and the cave remained closed for some years. Eventually this enthusiasm managed to net the interest of a new generation of diggers in the form of Tim Long and others. After being shown the site by Toby Dryden during the winter of 1996, Tim then managed to bully a few people into accompanying him to the site with a view to re-opening the choke.

On 1st January 1997 the project kicked off with a vengeance, after which almost every weekend saw a keen group of cavers struggling across the Mynydd Ddu under the weight of scaffold bars, clips, timber and tools. The dig team itself involved a very varied range of abilities from experienced cave diggers to reluctant kids being dragged over the hill by their fathers!

Easter 1997 saw a big push, which included a bunch of us camping out at the Giedd during a particularly fine weekend, made the more memorable for an evening huddled around a fire of scavenged dig timbers whilst under the remarkable sight of Comet Hale-Bopp bright in the night sky. On Sunday 6th April 1997, the entrance choke at Ogof Carreg Lem was again passed, and access regained to the chamber and passages below. The re-opening of the entrance choke had taken 101 person-trips and used around 100m of scaffolding, as we didn't want to repeat the experiences of the previous diggers!

Previous limit reached

Initial progress found the cave still more or less open as far as the lowest part of the cave, where a low, mud-filled crawl had become silted up again. Work started to reopen this section, and within a few weeks of the reopening, Ogof Carreg Lem was officially 'full' length again (plus a few metres more). However, many sections remained small and awkward, preventing larger team members from seeing the glories of the system they had reopened. Hopes for finding the 'master system' were high, and the project even managed to drag one of the original Carreg Lem diggers, Steve West, onto the digging team, whose last experience in the cave had been the collapsing entrance choke in the 1980s!

Regaining the end of the cave had been one of the key aims as it was here the most promising lead in the cave was considered to be, where a stream crosses the main passage and disappears into a low bedding with a good draught. Other leads were also re-examined, such as in the left-hand series, where Ben Lovett and Andy Harp put in some effort down a tight pot to gain a small stream. Some progress was made, but typically the cave turned tight and blasting was required.

Digging the Hilti Way

The prime lead at the end of the cave proved to be two low beddings, and both were investigated via the use of cordless drill technology, supported with the assistance of some rock-displacing chemicals. It was soon clear that the far bedding was the most viable lead, and trips now focused on enlarging this into human-accessible proportions. A rock sample from the base of the floor of the bedding plane was also removed and was confirmed to be honeycomb sandstone. This quartzite sandstone bed is a key feature separating the higher limestone beds from the main cave-bearing Dowlais limestone. It could be as little as 1m thick and there are areas in DYO where the passage breaks through the honeycomb sandstone (e.g., Dali's Delight area), so our hope was that we would be able to break through into the 'right' beds.

Slow Progress

However, progress at Ogof Carreg Lem proved disappointing. Enlarging the bedding was slow work, and typically we were only able to make around a metre or so of progress per trip. Getting to the end of the cave wasn't the easiest of trips, and usually involved 'swimming' through the gravel in the U tubes, and often having to clear sections that filled in due to floods - this was a particular problem with the last section of crawl to the dig.

Steadily we excavated close to 10m into the main bedding, getting close to the point where we could see a bend in the bedding from which the sound of the water tantalisingly ran off - seeing round this corner was now the key to whether the dig was pursued or not. But interest had gradually waned due to kids, work and other stuff, and trips to the cave ground to a halt.

After a hiatus of a few years, we started to return to the cave again with the aim of continuing the push on the bedding (Carter, 2003). The initial trips found the original 'first Dig' needing digging again, as did the final crawl, and it took a few trips to once again reach the dig site. A final push with the drill and associated chemicals gained the corner, only to show the bedding continuing as before into the distance…and with that we stopped.

The Furtles of Others

During this period other diggers had started to creep into the cave, despite the fact that one or two of them had told us that reopening the cave was a pointless endeavour! Exactly what they did and where isn't very clear, as sadly the ways of many diggers are very secretive. However, the likes of Joel Corrigan did try pushing some of the left-hand passages off the entrance chamber, and Gareth Jones persuaded his dig chums to have a go at digging a rift near the entrance, to regain the water in an attempt to follow the active water course.

More recently it is believed that other diggers have been back to the site, but where they are pushing and what progress has been made is unknown. This secret culture is a shame, especially on the Mynydd Ddu. A wealth of knowledge has been published over the years around DYO, the geology of the area and the numerous caves and digs, and not adding new knowledge and discoveries to this body of knowledge goes against the open nature of all the previous work that has gone on.

Reflections

In the end we didn't find any significant new cave at Ogof Carreg Lem, but the project was still well worth doing. The many dig trips were time spent in good company, sharing the adventure and challenges of re-opening, and then trying to push the cave. Many a classic trip was had such as having to dig back out through the gravel in the U-tubes when heading out after 'Roger Irrelevant' (a character of the Club at that time) had filled them in behind him as he crawled out! Or trying to find your way back up the entrance choke in very high-water conditions...

The walk over to the cave is worth the stomp itself; traversing one of the largest wilderness areas in Wales. On very fine days there would be the odd skinny-dip in one of the swim pools, or it could be a dash back in horizontal driving rain and hail to try and beat the hypothermia! All are experiences to savour.

So, where next in the cave? Recently I did re-visit the cave for the first time in many years. The entrance choke is still open, but the U-tubes seemed a little too full of gravel (or I'm older and fatter!). However, the cave draughts really well, takes significant water, and is close to the honeycomb sandstone layers. When compared with its near-neighbour, Sinc-y-Giedd, I think Ogof Carreg Lem is the better option to consider pushing again. Another team may care to take up this challenge - at least the cave is open for anyone who cares to try. I just hope they will be kind enough to share any discoveries with the wider caving community.

Editor's footnote: *in 2020 some photographs appeared on social media claiming to show 'new discoveries' in Ogof Carreg Lem. The source was not a reliable one and evidence within the photographs would appear to suggest that they were taken somewhere else.*

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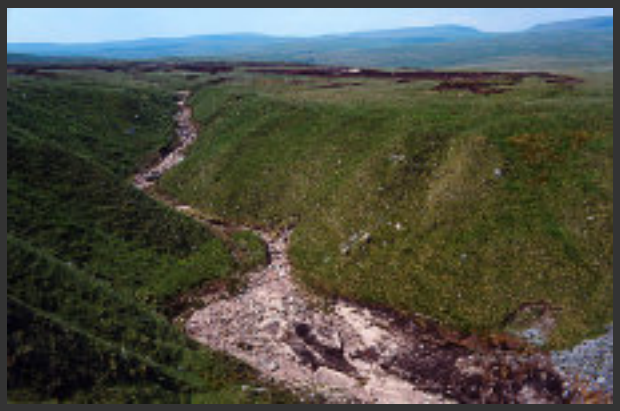
The Carreg Lem shakehole (©Pete Francis)



Fiona Thomson in Carreg Lem (©Pete Francis)

Camping at Carreg Lem (©Jules Carter)

Ali Garman in Carreg Lem (©Jules Carter)

The Carreg Lem shakehole (©Pete Francis)

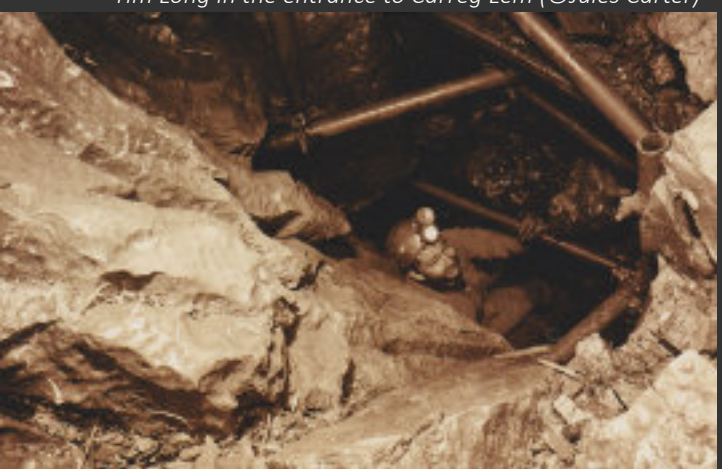
The entrance to Carreg Lem (©Pete Francis)

Fiona Thomson in Carreg Lem (©Pete Francis)

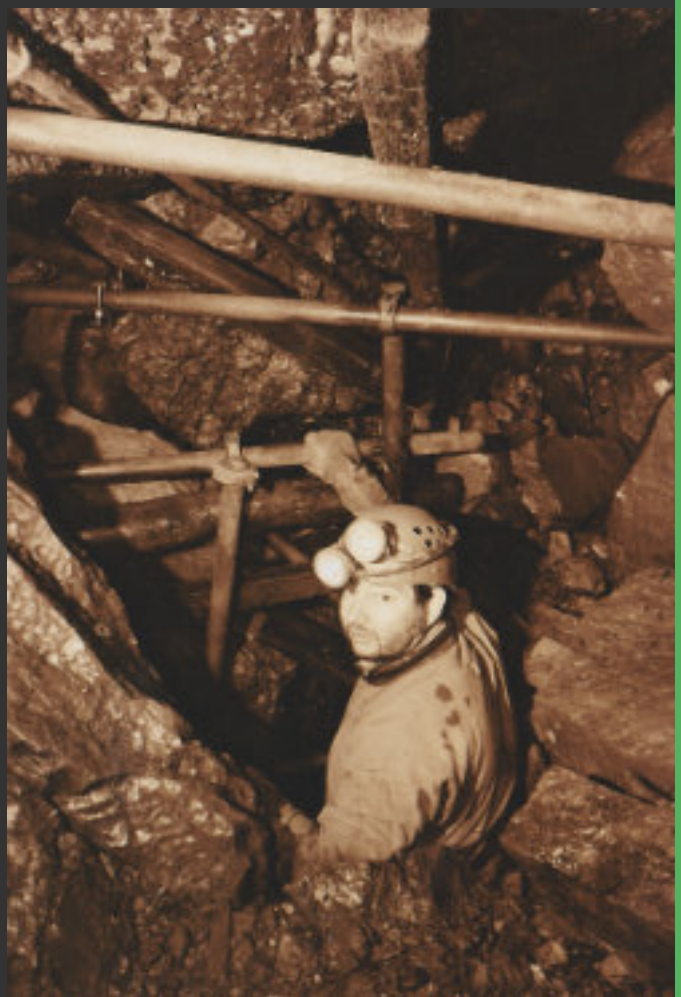
Paul Craddy in Carreg Lem, 2020 (©Jules Carter)

Paul Craddy in Carreg Lem, 2020 (©Jules Carter)

Tim Long in the entrance to Carreg Lem (©Jules Carter)



Tim Long in the entrance to Carreg Lem (©Jules Carter)



6. Digging the Sink at Waun Fignen Felen

SN 82565 17667 Altitude 460m

Jem Rowland

Waun Fignen Felen, often mis-spelled, and sometimes irreverently referred to as 'Wiggy Wiggy', is a large peat bog on the eastern side of the Black Mountain. The name translates to 'yellow boggy moorland', a reasonably accurate description. The bog is drained by several sinks, the largest and most impressive of which (at SN 82565 17667) was the subject of digging attempts from 1938 to a major push in 1970. It lies at the foot of a cliff face and in flood takes a very large amount of water which sinks into boulders and emerges at Dan-yr-Ogof, over a mile away as the crow flies. In normal conditions the stream sinks into the stream bed upstream from the cliff face but reaches it in flood conditions. There is a strong draught though, in common with many holes in that area, it goes in the 'wrong' direction.

By 1970 the main passages in DYO had been surveyed, revealing that the distance from the sink to the known cave was just over half a mile, and dye-tracing had shown that the sinking water flowed quickly through to the Great North Road in DYO. Half a mile of new passage was very tempting, and we anticipated an interesting project involving a pleasant week's camp at the site with everything transported by Land Rover.

Previous attempts had taken place before the discovery of DYO2 and DYO3 and so there had originally been much more to play for. Work at the site, from 1938 to 1947 and 1963 to 1965, had left a shaft down through the boulders at the foot of the cliff. It was about 110ft (33.5m) deep and well-stabilised with rounds of timber. For its entire depth, one wall was the cliff face, no solid floor was reached and there were no promising passages leading off, but it had been reported that sometimes water could be heard beneath the bottom of the shaft.

The first recorded dig at the site, in 1938, was led by Paul Dolphin and Norman Paddock, with the 'Dragon Group'. This was an informal group, initiated by Gerard Platten, of mainly Mendip-based cavers that led to the formation of SWCC in 1946. Their reports on the dig appeared in the 1938 journal of the Mendip Exploration Society[1] and, in 1947, in British Caver Volume 18[2]. These reports were summarized by Clive Jones in SWCC Newsletter NL44[3], who relates that in 1938 the Dolphin team had got down 20ft (6m) and found a hole in the cliff face "*in which it was possible to wave a crowbar at arm's length and the swirl marks on the rock indicated this was the route taken by flood waters.*" Our assumption must be that this did not prove to be a worthwhile lead, because they continued to dig downwards, spasmodically, until 1947. In the final push, they report, it was "*deepened by 15ft* [4.6m] *– got into what could have been a way on but wasn't. Further digging seems almost impossible – dig abandoned at 45ft* [14m] *depth*."

The site then lay dormant until 1963 when a typically beery Saturday evening in the Gwyn Arms gave rise to a new plan to attack the site. Clive Jones writes of the initial enthusiasm and planning in SWCC Newsletter NL45[4] and sums up the following two years' work in the SWCC 21st Anniversary publication[5]. By the time of this second push, in 1963, Dolphin's shaft had collapsed so as to be only 12ft (3.6m) deep and the intention was to push on downwards. The dig was planned to be a major exercise, with a substantial winch, and an aerial cableway to transport the spoil away from the shaft using a 10-gallon bucket in a tipping cradle. A 'home-made' generator would provide power. This would drive an electric Kango hammer to drill shot-holes and a small compressor, with an air reservoir resembling a diving cylinder, powered a pneumatic chisel. The shaft would be stabilised with high-quality oak and jarrah timber from scrapped railway wagons. Land Rovers would transport the timber and equipment and the team could camp at the site as required. There were no

access or camping restrictions in those days! After the initial frantic effort in 1963, work continued on occasional weekends. Following a major flood in the winter of 1964 a new winch was installed, the shaft lined with conveyor belting to ease the passage of the bucket, and a trap door was fitted in the shaft to protect those working at the bottom of the shaft from falling debris while the bucket was in transit. A telephone link to the shaft bottom was installed. By 1965 the shaft had been sunk to about 110ft (33.5m), and was still going strong, but the passing of the Long Crawl at Easter 1966, giving access to the far reaches of DYO, seems to have caused the team to lose enthusiasm and the dig was abandoned.

The main stimulus for our attempt in 1970 was, for many of us, our first inkling that the subtleties of limestone geology can have an important bearing on the prospects for a dig. Keith Ball, a professional geologist and long-standing Club member, had recently inspected the shaft and pointed out a limestone bed of Lithostrotion coral in the cliff face some way above the current bottom of the shaft. He explained that this bed marked the bottom of the 'S2' limestone (now referred to as the 'Dowlais' limestone) which, in south Wales, is by far the most favourable type of limestone for cave formation. In other words, the previous push had gone too deep. Consequently, the solid face above the level of the coral bed was subjected to much closer examination. This revealed, about 70ft (21m) down the shaft, what appeared to be a potentially interesting, blocked, bedding plane, and so the 1970 push was planned.

We set up camp on the first weekend in August and made a start on the dig. The winch and cableway from the 1963-5 attempt were still available but they were not needed because we now had the luxury of being able to dump the spoil into the base of the shaft, given that it was too deep! Blasting was done with one-inch diameter sticks of gelignite and shot holes were drilled using a 'star' drill. This was rotated by hand while being hammered by a 'Kango' electric jack hammer powered by a generator from the 1966 Balinka expedition. It was a tedious process, with a decent hole, say 8 inches (200mm) deep, taking over half an hour.

Clive Jones writes (Newsletter NL67[6]):

"*By Monday real progress was being made ... Monday's last bang got us ten feet. By Tuesday lunchtime the first sign of natural passages appeared. This passage, a tight crawl, over calcite fill, was pushed to an impossible bend. After a sequence of drilling and blasting over several days 'Kan-go Passage' was born, giving access to another small chamber round the bend ... Further blasting enlarged this (bend) until a loose boulder choke was reached on the Saturday. A space of some size was noticed but the instability precluded further investigation.*"

We were now about 30ft (9m) into the bedding plane. I managed to squeeze my head through a gap into the space and saw a chamber, probably about 10ft (3m) diameter and 4 or 5ft (1.5m) high. The whole place seemed extremely unstable and there was no obvious way on. Others had a look and concurred. A group of us went back a week later for another look and came to the same conclusion – it was just too dangerous to contemplate any further work.

Over the years, the shaft disappeared, presumed collapsed due to the timbers rotting, and filled by debris washed in by successive floods. The 1964 winch, made from a lorry axle buried vertically and surmounted by a capstan made from scaffold poles welded to its wheel, remains as a monument to a major 'clockwork caving club' effort which spanned over thirty years. However, recently, persons unknown have attempted to re-excavate the shaft, so maybe the story continues.

Contributors to the 1970 push (according to Peter Harvey's diary[7]) included: Clive Jones (leader), Jem Rowland, John Kingdom, Ken and Alison Maddocks, Pete Cardy, Bob Hall, Nigel Ellis, Mick Day, Clare Harvey (later Jones), Martyn Farr, Mike Ware and Peter Harvey.

Contributors in 1963-65 included[4],[8]: Clive Jones (leader), Bernard John, John Harvey, John Osborne, Bill Clarke, David Terry, Philip Mathers, Dai Hunt, Dick Baynton, Terry Lloyd, Bernard Woods, Bill Birchenough, Mark Skinner, Roger Smith, David Dilly, Noel Dilly, John Spooner, Jan Powell, Dennis Kemp, Roy Kemp and Rhidian Roberts.

Contributors 1938-47 included Paul Dolphin (leader), Norman Paddock and the 'Dragon Group'.

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Removing a boulder from the Waun Fignen Felen shaft 1964. L to R: Noel Dilly, David Dilly, Terry Lloyd, Roy Kemp (Dennis Kemp's brother), John Harvey (Photo probably by Glyn Genin)

Waun Fignen Felen. Front L to R: Clive Jones, John Harvey. Others unknown. Diving cylinder for pneumatic chisel in foreground, generator back right (Photo probably by Glyn Genin)

Paul Dolphin photographed in the early 1950s. He led the first Waun Fignen Felen dig from 1938-47 (©Phyllis Harvey)

Tea break time during the 1970 Waun Fignen Felen dig. L to R: Jem Rowland, John Kingdom, Alison Maddocks, Clive Jones, Clare Harvey, Ken Maddocks, Terry Rowland, Mick Day (©Peter Harvey)

A recent (2020) picture of the sink at Waun Fignen Felen in fairly dry conditions. Note the water sinking at the very bottom of the picture (©Jem Rowland)

Waun Fignen Felen sink in 2020. Paul Quill is standing at the location of the original shaft with the 1964 winch on the left (©Jem Rowland)

Work at the sink at Waun Fignen Felen in 1963 (©Dai Hunt)

Winching operations at Waun Fignen Felen in 1963 (©Dai Hunt)

View of the site following the 1970 attempt (©Bob Hall)

View upstream from the sink. L to R: Clive Jones, Martyn Farr,Mike Ware, Gerry Wolff (©Bob Hall)

7. Pwll Dwfn and Extensions

SN 83322 16491 Alt 398m Length 89m

Tony Baker & Gareth Davies

At Easter 1947, while Peter Harvey and others were battling the weather at Sinc-y-Giedd, Paul Dolphin and others found a cave in the dry valley above Dan-yr-Ogof. Peter's memoirs (Rowland (ed.), 2009) recall:

"*It was on our return [from Sinc-y-Giedd] that we learned that Dolphin, Lander and Colin Low, collectively known, with Norman Paddock, as the 'Dolphin Gang', had found a promising hole in the Dan-yr-Ogof valley which they described as 'very dangerous'. They had been sheltering from the wind and rain in a small depression to consume a snack when they heard the sound of running water beneath them. It was not long before they had removed enough soil and boulders to enter a sloping passage with the stream running along the floor and which after about 20ft* [6m] *dropped down a pitch. They returned quickly to the Gwyn for some rope ladder. They returned again later for all the available ladder. They had descended one short pitch of about 20ft* [6m] *but there was another one immediately beyond it. Unfortunately, at the bottom of the second pitch, which was about 55ft* [17m]*, they found a third pitch for which there was no more tackle. It was decided to acquire more ladder and have another attempt at a later date.*"

Pwll Dwfn turned out to resemble a classic Yorkshire pothole; a series of five pitches leading to a sump. It's popular with those who enjoy SRT and has been the scene of many a training trip.

In 1964 Charles George and W.E. Clarke went in intending to dive the sump (George, 1964). Frank Salt and others rigged the ladders while the divers put on their wetsuits on the surface, but on their way down the second pitch one diver "*damaged an arm*" and wasn't able to dive. This at least had the advantage that only one set of diving gear had to be manhandled down the remaining pitches. Although the water was described as "*crystal-clear*", any movement "*stirred up quantities of fine silt*." The water was soon "*opaque*" but the diver did a "*crawl search*" and concluded that there was no viable way on, with the water appearing to enter a choke of sand and boulders. In 1972 John Parker dived the sump and reported in the CDG Newsletter (Parker, 1972): "*The terminal sump is to the right at the bottom of the pot. JP descended 12ft* [3.7m] *to the bottom of the pool and followed current marks in the sand for 15ft* [4.6m] *down to the right where it choked with boulders. (Not a hope!).*"

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- South Wales Caving Club (swcc.org.uk)

Gareth Davies takes up the story, with details of recent explorations:

Pwll Dwfn Extensions

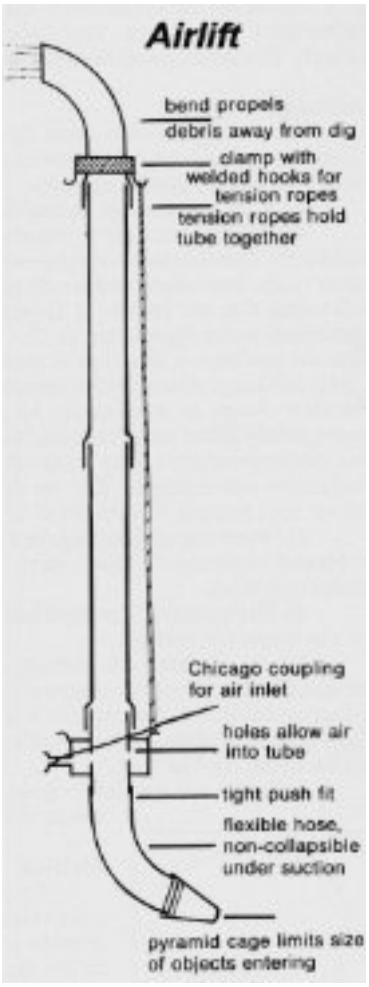
Having started caving in my mid-20s, and with no SRT experience, I agreed to join SWCC's 2007 Berger expedition. A training weekend in the Nave, in Ogof Ffynnon Ddu, was followed, a few months later, by a trip to Yorkshire, where a cock-up with dates saw me turn up the weekend after SWCC had left. Thankfully Hades

CC took pity on me, and I joined them. Back home, a work colleague and former SWCC member, Christopher Payne, took me to Llanelly Quarry Pot and Pwll Dwfn prior to my Berger trip, which I did after just six or seven SRT trips.

Chris also convinced me to go to Ogof Capel, which was my first cave dive, and a few other sites. So, after the Berger I convinced Chris Payne to again rig Pwll Dwfn so we could dive the crystal-clear sump at the bottom. At the time I was only vaguely aware of the CDG and hadn't considered joining. John Parker's was the only previously published dive report for the site, dating from 1972, and he'd summed the possibilities with the phrase "*Not a hope!*", (Parker, 1972) but it wasn't until many years later that I read JP's report. Chris and I made a number of dives and, while there was no ongoing passage you could easily enter, there was an obvious direction to the underwater chamber, which descended a gravel slope, that I felt could be dug to gain access beyond. Chris and I attempted to fill hessian-type sacks with gravel using a small shovel and then drag them up the slope, to try and gain access to the dry passage that I firmly believed must exist between Pwll Dwfn and Dan-yr-Ogof. While this wasn't an easy task, I felt that by sweeping my arm into the hole at the end, just beyond a small wall, it seemed as if the passage enlarged:

A number of years later Joel Corrigan and Matt St.Clair spent many trips in Pwll Dwfn pushing an aven in the chamber between P4 & P5, and the aven above the connection between P3 & P4 - eventually finding a connection back to the top of P2 via an interesting slot. (We're currently waiting for BCRA to supply P-hangers to provide an alternative trade route into the cave via this route.) Joel and Matt also installed the scaffold across the sump to hold large gravel bags for digging and started a dig beyond the sump up one of the rifts. Joel had remembered my enthusiasm for potential dry passage.

Around 2010, Mike Barnes, of the Welsh and Somerset section of the CDG, spent a winter digging underwater in Llygad Llwchwr. By then I'd decided to join the CDG and learn to dive properly. I was fortunate to meet Mike here several times and that's when the plan came together, with Joel approaching Mike as he'd known him from diving in Wookey Hole. Mike had vast experience using an air compressor to supply a constant volume of air at approx. 100psi under water. The air enters close to the end of a tube and as it ascends to the pipe towards the surface it creates a pressure differential, which the diver uses to suck up water and gravel, which is then thrown out of the top of the tube into carefully positioned one-ton gravel bags.



In September 2011, the Welsh Section of the CDG's compressor was installed on site (with thanks to Bob the local farmer). A number of acrobatic SRT trips saw installation of 120m of ¾ inch air-hose draped down the cave to the sump pool via the bypass route. The main trade route down the cave was also rigged on a long-term basis. The air-hose was connected to one of Mike Barnes' air-lifts, constructed of sections of 100mm diameter plastic pipe joined with ferrules to give a ~7m length.

Working alone at the foot of the airlift, generally with a single cylinder and no fins, the visibility was low to nil. Divers took it in turns to loosen gravel and mud with a short crowbar in the only possible alcove, feeding the debris into the hoovering mouth of the airlift. Awkward rocks would jam in the airlift and have to be freed, by shoving the crowbar up the pipe, or by turning the air on and off to blow out the blockage, or as a last resort by having to manhandle the whole airlift out of the water and tap it along its length to knock out the jammed stones.

Above water the debris shot out in a metre-high plume of brown water to fall into the gravel bags behind the scaffolding. Slowly the bags filled, and more were placed on top. Sections of drainpipe were laid through the thickness of the 'dam' between the bags, this is to prevent any difference in water pressure either side of the stack of bags pushing them over. Occasional rocks were either pulled out in a drag tray or, if too large, lifted out on the end of a rope.

In order to reduce the carrying of heavy cylinders up and down to the sump each trip, we were able to borrow a number of carbon fibre cylinders. These are considerably lighter than the usual steel cylinders and came in two varieties: 11ltr 200bar or 7ltr 300bar. These were supplemented with a pair of cast-iron sash window weights, to make the cylinders neutral buoyancy for diving. These were far easier to carry, particularly as there were often many other items taken in or out on every trip to help with digging

A Saturday of heavy rain saw the water levels in the sump pool rise 150mm during the divers' time in the water. This allowed the team to confirm that

One very effective device for shifting large volumes of gravel is an 'airlift'. This consists of a rigid vertical pipe with a short flexible section on the bottom with a cage on the end into which air is fed (from a compressor on the surface). The air bubbling upward creates a rapid upward flow inside the tube that carries sand and gravel with it. A curved section of pipe at the top allows the outfall to be directed away from the dig.

the water descends pitch five into the deep pool at the bottom, and then flows through to reappear behind the stack of bags in the terminal sump pool. From here it definitely goes into the dig, with enough flow in high water to clear the 'vis' sufficiently for a diver to have some view of their hands. (Previously the team had considered digging in the deep pool at the foot of pitch 5. The confused nature of the bottom of the cave could have meant that the water flowed from the 'terminal' sump towards pitch five, collecting the water coming down the pitch and then flowing off along an undetermined route under the boulder floor beneath pitch 5. High water allowed this theory to be disproved.)

Flooding of the cave in the divers' absence left 'safely stored' gear jammed in cracks more than 2m above normal water levels. Under these conditions the passage between pitch 5 and the terminal sump would certainly contain water. This backing up of water in flood proves that there is a significant constriction in or beyond the terminal sump.

Over the weeks the dig face receded under a lip of rock and into a body-sized tube. Over the last few trips, the first diver went into the water with a video camera to try to record a view of the onward route in the clear vis that lasted for a few seconds after entering the water. This technique had variable results but was useful. It confirmed that the onward route is in solid rock and has a solid roof. A large square rock is in the way on the floor and beyond this an eyehole, again in solid rock, gave a restricted view of a bank of gravel flowing in from the right and some small black spaces beyond. That first winter's project enabled some five tonnes of gravel and silt to be moved plus a further tonne of rocks, during approximately twelve hours of underwater work.

While this was ongoing, another local caver had joined us to help porter and spotted a possible lead at the top of P5. While the divers were busy, he rigged a route down 3m and installed a traverse north around the east side of the P5 chamber, until he reached a sandy slope. This required digging out as it was plugged with sand. After a few metres he entered what was the first new, previously unseen, cave passage since the cave was explored by SWCC in the 1940s. The passage was pushed over a few trips though a sand-filled chamber which ascended into a boulder choke, but unfortunately no route through could be found. The initial sand-filled chamber had one of the few calcite features in the cave and is worth a visit.

In 2012, after a few dives to see that nothing had changed, we felt another strategy was required but we didn't have the equipment or knowledge to break the rock, to enlarge the underwater face. So, we decided to try a dry dig in one of the rifts at the end of the cave that Joel had dug with Martin Groves some years earlier. Over just a few digging trips, Malcolm and I finally dug our way through the boulder ruckle blocking the end, installing scaffold as we went to protect our route. Beyond the choke, we stood at the base of an aven with water pouring in from high above. This was a good day and our humour and references to an old Star Trek episode about being 'beamed up' and wondering if there was 'life as we didn't know it' ended with us naming it Enterprise Aven in the hope of 'boldly going where no caver has gone before', split infinitives and all. Over several trips the aven was bolted with assistance from Malcolm and others. It began as an 8m climb up a rift to the base of Enterprise Aven proper. From there, we then bolted 41m up an interesting sloping chamber which was developed on a fault and offered tantalising glances into potential side passages which were too small to enter, but far enough that you couldn't tell if they closed or opened beyond.

Finally, at the top of the aven a rift could be followed at several levels but the higher one appeared the best prospect. However, it wasn't the biggest, so after installation of an etrier at the entrance - so you could hang on it and remove your SRT kit - progress was made along a passage named 'A Thrutch Too Far'. Unfortunately, after some 30m of passage, the end was reached with the water emerging down a small aven. On the surveying trip, which was considerably drier, the water was considerably less, and a small amount could be heard under the end of the passage, but I believe this is encountered further down the aven in one of the many inlets. With that being the spring of 2013, and another Castleguard return imminent, all was postponed until the end of the year.

Later in 2013, Malcolm and I returned to the sump armed with new equipment and tactics. The first few trips were spent with the airlift removing the unstable gravel that had moved down the slope. The diver working at the dig face was able to enter the restriction up to his calf, but only by hand-holding a cylinder – this wasn't felt to be good dimensions for a longer dive. A few metres of constriction are one thing, but if it continued it would have complicated an exit. The decision was made to try and remove the rock at the entrance to the sump to enlarge the first few feet as this was certainly a restriction. Having discussed techniques with other CDG members, it was felt that drilling holes to use the detonating cord widely used by diggers might be the easiest and safest route. Having an engineering background, I knew that drilling had potential for hearing loss, amongst other issues. The compressor on the surface, having been used to supply air at the dig face for the airlift, only required small modifications to change it to supplying an air drill. Having seen the price of industrial air drills with hammer action, we felt something else could be utilised so I acquired an impact gun, designed for riveting of metal rivets, and modified a rivet tool and a drill chuck so they would combine into a gun that, when the trigger was pulled, acted like a drill in impact mode. We were sceptical about how well

this would work due to the lack of rotation of the drill bit, being limited to turning the chuck by hand, but were pleasantly surprised to find the drill bit in the chuck rotated by itself slowly and the water almost aided the drill effort by turning the limestone dust into a paste. Drilling the rock arch above was undertaken but as with these things it was never straightforward. A 3-way air valve was installed which either directed the air to the air lift, small feed hose for the drill or to vent the air to prevent over pressurisation. This was needed as the air hose extending to the surface had an interesting habit of finding a weak link in the process. Several trips involved a quick return to the surface to restart the compressor, reattach the airhose at the compressor or return to the sump via the 'CUCC old' bypass to find the fault. Over time many of the connections were upgraded with stainless jubilee clips, an extension to the compressor air outlet was also installed which was a 1m length of steel bar with tack-welded round metal fins to allow for the air temperature of the compressed air to be reduced, so that it didn't soften the flexible air hose. Additionally, an old, scrap electric compressor was purchased, with a 24ltr reservoir, which was carried down to the sump and installed above the sump with a pressure relief valve so the compressor could be run at a decent rate without issue, yet the diver had a sufficient volume of air in the chamber that the gun would run with enough power.

It had been understood, from reading and talking to other divers before the project, that protecting the eardrums would require careful consideration as the movement of the gun underwater, instead of producing sound, would generate a pressure wave which can damage hearing permanently if left unchecked. Several attempts were initially made to mitigate this. Wearing moulded ear plugs caused pressure equalisation issues even at shallow depths, water temperature being a nice toasty single figure meant a hood was worn, so removing and installing underwater was fun. We tried using a neoprene hood with large holes punched out so ear plugs could be installed underwater, or large ear defenders worn, but sound, or rather transfer of vibration, meant these didn't provide the benefits we'd hoped for. A solution was found by installing a scaff bar across the chamber above the sump, nicknamed 'The Rat-Trap', after the classic 1980s game. We'd welded three sections of angle iron onto the end of a scaff bar, creating a frame into which we installed a plastic trug using jubilee clips. With a second one just placed inside this could be positioned, inverted, underwater, creating an air chamber which allowed us to keep our head out of the water in an airgap and allow us to operate the drill safely.

This worked well initially, however air tools and submersion aren't natural companions so alas the gun broke. Having managed to acquire another with a 3/8 fitting, this was used but also soon broke, and a borrowed air drill failed to drill the rock despite our efforts, due to the lack of hammer action. Bosch make air drills that are supposedly designed to be used in wet environments and, with a company called Parker Construction having gone bankrupt, one of these was purchased, followed by a second one.

While this was going on there were several other considerations. Vis was often poor to non-existent once we'd started drilling, so a trug was installed below pitch 5. This had a fire hose which had been welded to a plate and attached with bolts to allow the water to be directed into the sump and used at the dig face to wash away poor water. This also improved P5 for non-divers as they kept dry. The drill hole position was maintained by a piece of metal which was removed before drilling and reinstalled afterwards.

Another consideration was the use of chemicals for purpose of separating the rock; having already accepted that we couldn't get access to shaped charges. As the dig face was just 4 to 5m below the surface it was felt it was safest to run a length of small charge with a detonator above the water to reduce the likelihood of a misfire. We could then remove an inch of powder and fill each charge with the same sort of sealant you might use to seal a bath, this we hoped would stop water tracking along and neutralising the chemical which we'd already had experience of not working when wet. A local landowner, and SWCC member, Laurie Galpin was more than happy for us to have some trials on his land in the vicinity of the stream that passed through. All our trials were successful at getting the chemicals to perform as intended when we replicated the Pwll Dwfn sump and left everything under water for an extended time.

Despite all this effort, and three winters at the project, it became clear that we were unlikely to find an easy way of passing the sump and that we'd have to accept that the initial thoughts of John Parker were indeed correct, and we accepted that retreat, with the lessons and passage found, was indeed the better part of valour.

In 2016 Malcolm and I returned to the cave with Brian Clipstone and surveyed to the bottom of P3. After just one day and after much discussion it was shelved as being too difficult to achieve what I wanted with those instruments. In 2017 a Distox2 was purchased and, after a few uses in two foreign expeditions, having loaned it to Tarquin, he was persuaded to join me in carrying out a grade 6 survey which we'd hoped to have finished for this article. Unfortunately, with COVID-19, and an accident in September involving a cat and a bike, the survey won't be finished until 2021 as the surgeon won't allow me to cave, let alone get on a rope!

What is left is the 'CUCC old' P2 bypass and one aven between P4 & P5 to be climbed; then the cave can be de-rigged and, hopefully, P-hangers installed down the 'CUCC old' bypass, which have been ordered.

The divers would like to record their thanks to Bob the local farmer, for the use of a quad bike and trailer for positioning heavy gear, and to Ashford Price of Dan-yr-Ogof for support and parking. A special thanks to Jopo and Marj for many a cup of tea to warm us up on our return to the surface.

Divers: Chris Payne, Malcolm Stewart, Mike Barnes, Martin Groves, S. McCabe, C. Minton, and Gareth Davies.

Support: Jules Carter, Richard Frost, Krysia Groves, Kate Humphries, Keri Lewis, Gareth Phillips, Matt St.Clair.

Gareth Davies in Pwll Dwfn (©Brendan Marris)

Enterprise Aven (©Brendan Marris)

8. Ogof Twyn Tal-Draenen

SN 80756 19116 Altitude 490m Length 195m

It seems that the sink at Tal-Draenen was, for many years, considered to be beyond the Dan-yr-Ogof catchment and so it did not receive the attention from diggers that it might have. Alan Coase had speculated that the stream might go to DYO (Coase, 1977) and Bill Gascoine's 1982 dye-tests (Gascoine, 1983) confirmed the connection, with an encouragingly quick flow-through time.

On a day in August 1947 when there was too much water going into Sinc-y-Giedd, Peter Harvey noted: "*We also examined a swallet we had not seen before to the north… called Twyn Tal Ddraenen (sic). We pulled a few boulders out and noted it down for attention later on.*" Club logbooks record a series of visits to the sink at Tal-Draenen by Sam Moore, Peter Harvey and others in 1984. Inspired by the 1989 one-day conference described above, a group of us started work at the Tal-Draenen sink in 1989. Our efforts were intermittent, and it wasn't until 1992 that a more focused approach was started. Paul Quill, Ian Middleton and I became the most regular visitors to the site, and one day in June 1992 Paul went up on a solo visit, as many Club members were on an 'away' weekend in north Wales. He managed to force his way past some dodgy boulders and found around 30m of new cave, including a sizeable chamber (later called 'First Big Chamber', in the optimistic expectation that there would be others!), and then returned to the Club to recruit additional help. The next day he was back with Clive Jones, Nig Rogers, Dai Hopkins and Mark Withers. The slimmest member of the team, Dai, was able to force a squeeze and then enlarge this for the others to follow him. They explored 50m of mostly small passages, including a deep canal that ended at a sump. Paul, Nig, Dai and Mark returned a week later and found another 18m of 'tortuous passage'.

Gareth Hardman and Andy Ward had three attempts at diving the sump, in 'zero vis', in 1992 and 1993, all without success. In the meantime, Bob Hall, Haydn Rees and Paul Quill had done a sterling job of timbering the precarious entrance choke, making progress in and out much safer.

We spent the rest of 1992 desperately pushing other leads, and in December Ian Middleton and I forced our way up a rift above the sump and were delighted to find a draught. Having cleared some boulders, we entered a high-level passage ('Boost Passage'). New Year Chamber was entered on 31st December 1992. We enjoyed a succession of breakthroughs in this 'upper series' early in 1993, including one thrilling day when we entered more than 50m of new passage, including a chamber 10m long and 5m wide (Mrs. Miggins' Coffee Shop). Ian Middleton, Hywel Davies and I had an epic struggle to get out of the new find, having forced a downhill slot that turned out to be much harder to do in the opposite direction. Much of that new find, though, was small and awkward, especially when travelling through with tackle sacks, and every trip saw us leave the cave caked in thick mud.

By late 1993 Martin Hoff had joined as part of the regular team, and the place became our shared obsession for most of the next twenty years. On alternate Saturdays we would drag huge rucksacks, loaded with a Bosch drill and the weighty 'ammo box' batteries, up the hill and take the kit through the mostly constricted passages to the far end of the cave. Ian Middleton and Paul Quill were still regulars, and other names that crop up frequently in our records include Steve West, Pat Hall, Sue Mabbett and Hywel Davies. The far end of the cave was a boulder choke, Platypus Choke, but we managed to get beyond this, pushing a mud duck ('The Slurry Bath') into an uninspiring rift that we worked on time and again. The bang cable was vulnerable in the tight route to the far end and through the choke, and we were forever having to shuffle back and forth, our

oversuits thick with mud, trying to diagnose faults. It would take most of an hour to get from the cave entrance to the far end of the cave, and usually longer on the way out after several hours of hard work.

We pushed countless leads throughout the cave, sometimes gaining a few metres of new passage here and there but never getting the rewards our efforts deserved. The draught that we'd followed into the upper series mysteriously (and infuriatingly) disappeared towards the far end. We endured some epics, including Martin getting himself thoroughly stuck in a tight slot in March 1998 and, after a surface cloudburst in October 1999, having to escape quickly as the cave flooded. We only made it out of the torrent that the entrance choke had become by taking a deep breath and by knowing every inch of the way out so intimately. There are numerous write-ups in back issues of the SWCC Newsletter that record our struggles (Baker, NL110, NL117, NL129). We walked up in wind and torrential rain, through snowdrifts, and on scorching summer days. I lost count of the times when, in the winter months, we failed to get out of the cave before dark and had to rely on a compass bearing to find our way back to the Giedd (and then to the track) in visibility of only a few metres, but on other occasions we enjoyed fabulous sunsets on cold, still evenings.

By 1999 I'd clocked up more than a hundred visits to Tal-Draenan, and Martin was rapidly catching up, having made a number of trips with others on weekends when I wasn't around. Our totals to date are more than 150 trips each.

In 2009 we followed a draught into a separate 'upper series' near the entrance and into a fine, well-decorated chamber, 10m long by 3m wide, which sadly ended up heading for the surface. In July 2014 Martin took Gareth Davies in to dive the sump, and after an epic struggle Gareth managed to pop his head out of the sump on the far side, but he couldn't get out of the water. Encouraged by this, in recent years we have started work to try and open the sump by working on the roof, but access to the sump can only be gained in very dry conditions, most usually in the summer months, and our attentions have often been distracted by other projects.

An added complication is that, over time, the surface stream has changed its course. When we first explored the cave, going through the entrance choke involved a minor soaking from percolation water, much worse in times of wet weather, but the main flow of the surface stream entered the cave in a larger passage beyond the choke. The stream has subsequently cut its way back across the floor of the shakehole and now flows directly down the cave entrance and into the choke. Even in dry weather, a visit to the cave starts with getting drenched. It's unpleasant at best and at times more than a little intimidating.

But Ogof Twyn Tal-Draenen still has a special place in our hearts and it's still an ongoing project. Every so often Martin and I make a trip to the far end and look again at all the leads we've abandoned, and check for the umpteenth time every corner and crevice. We realise just how dedicated we were back in the late 1990s and the early 2000s, when we would drag large amounts of equipment up the hill and through the cave at least twice a month. I still lie in bed at night sometimes and think 'maybe we should have another go at that', while visualising some remote part of the cave. And one day, we will.

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- Baker, Tony (1996) "*A Game of Two Halves: Ogof Twyn Tal-Draenan 1992-96*", *SWCC Newsletter* 118, p.196.
- Baker, Tony (2012) "*Mud, Sweat and Tears: a Digging Trip to Tal-Draenen*", *SWCC Newsletter* 128, p.10.
- Coase, Alan (1977) "*Other Caves and Digs in the Catchment Area*", *BCRA Transactions* 4(1&2), p.269.
- Gascoine, Bill (1983) "*A Hydrological Study of the Dan-yr-Ogof and Ffrwd Llas Resurgences*", *SWCC Newsletter* 97, pp.9-12.

Ian Middleton at the entrance to Tal-Draenen, probably mid-1990s (©Tony Baker)

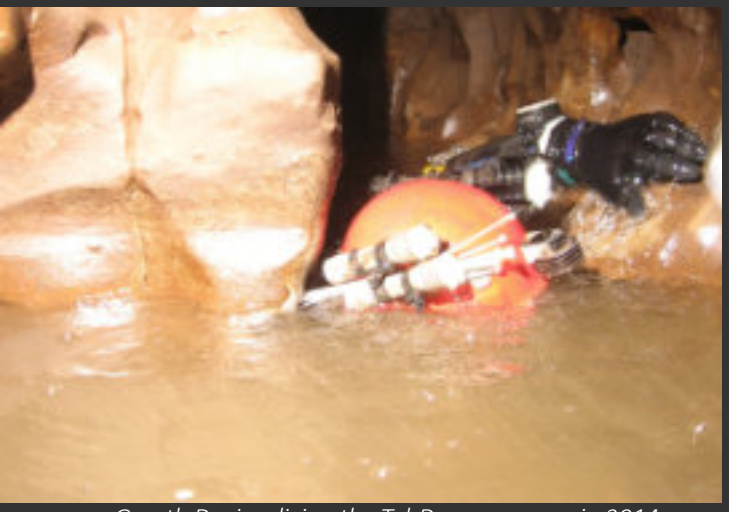
Rita Mallinson-Cookson at the entrance in August 2018 (©Tony Baker)

Jules Carter at the entrance in May 2021. Notice how the route taken by the water has changed over the years (©Tony Baker)

Martin Hoff in the entrance shakehole, probably mid-1990s

(L to R) Tony Baker, Martin Hoff and Ian Middleton after a trip into the cave, probably mid-1990s

Ian Middleton in Ogof Twyn Tal-Draenen, probably mid-1990s (©Tony Baker)



Gareth Davies diving the Tal-Draenen sump in 2014 (©Martin Hoff)

Tony Baker on the approach to the sump in Ogof Twyn Tal-Draenen (©Martin Hoff)

Tony Baker using a Hilti drill in Ogof Twyn Tal-Draenen. Note that the drill was the digger's own, not Club gear! (©Martin Hoff)

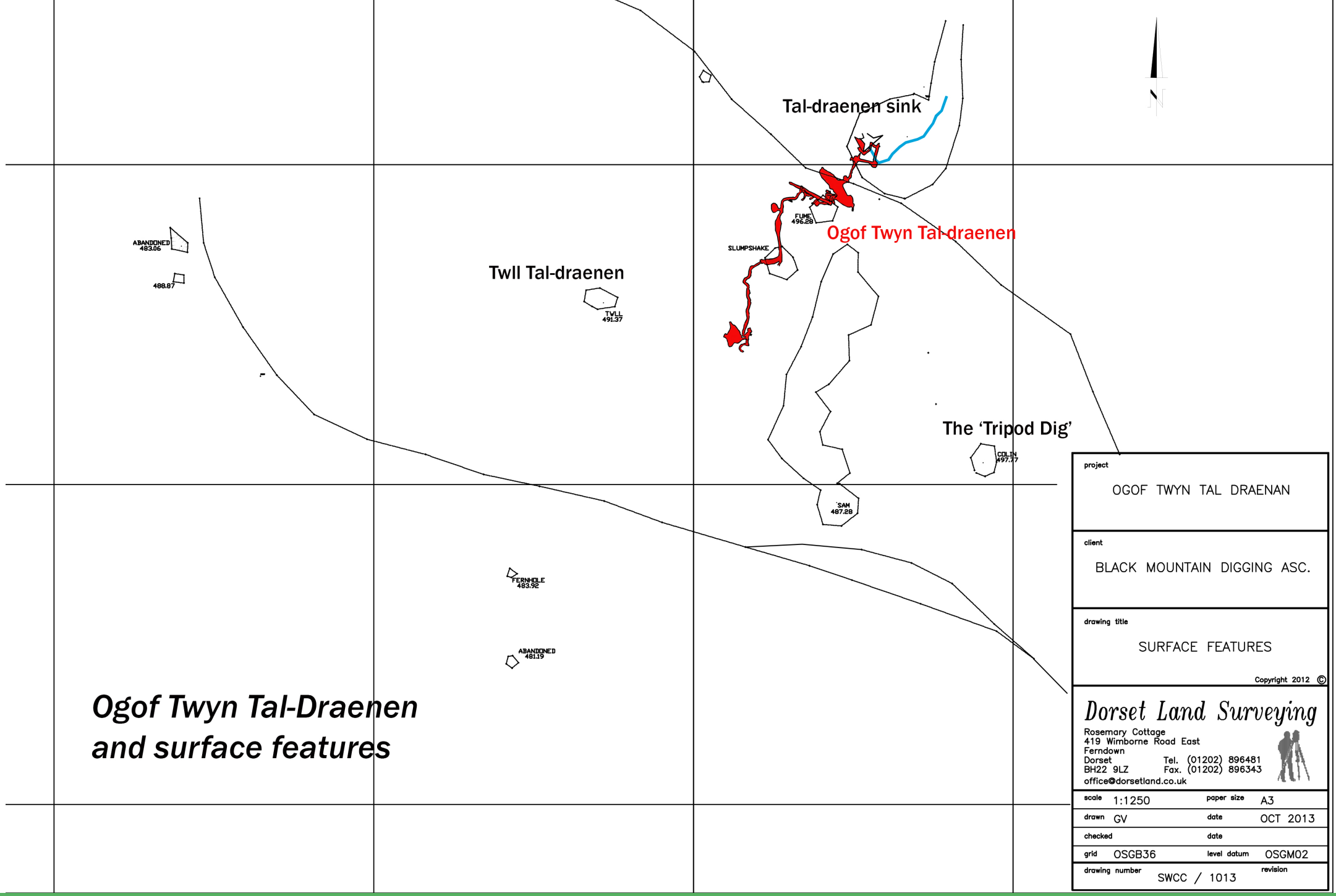
Tony Baker in Ogof Twyn Tal-Draenen (©Martin Hoff)

Tony Baker in the entrance choke, Ogof Twyn Tal-Draenen (©Martin Hoff)

A typical outcome from digging in Tal-Draenen (©Martin Hoff)

Martin Hoff in Ogof Twyn Tal-Draenen (©Tony Baker)

Survey of the cave at Ogof Twyn Tal-Draenen and related surface features. Cave survey data kindly provided by Iain Miller; surface survey made and drawn by Gary Vaughan



Ogof Twyn Tal-Draenen and surface features

9. Summary of other digs of interest

Twll Tal-Draenen SN 80674 19065 Alt 503m Length 50m

Just a few metres from the sink at Twyn Tal-Draenen is an open shaft at the base of a shakehole. Pete Francis was almost certainly the first to find this, on July 1st, 1977, and explored the cave two weeks later with Liz Millett and Tony Davies. The base of the shaft, 10m down, leads into an impressive fossil passage that leads to a junction. Stuart France wrote about the site, and included a sketch survey, in the one-day conference publication (France, 1990). I've made several visits to the site but there is no obvious place to dig. It's well worth a visit, though.

Reference

- France, Stuart (1990) "*Ogof Twyn Tal-Draenen (sic)*", *SWCC Newsletter* 106, p.25.

Rusty Horseshoe SN 80841 18388 Alt 458m Length 30m

This is a sink in a large shakehole to the north and west of Sinc-y-Giedd. It was dug originally by Gareth Jones, Nig Rogers and others in the early 1980s, and then by Tony Donovan and others in the mid-1990s. The entrance shaft is lined with a metal tube, leading to a climb down. There used to be a rather tortuous route down to a choke that various people have worked on, but a few years ago Tony Donovan worked to open up a more direct route down that has made the removal of spoil rather easier. Tony has been working at the site more recently, but no-one has yet been able to find a route from the entrance to the significant stream that sinks in the corner of the shakehole. There is obvious potential here but if a site beats Tony Donovan, then the indications are that it's going to be a tough nut to crack. (Updates for this article are not available at the current time - please see Bob Hall's afterword for comment).

Pwll Dewi Sant SN 81221 18507 Altitude 458m Length 20m.

This 25m blind pot, close to the east bank of the Giedd, 'appeared' suddenly in the early 1980s. The open shaft soon collapsed in but in the 1990s Martin Groves and others made a determined effort to re-open it and the remains of their scaffolding can still be seen. Water from the Giedd still enters the hole and can be heard from the surface. Sometime in the early 2000s, Paul Quill, Pat Hall and I went in for a look and the stream was disappearing into a low sump, almost full of gravel, that appeared to offer little hope of further exploration. More recently Tony Donovan and others have been working at the site again, and have attempted, with limited success, to divert the water from the stream to make the site easier to work on. (Updates for this article are not available at the current time - please see Bob Hall's afterword for comment).

Pwll Porth Ddu SN 82623 17225 Altitude 474m Depth c.40m

In January 2004 Gary Vaughan, Paul Meredith, Martin Hoff and I spent a bitterly cold day doing a temperature survey of digs on the Black Mountain. Using a digital thermometer, we were hoping to find a significant temperature differential between the air emanating from the various sites and the outside air. Sadly, this proved something of a fruitless exercise, but on a similarly cold day a few weeks later Gary and Paul found two holes in the dry valley below Waun Fignen Felen that were emitting 'warm' air (8.5°C) on a day when the ambient temperature was 1.5°C. The more promising of the two became the focus of a concerted digging

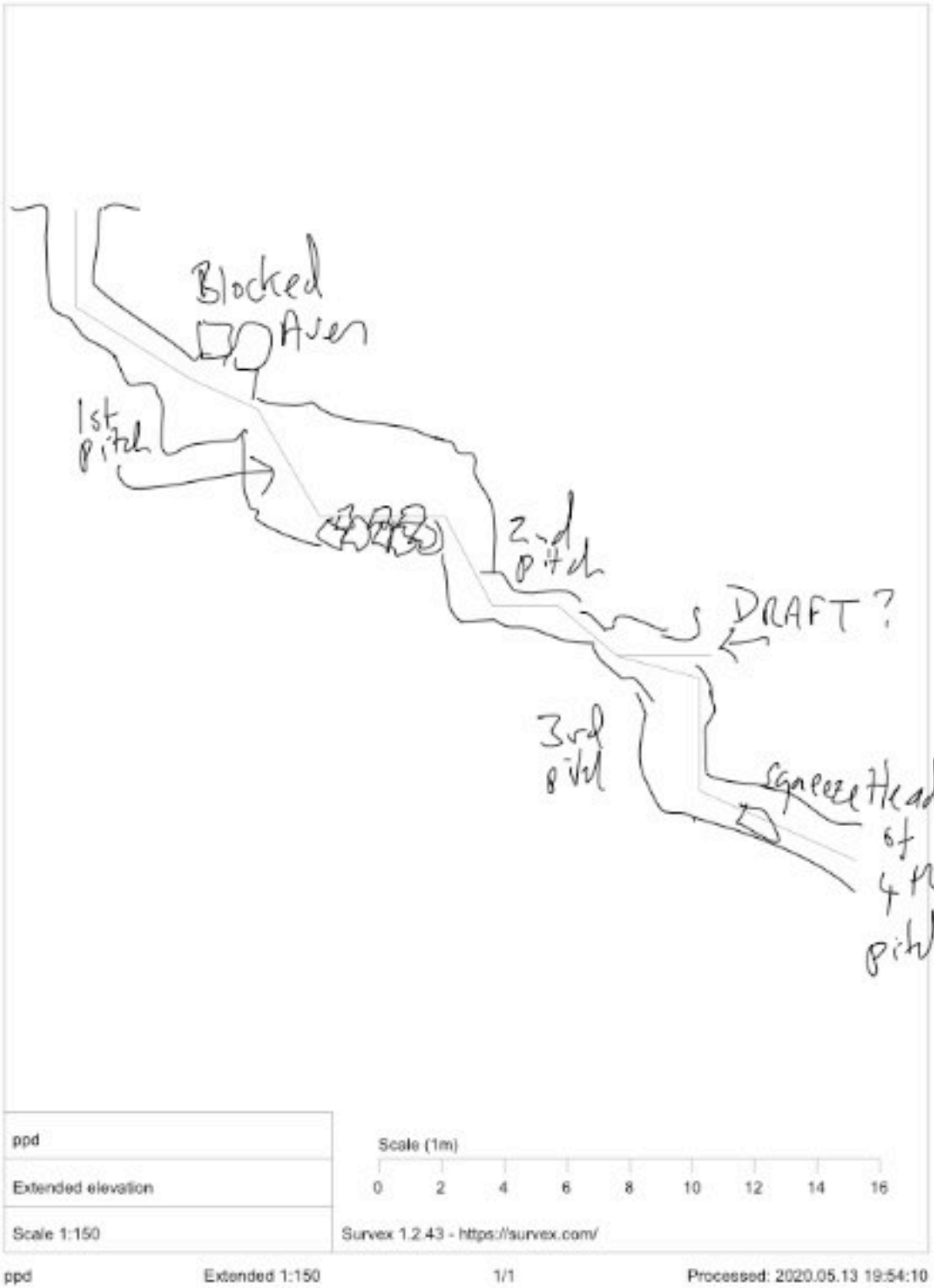
Steve West descending Pwll Dewi Sant soon after it 'appeared' in the early 1980s (©Pete Francis)

David Eason at Pwll Dewi Sant in August 2020 (©Tony Baker)

effort by the four of us, and others, over the next few years. Scaffolding was installed to stabilize boulders at the entrance, and it took more than a year of regular visits before we achieved a 'breakthrough' into a chamber with a boulder floor. A succession of hard-won lesser breakthroughs, down several vertical drops, eventually led us to an 8m pitch and things were really starting to look exciting. At the base of the pitch, we enlarged a small hole and gained access to a descending rift. At the very bottom of this we worked for a while on a low and rather uninspiring passage, but this closed right down, and we eventually took the decision to fill this with spoil to make work on other areas easier. Our most recent efforts concentrated on a potential continuation of the descending rift at a corner where we had taken the more obvious passage leading to the right, but enthusiasm for this was limited and our attentions have turned to other projects elsewhere on the mountain.

PPD is probably the most frustrating digging project I've worked on. The cave is 40m deep and we fully expected that by this depth we would have encountered the Waun Fignen Felen stream. The upper section of the cave has a good draught that kept us inspired but the further down you go the less distinct this is. We put an enormous amount of work into the project and for the cave to close down in the way it did was very demoralising.

Sketch survey of Pwll Porth Ddu, made to a surveyed centre-line by Ben Stevens



Tony Baker in Pwll Porth Ddu (©Martin Hoff)

Martin Hoff in Pwll Porth Ddu (©Tony Baker)

Ogof Giedd SN 81190 18255 Altitude 445m

Having come to something of an impasse at Tal-Draenen, a group of us started looking at surface sites in the vicinity. It was while working at one of these (see 'Tripod Dig' below), in the summer of 2015, that a walker came past and asked if we had seen the 'big black pool' that had recently appeared on a bend in the Afon Giedd, a few hundred metres upstream of Sinc-y-Giedd. This provided the perfect excuse for a diversion on the walk back and we were surprised to see that, at the sharp bend in the Giedd where the small tributary (the Cig) enters the main flow, a deep pool had appeared that was taking a significant proportion of the stream's volume. A big slump in the adjacent steep bank was clearly related. Something major had obviously happened underground.

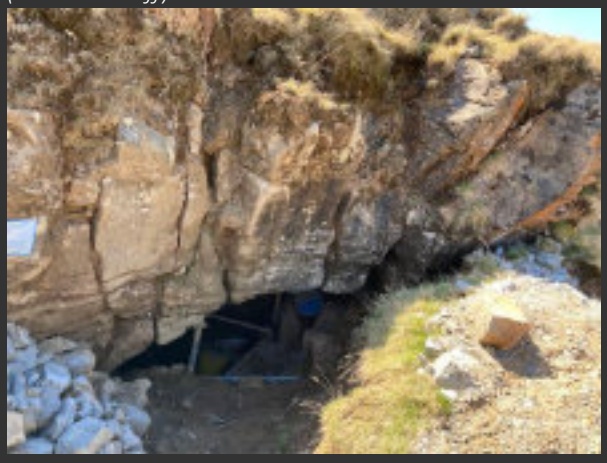
On subsequent visits we started digging at the base of a small cliff above the stream, and despite numerous setbacks we eventually gained access to a horizontal passage, with a small stream, at the base of a 3m shaft. The dig drew attention from the Brecon Beacons National Park Authority (France et al, 2017) and Jem Rowland drafted a request for permission to dig that was accepted. The regular team of Jem, Martin Hoff, Paul Quill, Jules Carter, David Eason and I, with others, have devoted many days to the project. The digging weeks of both 2016 and 2018 were spent working on it and eventually in 2019 we were able to descend a 4m shaft, from where the water flowed away readily into an area of breakdown. Working at the bottom, under the full flow of the water, was cold and uncomfortable and Paul Quill devised an elaborate system of pipework that kept the water away from the digger, but just as we had this installed and fully working, in March 2020, the COVID-19 pandemic hit the UK and all activity ceased. Fortunately, 'lockdown' restrictions were lifted by the start of Digging Week 2020, but the weather intervened, with big downpours in the previous week making the water back up at the base of the shaft, making further progress impossible. Further COVID-19 restrictions quickly followed and at the time of writing (May 2021) we have only just been able to resume work.

Reference

- France, Stuart, & Paul Sinnadurai (2017) "*Surface Exploration in the Dan-yr-Ogof Area*", *Cambrian Caving Council Newsletter* 55, pp.3-4.

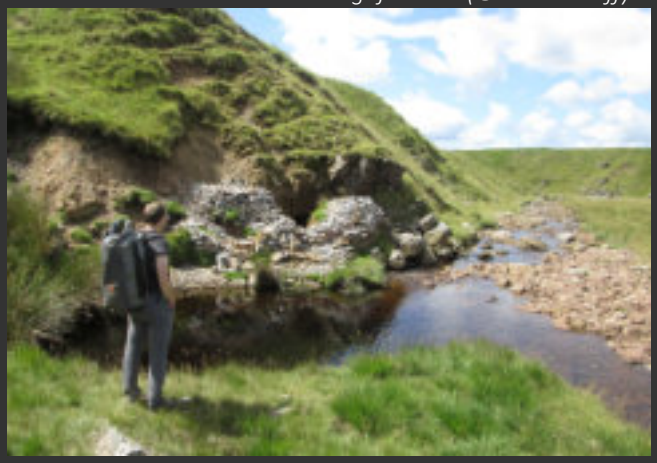
This pool first appeared in 2015 and drew our attention to the site. (©Martin Hoff)

We started digging at the foot of the cliff in 2016 and soon discovered this natural arched 'cave entrance'. (©Martin Hoff)

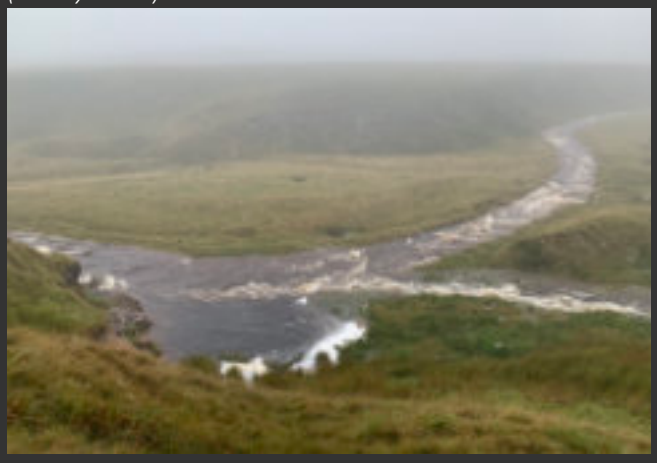


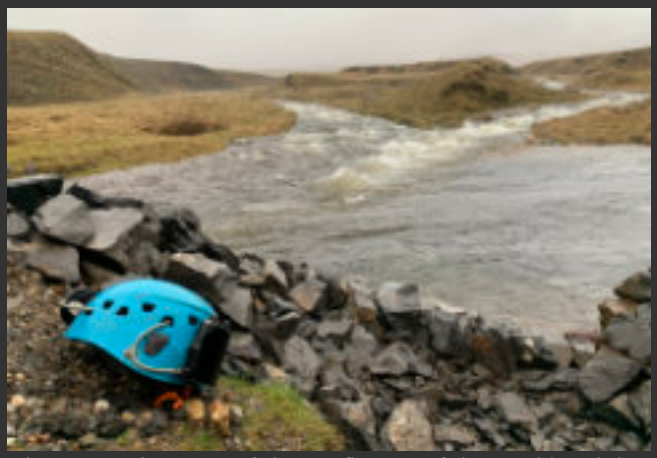
Jem Rowland on surface-hauling duties at Ogof Giedd. (©Martin Hoff)

Jules Carter at the entrance to Ogof Giedd. (©Martin Hoff)

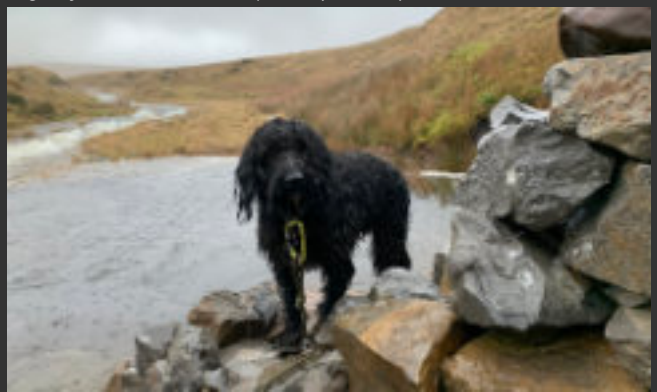


The confluence of the Giedd and the Cig in flood conditions. The entrance to Ogof Giedd is at bottom left of the picture. (©Tony Baker)





Above: Another view of the confluence of the Giedd and the Cig in flood conditions. (©Tony Baker)



Mavis is the Ogof Giedd mascot but she doesn't like hanging around in the rain.

Tim Lewingdon at work at Ogof Giedd, August 2018. (©Tony Baker)

Above: Paul Quill measures up for his clever pipework, that keeps the digger dry at the sharp end.

Tony Baker hauls a drum of spoil up the shaft at the bottom end of Ogof Giedd, May 2021. The blue firehose directs the water away from the digging face (©Jules Carter)

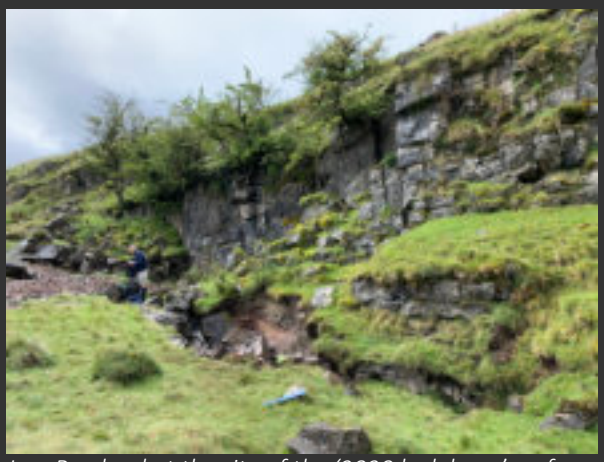
Entrance shaft at Ogof Giedd (©Martin Hoff)

The 'Plan B' dig SN 81040 17920 Altitude 439m

At some point in the late spring of 2020, at a time when the UK was under COVID-19 lockdown restrictions, two sizeable holes 'appeared' adjacent to the upper sink at Sinc-y-Giedd. Paul Quill and Hywel Jopling found these when restrictions had eased, on a walk up to check on the dig at Ogof Giedd. By July those of us living in England were able to travel to Wales and a large group of us walked up to investigate. The larger of the two holes had left a big, exposed section of cliff face just north of the sink, and clearly a large volume of soil and rocks had collapsed into an underground void. Paul Quill spent some time pulling rocks out of the smaller collapse and found a small draughting hole heading into the limestone. It was clear that water flowed into the hole in wet weather. We spent some time enlarging this with the aid of a drill and SDS chisel and, while the draught was intriguing, the site would clearly need some considerable effort. Digging Week 2020 escaped COVID-19 restrictions, but, frustratingly, weeks of dry weather came to an end immediately beforehand and the dig at Ogof Giedd was too wet to allow for meaningful progress. With a group of willing diggers assembled, we decided that the draughting hole at least offered some prospect of new discovery and set to work. Further rain during the week kept Ogof Giedd off the agenda and much of the week was spent on the 'Plan B'.

Within a couple of days, we'd made some good progress and after enlarging a constricted bend I was able to drop down a 2m climb into virgin passage. This was 'proper' cave: water-worn limestone with scalloped walls. There were three ways on: to the left was an uphill crawl heading towards the upper sink; to the right was a descending narrow tube, while straight ahead appeared to be the route taken by the water, a low passage in which the rusting remains of a saucepan could be seen. Fortunately, the next bout of rain saved us a lot of effort: with water flowing in the dig the picture became much clearer – the stream was running out from the 'saucepan' passage and into the descending tube, so this became the focus of our efforts. By the end of the week, we'd gone a few metres along this, but it looked like a very long-term prospect.

In the meantime, we'd explored the 'uphill' passage and broken into a pretty little chamber, some 5m long and 2m wide. A side passage off this might repay further investigation.

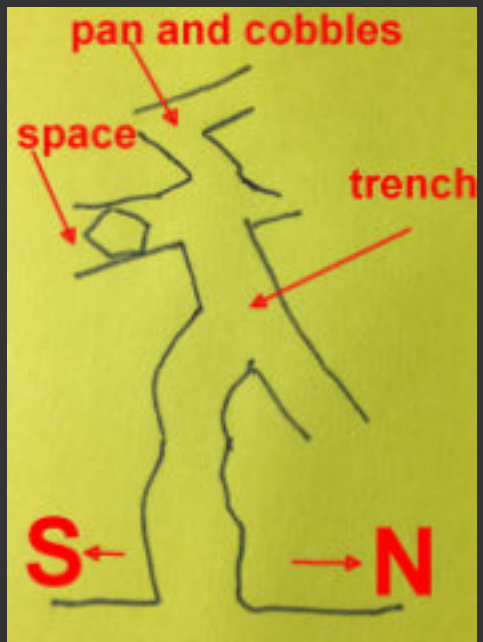


Jem Rowland at the site of the '2020 lockdown' surface collapses. Just behind Jem is the upper of the Sinc-y-Giedd sinks (©Tony Baker)

Right: One of the first visits to the Black Mountain after the COVID-19 lockdown, July 2020. (In the background, behind Jem Rowland, can be seen the remains of Bob Hall's 'megalithic dam', built in 1981.) (©Carlo Ryan)

Work at the Plan B dig during digging week 2020 (©Tony Baker)

Sketch survey of the Plan B dig by Martin Hoff)



Digging at the Plan B dig, August 2020. On the extreme left of the pic is upper of the two Sinc-y-Giedd sinks; on the right you can just see the left-hand end of the larger of the two surface collapses that took place in spring 2020

Above Right: Martin Hoff (L) and Jules Carter in the dig, August 2020 (©Tony Baker)

Right: Entrance to the Plan B dig (©Tony Baker)

Tony Baker enters new cave at the Plan B dig, August 2020. Note the scalloped limestone wall on the lower right-hand side of the picture (©Martin Hoff)

The 'Tripod Dig' SN 80795 19012 Altitude 501m

Despite the significant amount of cave we have explored in Twyn Tal-Draenen, the sump has always remained the most frustrating barrier to progress. We recognised that following the water was essential if we were to find our way into 'the missing miles'. We've looked at a number of the surface shakeholes in the vicinity of the Tal-Draenen sink, in the hope of entering the stream passage beyond the sump. One wet day during Digging Week in 2014 I was up on the hill with Jem Rowland and Ben Stevens; Jem was using his dowsing rods. He had a solid 'reaction' from the Tal-Draenen sink that led him in a south-westerly direction, directly to an abandoned dig in a shakehole with a small surface spoil heap. (Later investigation established that this had been dug by Colin Graham in the 1960s.) Ben was able to replicate the exact same reaction. Sometime later we took the resistivity kit up there and gained some very interesting results that seemed to indicate the presence of a large underground void close to the dig, and this spurred us on. A few days of intense digging opened a square-section shaft some 4m deep, into which we installed a scaffold cage. From the base of the shaft, a small stream trickled into a low passage that took a considerable effort to enlarge. We recovered a scaffold tripod from another dig, and this made hauling buckets of spoil out very much easier. The low passage went round a corner and the stream could be heard gurgling away ahead. We attached a GoPro camera and a torch to Jem's drain rods, but the resulting footage showed the passage continued small. By now we were sufficiently far from the base of the shaft that we should have encountered the large void indicated by the resistivity scans, but Jem had by this time established that the equipment was suffering from glitches and the results were not reliable. Then in the summer of 2015 our attention turned to another site (see 'Ogof Giedd' above) and the project is on hold, but not written off.

Ben Stevens instals a scaffold cage in the Tripod Dig (©Tony Baker)

Roaring Hole (SN 82141 17968, Altitude 487m) and other sites at Waun Fignen Felen

The eastern side of the bog at Waun Fignen Felen drains into the sink described above by Jem Rowland. Meanwhile there are numerous sinks and shakeholes on the western side of the bog, several of which have been dug. Gareth Jones and the late Jeff Bain found Roaring Hole after a walk up on to the hill following heavy rain, and work was continued by Martin Hicks and Martin Laverty. Other sites in the vicinity, including Dead Dog Cave and Rumbling Rift, were also investigated. The project was comprehensively written up by Gareth Jones in SWCC Newsletter NL126 (Jones, 2007) and there is little point in republishing the same material here, but anyone interested in this area would do well to read the article and talk to Gareth Jones.

Interestingly, a somewhat inconclusive dye-test carried out in 1991 (Jones, 2007) would seem to indicate that water sinking on the western flanks of Waun Fignen Felen enters Dan-yr-Ogof via the proposed 'Giedd Series' and not via the Great North Road, where water from the eastern side enters the cave.

Reference

- Jones, Gareth (2007) "*The Case of the Disappearing Bog*", *SWCC Newsletter* 126, pp.27-30.

10. Recent Digging and Exploration in Dan-yr-Ogof

As the previous set of articles makes clear, there is the potential to find miles of cave between the sinks on the Black Mountain and the 'known' cave. So, what progress has been made recently in exploring from *within* the cave, particularly with regard to the fabled 'Giedd Series'?

The water from Sinc-y-Giedd first appears in the cave in the Mazeways area, much of which is only accessible to cave divers. Martyn Farr outlined the possibilities in SWCC NL106 (Farr, 1989) but despite intermittent activity in the intervening years it seems that little progress has been made in extending this further.

Heading in the same direction as Mazeways, but at a higher level, is the area of Dali's Delight, reached by a climb up from The Abyss. Again, Martyn Farr was among those exploring this area and Nig Rogers wrote about the prospects for this, also in SWCC NL106 (Rogers, 1989). Nig cautions that everything in high-level Dali's is "*very, very loose*", which may explain why there has been little in the way of further work, but there is a strong draught, and the area might also yield a dry connection to Mazeways II. Cavers from outside SWCC were exploring some high-level passages here in the 2000s, but an ill-judged trip on a day in March 2008, when more than an inch of rain fell in the Swansea valley, saw them trapped in the cave by flood waters and rescued the following day.

Nig's article also includes details of the work done by him and others in Hangar North and Hangar South, another part of the cave that seems to be heading in the 'right' direction. Again, there are cautionary tales of dangerously loose boulder chokes and Nig implores the reader to "*remember the laws of gravity*" when exploring the Hangar chokes. But, as he writes, "*What is certain is that new passage is virtually guaranteed at any of these places given sufficient time and effort on the part of the diggers.*"

Further up the cave, Liam Kealy, Dudley Thorpe and others found the High and Mighty Series as part of their Far North project (Amman Valley Caving Club, 1992).

The Far North Choke itself has been a major barrier to progress since it was first reached in the late 1960s. Paul Quill and Tony Donovan made a number of trips here in the late 1990s and made some progress along the right-hand wall of the choke but work here is always going to be difficult given the length of time and the effort involved to reach this part of the cave.

More recently, digging activity has been concentrated on sites rather closer to the entrance. One particularly intriguing prospect is Alfrebag Passage, first explored by Alan Coase and others in 1964, and Mike McCombe tells the story so far in a following article.

In the mid-2000s, Bernie Woodley, Mike McCombe, Keith and Sue Goodhead and others pursued a dig known as Barbarians' Dig, close to the showcave. This seems to have involved removing large quantities of sand fill; there are a number of SWCC logbook entries from 2006 that record their efforts. Bernie had a narrow escape from the dig in April 2006, when a flood pulse hit the cave while he was in it. A logbook entry from July 2006 suggests that the project had reached an impasse, reaching small passages in solid rock with limited prospects and no means of stacking spoil.

I must end with a word about access and permission. As you will appreciate, caving access to Dan-yr-Ogof is granted by kind permission of the showcave owners. Ashford Price and his family have always been broadly

supportive of responsible digging activity, both in and above the cave, but in the last ten or more years their patience has been sorely tested. In the 2000s, a caver from outside the area (not an SWCC member) relocated to south Wales and became obsessed with original exploration in DYO. He engaged in something of a one-man onslaught in the cave: digging, drilling and bolting some extreme climbs, and using explosives. Although he found some new cave, including some impressive passages above Cascade Aven, close to the Green Canal, he was in the cave on several days each week, many of his projects were carried out without due regard for conservation issues and the showcave management became very concerned by the situation. Numerous attempts by the cave's management body, the DYO CAC, to 'rein in' said caver were unsuccessful and he had a tendency to respond to such attempts with forthright and sometimes aggressive communications. The showcave management, supported by the CAC, took the decision to enforce a five-year moratorium on exploration work in DYO, and banned cavers from using drills or other digging equipment in the cave. The caver in question soon breached this ban and his DYO Warden permit was withdrawn. Hostile communications continued and in the end his access ban was made permanent. Sadly, this didn't end the story: he turned his attentions to a surface dig on land above the known cave, a dig that not only breached the SSSI regulations but upset a local landowner, who stood to be held responsible for damage caused to the SSSI on her land.

Inevitably this whole sorry tale has caused tensions between the caving community and the showcave management. Threats to create a second entrance have led to a grille being installed across the passage at the end of the showcave, and this will be permanently locked (and caving access withdrawn) should such an entrance be created.

Although the five-year moratorium has now run its course, any intention to dig or carry out exploration activity, such as bolt-climbing, in the cave must be cleared with the renamed Dan-yr-Ogof Cave Advisory Panel (DYO CAP) *before* starting, and any conditions imposed must be strictly observed. Failure to do so could threaten cavers' access to the cave and lead to further deterioration of what has historically been a very harmonious relationship. Please act responsibly.

References

- Amman Valley Caving Club (1992) "*Recent Progress in Dan-yr-Ogof: The Far North Project*", *SWCC Newsletter* 110, pp.6-8.
- Farr, Martyn (1989) "*Diving Related Prospects in Dan-yr-Ogof*", *SWCC Newsletter* 106, pp.8-10.
- Rogers, Nig (1989) "*The Giedd Series: Digging prospects from Dan-yr-Ogof II*", *SWCC Newsletter* 106, pp.12-15.

Alfrebag Passage - By Mike McCombe

Alfrebag is a curious bit of passage that ascends from an alcove at the far end of Bypass Passage, not far from the end of the showcave. Even the origin of the name is a mystery, though it's most likely a concatenation of the names of the original explorers – Alan Coase, Doug Baguley plus an unknown 'Fre' back in 1964. (Coase, 1964) The site is particularly interesting because it has a couple of leads pointing into a blank area of the survey and no-one seemed to have given this any attention – until we arrived in 2002.

After a muddy clamber, the passage soon splits in two, the left-hand branch passing via a short flat-out section into a low chamber with a view down to Lake 2. The right-hand branch is much more interesting, passing via crawling-sized ducks, the last of which is about 10m long and often involves total submersion. From here, there is a steep winding descent with the passage cork-screwing under itself before dropping into a fast-flowing streamway in easy walking passage. Downstream clearly connects back into Lake 2 but the source of the water is unknown. Upstream leads to a small chamber with a left branch blocked by brick-sized boulders in mud but the stream enters a few metres to the right from a low passage 2m above the floor of the chamber. The original explorers must have climbed into this, perhaps only to take a single survey leg because the Coase & Judson survey shows no more than can be seen from the start of the passage. (Coase, 1966)

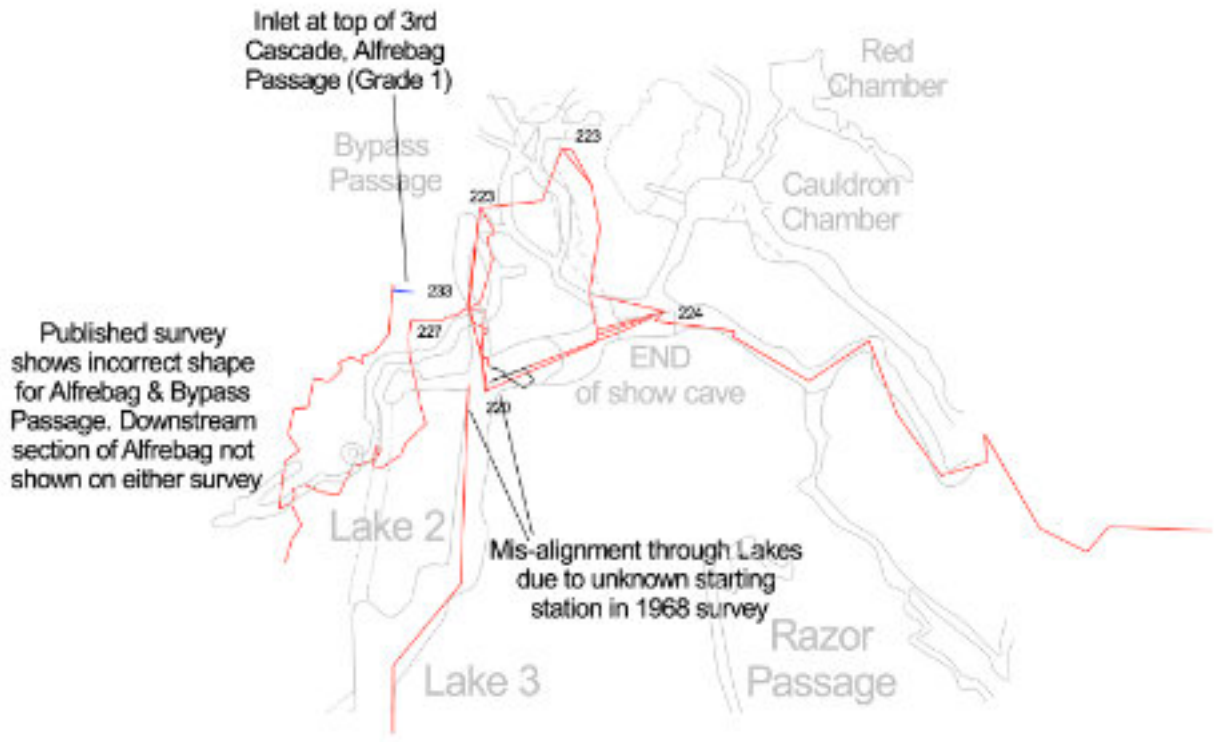
In 2002, Jon Jones, Dudley Thorpe and I decided to take a look at Alfrebag as part of our weekly practice of finding interesting leads and seeing if we could extend them. We soon arrived at the 'terminal' chamber and recognised that there were two good leads, both heading into a blank area on the survey. We don't seem to have returned until 2004 when Jon, Liam Kealy and I started pulling mud and rocks out of the choked passage on the left. After a couple of trips, it became obvious that we were going to run out of stacking space before breaking through. Meanwhile, whilst the others were struggling with an increasingly squalid choke, I decided to see how far I could get upstream. Climbing up into it, I could see that it was definitely at least body-sized and found that as well as the stream it also carried a good draught. At the limit of the Coase survey was a sharp bend that I could get my head and shoulders round to see that the passage continued, much the same

size, the only obstacle being the sharpness of the bend which created a pinch-point too tight for the team to follow. So, with the imminent failure of the dig through the choke, we turned our attention to the stream passage.

The stream passage was quite joint-controlled and, at the bend, had side-stepped into a different joint-plane. Drilling parallel to the new joint plane on the inside of the bend, it proved easy to widen the bend six inches or so at a time with one or two dets. In this way, we were able to engineer the route to be Liam-sized. At intervals, the passage would arrive at a chamber, big enough for the three of us to sit upright together and turn round, with the stream entering via a cascade one or two metres in height, sometimes with an obstacle or two at the top. The draught continued, strong enough to carry the drill dust and det fumes away into the distance. We always seemed able to lose the spoil in the passage floor, so we never had the need to move it any distance. The only real enemy was the cold. Lying flat-out in up to a foot of water, in a strong draught for half an hour at a time whilst one of us drilled holes and the other prepared the dets often left us both too chilled to think clearly!

By August 2006 we had reached a fourth cascade, one or two metres high, in a chamber big enough for Jon and I to stand up. Unusually, the stream and the draught, strong as ever, were on the left. The ongoing passage was obstructed by boulders with what looked like space beyond. We drilled holes but had run out of dets, so we retreated, leaving digging tools there ready for the next visit. We've not yet been back, distracted by opportunities elsewhere.

We've not yet done a proper survey with a DistoX but we've covered about 50m (it seems much longer) beyond the limit of the Judson and Coase survey, heading into the blank space above and behind digs like Phyllosan Drive or the big draughting chokes off Cauldron Chamber, such as Tetley's Revenge, following a natural, body-sized passage with a good stream and a strong draught. Sooner or later, this has to connect into a sizeable void!



Alfrebag Site

References

- Coase, Alan (1964) "*Exciting Developments in Dan-yr-Ogof*", *The Speleologist* 1(3), p.30.
- Coase, Alan (1966) "*Dan-yr-Ogofian Developments*", *SWCC Newsletter* 52.

And finally, while on the subject of digging in Dan-yr-Ogof, Bob Hall recounts the story of 'Judson's Tomb' – a cautionary tale for diggers everywhere.

Dave Judson Entombed! ***Bob Hall Remembers***

Thus it was tersely recorded in the Logbook. Dave had been digging in a side passage between Shower Aven and the start of the Long Crawl. The dig was in a passage leading in the direction of a boulder choke in Gerrard Platten Hall and had been an attempt to seek a way past the crawl. Dave had managed to wriggle past the suspended, unsupported, 'hanging death' his digging had created into a narrow, virgin scrap of rift passage beyond. Seemingly unprovoked, but possibly caused by water seeping through the fill above, it suddenly ran in, trapping Dave.

In due course, the fact that it was Good Friday naturally led to speculation about exactly WHAT was going to happen next!

It is likely that Dave's companions were fellow Yorkshire cavers but that is speculation. In any event, one or more of them were soon out of the cave to raise the alarm. I was at the Club when the call came in and a small group of us got to the dig site very promptly indeed. 'Boulder fall' doesn't describe the fill accurately – the rocks were mostly quite small and were mixed with quite a large proportion of pea-sized grains of quartzite gravel which has the capacity to act as a 'mechanical lubricant'. Think of walking on marbles! By dint of some very cautious burrowing, a small gap was opened up and we were able to peep through, to see a rather forlorn Judson cooched up on the other side. As was common in those times, he was rather inadequately dressed for a long wait in a damp, confined space and was complaining of the cold. (Dave was noted for caving in a knitted woollen mini-dress he had bought at a jumble sale! Whether he was thus clad on this occasion I could not say.) Fortunately we had a 'space blanket' to hand and this was passed through the peep-hole.

My judgement of the situation was that if it had run in once, it would very probably do so again. It was clear that the best course of action was now to wait until the 'heavy mob' arrived with timber to allow proper support to be installed before further excavation was attempted. The next hour or so became rather tense as one member of my party would not refrain from scrabbling away at the debris and even my assertiveness was put to the test!

Divine intervention took the rather prosaic form of John Harvey, Gwynne Sanders and possibly Clive Jones and it was then only a matter of a few hours before Judson was released chilly, chastened but unharmed.

The red arrow indicates the small rift Judson was trapped in. The yellow arrow indicates the area of the collapse. As can be seen, GPH is not far away.

Epilogue

The idea of by-passing the Long Crawl remained a popular one for some while. The probable difficulties of rescuing an injured person from deep within the cave was one reason, the desire to transport maypoles into the cave was certainly another and no doubt some cavers just wanted an easier life. In any event, sporadic attempts were made at the same dig site in the following few years, notably by Bruce Foster and Penny Tutt who made it a regular mid-week dig in the mid-70s. Apart from any ethical considerations it should be noted that the dig is situated smack bang beneath the vast collapse feature on the surface generally known as The Crater. It kept running in for a reason!

11. Other sites and a note of caution

The above list of digs is by no means exhaustive. There are literally hundreds of shakeholes up on the hill above DYO, and while many of them have seen some sort of brief investigation or a more concerted effort, there are plenty that remain untouched. You don't have to stray far from the obvious footpath from the DYO car park across to Sinc-y-Giedd and beyond (known, as a reminder of former liberties, as the Land-Rover track) to find interesting sites. Pull back the long grass from the base of a shakehole and you are likely to see water-worn limestone or black space between rocks that emits the faintest hint of cool air. Small spoil heaps and pieces of soggy timber give away the sites that have been previously dug, but many have had only cursory investigations. Go up there and explore. Remember that cordless drills and easily portable batteries are a relatively modern introduction to the digger's armoury. One day, someone will get lucky, just as those who discovered Pwll Dwfn did. And never forget that, somewhere under that hill, there is almost certainly a master cave system that will lead a long way towards the known cave at DYO.

Throughout most of the history of SWCC, cavers have had pretty much free rein to explore and to dig on the Black Mountain. Historically, the Brecon Beacons National Park Authority were only vaguely aware that digging activities were going on and didn't interfere. You will find accounts of digging trips, from the 1960s and later, in which Land-Rovers were driven up the hill laden with timber and digging equipment, explosives were used with impunity, and so on. Sadly, such freedoms are long gone. The land on which all of the above dig sites are found is now owned by Welsh Water and administered on the company's behalf by the BBNPA. It goes without saying that a water company will be acutely sensitive to any activity on its land that might have an impact on water courses, and this applies to anything done at a sink, even a seemingly insignificant one. Much of the land is designated as a Site of Special Scientific Interest (SSSI) and any activity on that area that might be a Potentially Damaging Operation (PDO) – this includes digging – is considered a serious matter and will quite probably lead to prosecution. Vehicles are now completely forbidden, so forget using a 4WD to take your timber or scaffolding up the hill; you will have to carry it! (Although the graziers have dispensation to use quad bikes – this might be an avenue to explore, carefully…) Walkers who use the hill frequently have been known to raise objections to unsightly spoil-heaps, open shafts and the like. Sadly, the actions of one rather irresponsible digger (not an SWCC member), in recent years, have exacerbated the problem and digging on the mountain is very much on BBNPA's radar. However, they are not averse to digging *per se* and will give due consideration to any proposal that is sensible and responsible. Ogof Giedd, described above, has received permission to proceed, under certain conditions and subject to the provision of regular written updates. Any request for permission would be best coming from SWCC (via the committee) rather than from individuals, as the Club is seen by the Park as a respected authority and this is how permission was secured for Ogof Giedd.

Let's be clear, though – no-one is going to object to any provisional exploration that involves pulling a few rocks out of a hole to investigate a promising-looking site. But there is a fine, if somewhat vague, line between what could be considered a 'preliminary investigation' and what is a full-on digging project. For the sake of all those who might wish to dig on the mountain now or in the future: *please act responsibly*. Any site must be left safe for other users of the hill and for livestock – so no open holes left uncovered, please. Anything that leaves a visual impact of any sort (such as a spoil heap, or a pile of timber) is likely to attract attention and if cavers act thoughtlessly the consequences for future projects could be bleak. As I have outlined, there is

massive potential up there; to have caving or digging access removed would be disastrous and would leave those responsible for such consequences facing the opprobrium of the whole caving community.

*Before leaving the Digging Theme, I feel the need to reflect on and, indeed, repeat Bob's words, contained in his Part 1 Afterword. I fully support the following statement made by Bob after experiencing frustration myself in trying to obtain information of significant relevance to certain sites reported here in Part 2.

"*I believe that as a member of SWCC you have a duty to publish in your own Club's publications. In a way, what has been more worrying has been the hint in the background of some self-censorship or social censorship operating. Several members have declined to contribute material I sought from them because of the prevailing atmosphere on social media platforms. In effect, they were fearful of a backlash. That is an appalling state of affairs for the caving world to find itself in and stands in stark contrast to the wonderful spirit of cooperation I delighted in reporting in my Foreword.*"

Afterthought. The SWCC Logbook

When I joined the Club, anything of note was entered in the logbook that lived then, as it does now, on the sideboard in the lobby at Penwyllt. This could be anything from a problem with a cave gate to a sighting of a rare bird on the nature reserve. But anything that counted as cave exploration – pushing a remote passage, pulling rocks from a surface shakehole – was diligently written up for the benefit of future readers. The Club's early logbooks (kept in a firesafe in the library) are a treasure-trove of Club history and interesting snippets, and the careful reader can find logbook entries that inspire a return visit to some obscure shakehole or rarely visited corner of the OFD system. When we first started work on sites such as the sink at Tal-Draenan, I took care to write up every trip so that everything was properly recorded. But over time, the logbook changed. It became less a caving logbook and more a repository of late-night quotes from the alcohol-steeped environment of the long common room, amusing though these are. (I wrote more than a few of them myself!)

Eventually a second logbook, the 'comments book' was added, with the intention of separating the drunken comedy quotes from the serious business of cave exploration. But already things had changed. I became aware that one or two unscrupulous cavers would regularly check the logbook for indications that a dig or project might be about to 'go' and would be worth a 'pirating' trip. As a consequence, my logbook entries on digging became increasingly cryptic and therefore, of course, much less useful to future diggers and explorers as well as to would-be pirates. Gradually the logbook has fallen almost completely out of use. A few years ago, I dug out all the logbooks from the latter period of our exploration of Tal-Draenen and even I, as the author of most of the relevant entries, struggled to interpret what I had been attempting to record.

To me the demise of the logbook is a great shame, but I suspect that it will never return in its previous form. So, I will conclude this little aside with a plea to the next generation of diggers, divers and underground climbers. Whatever you do, WRITE IT UP. Keep a log of every trip: the location, the date, who you were with and what you achieved (preferably a hard-copy written one rather than a digital log – every hard-drive fails at some point…). For many years the logbook served as my personal digging log, but once it fell out of use, I never took the trouble to keep a separate record of what we did. Compiling this article would have been so much easier had I had more material than thirty-plus years of unreliable memories to go on! Fortunately, I have been pretty good at keeping records of major projects (PPD, Ogof Giedd) but many days of effort at lesser projects have been lost to posterity.

Front Cover

Paul Craddy Digging in Ogof Giedd - Photographer Martin Hoff

Inside Front Cover

Luke Ashton helping to regain access to Llethryd Swallet - Photographer Antonia Freem

Inside Back Cover

Tony Baker in Ogof Twyn Tal-Draenen - Photographer Martin Hoff
Pete Kokelaar at a dig 'somewhere on the Gower' - Photographer Duncan Hornby

Back Cover

Blasting at Waun Fignen Felin, early 1960s Figures, from left, John Osborne, unknown, Clive Jones, John Harvey - Photographer Dai Hunt (SWCC Archive Image DHUNT1_041)