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Expedition Leader's Overview

The reaction I had from most non-cavers when I told them about Extremero 99 was one of puzzlement. Surely there is no part of Spain still unexplored? Yet not only did we find 1.5km of virgin cave passage in the seven weeks of expedition, but we left exciting possibilities for future years. The positive dye trace from Sistema Verdelluenga (C3/C4) to Pozu Jultayu (2/7) confirmed our hypothesis that the two caves are linked. So our pre-expedition ravings about a 20km long system were correct. A cave of this length has never before been found in the high karst of the Picos de Europa.

At the beginning of the expedition we had three leads in upstream Pozu Jultayu, plus GSP higher up in the cave. GSP now provides a quicker route to the lower reaches of the cave, and all three upstream leads have been extended by several hundred metres and are still going strong.

We also spent plenty of time exploring smaller caves, with a particular focus on Cueva de los Huesos (Cave of Bones), also known as 10/9.

We were fortunate to find so much new cave, but it couldn't have happened without the hard work and enthusiasm of every expedition member. Although many of us had plenty of general caving experience, some of us needed to learn the more specialised expedition skills such as rigging and surveying. For others, the long deep trips and the challenges of camping underground were new experiences.

Despite the small size of the team, we managed to carry out several experiments in the field. The dye trace I have already mentioned; we also successfully tested the prototype of a cave radio and carried out a small study of the ^{222}Radon concentrations in Pozu Jultayu.

And the last, but most important, thing for me to say is...

…a big thank you to:

The grant giving bodies which supported us

A.C. Irvine Fund
David Hood Award
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Royal Geographical Society
Sports Council
Oxford University

Our sponsors

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Our field and home agents

Juan-José González Suárez (Field Agent)
Steve Roberts (Home Agent)

The expedition organising committee and the rest of the expeditioners (see below)

...and finally the people who, despite not making it to Spain in 1999, were incredibly helpful. In particular Paul Mann (survey compilation and Treasurer), Joan Arthur (Medical Officer), Chris Densham (loan of his attic and help with gear), Steve Roberts (transport) and Andy King (analysis of dye detectors) expended a lot of time and effort on expedition tasks.

Not everyone who helped with Extremero 99 has been mentioned here - there simply isn't enough space. If your contribution hasn't specifically been acknowledged: consider yourself thanked!

Joanne Whistler
Expedition Leader

Expedition Members

LB	Lev "Mr Tumnus" Bishop
JC	Jonathan "I make people physically sick" Cooper
PC	Pippa "Chica" Crosby
RD	Richard "Drinking whilst drunk" Doyle
RG	Richard "NRT" Gerrish
SG	"Don" Simon "Spotty banana flavoured Mr Blobby toothpaste" Goddard
HG	Hilary "Commando" Greaves
TG	Tim "Viagra" Guilford
GL	Gavin "Good boyfriend" Lowe
LM	Lou "Viagra" Maurice
LJM	Lynn "Lev shaped hole" Mulelly
SP	Steve "Flash" Phipps
WS	William "I am an air hostess" Stead
AW	Alison "It's in the wrong hole" Waterfall
JW	Joanne "I'm not stressed!" Whistler

Expedition Diary

Date	Who	What
3/7/99		Van found to have no MOT, sailing delayed two days until 7/7/99.
3/7/99		Pre-emptive "leaving curry".
4/7/99		Van packing.
6/7/99		Set off for Plymouth, arrived safely (still with trailer).
7/7/99		Caught Plymouth – Santander ferry.
8/7/99		Arrived in Spain, set up base camp.
10/7/99	LB, JC	First rigging trip in 2/7; reached bottom of Seventh Heaven pitch.
11/7/99	RG, JW	Rigging in 2/7 down to Gripper pitch.
12/7/99	JC, LB, HG JW, PC, LJM	Rigging in 2/7, reached Pessimist's Pot. Went to see Juan-José and pick up carbide.
13/7/99	PC, RG	Portering/acclimatisation in 2/7.
14/7/99	LB, LJM JC, HG	Rigging in 2/7, reached the bottom of The Bells. Rigging in 2/7, reached the First False Floor.
15/7/99	RG, JW LB	Rigging in 2/7, reached Just Awesome I. Hilti-capping in 10/9. Found an undescended pitch beyond the squeezes.
16/7/99	LB, LJM RG, PC, HG	Pushing in 10/9. No further progress. Shaft bashing in area 7.
17/7/99	LB, LJM PC	Pushing in 10/9. Pitch and climbs explored. Shaft bashing on Cuvicente.
18/7/99	JC, HG PC, RG	First 2/7 camping trip goes underground. Portering trip to –350m.
19/7/99	LM, GL, LB TG, JW	Trip to place dye in C4 (Sima de la Verdelluenga) for trace to 2/7. Digging in Pozu Jenga.
20/7/99	LB, LJM JW, LM,TG GL PC, RG	Second 2/7 camping trip goes underground. Digging in Pozu Jenga. Shaftbashing in SE area 5. Pushing in 10/9. No further progress.
21/7/99	GL, LM HG, JC TG, RG, PC	Rigging of GSP route in 2/7. First camping trip returns. Surveyed 500m found in 1998, pushed inlet on RHS for 250m (Holier Than Thou). Pushing in 10/9. Pitch descended and tight rift passage explored.
22/7/99	TG, LM	Third 2/7 camping trip goes underground.
23/7/99	GL LJM, LB	Shaftbashing in areas 8 & 9. Second camping trip returns. Route finding difficulties were experienced, but both LJM & LB are now familiar with the route upstream.
24/7/99	GL, PC HG, RG	Pushing in GSP. 10m pitch found. Fourth 2/7 camping trip goes underground.
25/7/99	LM, TG JW, JC, PC JW, LJM, LB	Third camping trip returns. 150m discovered and surveyed in LHS inlet (Coral Corner). Top of Viagra Falls gained, passage seen to continue. Fifth 2/7 camping trip goes underground. Nicola system radio tested. Surface to underground camp contact established.
26/7/99	LB, GL AW, LJM Ario	Pushing in GSP. 90m pitch found. 10/9 pushing trip. No further progress. Freak hailstorm.
28/7/99	LB, GL	Pushing in GSP. High water prevented cavers from reaching the limit of exploration.

29/7/99	HG, RG	Fourth camping trip returns. Over 400m pushed and surveyed upstream of Viagra Falls (After Eight Series). Big Ledge camp derigged with PC, JW & JC.
	PC, JW, JC	Fifth camping trip returns. Holier Than Thou surveyed, Coral Corner climb at the limit of exploration bolted part way up.
	LB, GL	Pushing in GSP. Connection to original shaft series made at the First False Floor.
30/7/99	JW, PC, RG, LJM, HG	Lots of people leave expedition.
31/7/99	JC, AW	Hammering Pablo's Rib in 2/7. Missed callout, met rescuers en route to Ario.
1/8/99	GL, LB	Retrieval of multiple tacklebags from top of Pessimist's Pot (2/7).
2/8/99	JC, LB, GL	GSP to 2/7 shafts derigging round trip (GL: GSP only).
4/8/99	LB, GL	29/5 Hilti capping trip.
5/8/99	GL	12/8 trip. No way on.
7/8/99	WS, SG	Bag carrying through 2/7 rifts.
	GL, AW	Bag carrying from Pessimist's Pot (2/7).
9/8/99	WS, RD	Shaftbashing in area 7.
10/8/99	GL, RD	Survey & derig in GSP (most ropes left at tops of pitches).
11/8/99	GL, RD, WS	2/7 derig completed.
13/8/99	GL, RD	Shaftbashing in area 9. Bottomed 3/9 with no way on.
14/8/99	RD, WS	Shaftbashing in area 9.
	GL	29/5 trip.
15/8/99	RD, WS	Shaftbashing in area 9.
18/8/99	SP, RD	10/9 photography and derigging trip.
19/8/99	WS, SP	Pozu Jenga photography and derigging trip.
	RD, SG	10/9 derigging trip.
20/8/99	RD, SG	Shaftbashing in area 9.
	WS, SP	Shaftbashing in area 9.
21/8/99	SP, WS, SG, RD	Ario camp detackled.
24/8/99		Expedition leaves Base Camp to go home.
26/8/99		Board ferry in Santander.
27/8/99		Disembark in Plymouth, drive back to Oxford.

Alone Together

Ting! ting! ting! ting! ting! Twist the driver. Ting! ting! ting! ting! ting! Again. Ting! ting! ting! ting! ting! Out, carefully now. Ting! ting! Tap tiny shards of rock from the anchor. Even though the rock is wet, the driver's teeth are dry from the heat of hammering. Relentless hammering. The hole plumes as I crane up and blow, rock dust crusting my lips. I look up. It's close now. Just two metres above me the steep rock curves over, and beyond it is the vast blackness of unseen passage. Nearly there, must carry on. I place the driver back in the hole, shift my awkward balance slightly, and swing the bolting hammer again. Ting! ting! ting! ting! ting!

Ting! ting! ting! ting! ting! Below me is the fragile line I've followed, shiny hangers glinting back at my lamp. They look alien against the rock. Old rock, cracked and furred; seamed with calcite; worn weak under aeons of water. The 9mm static rope strains in an awkward line, dodging between the carabiners, dirty, dripping, defiant. My life. Must go on. Nearly there.

Ting! ting! ting! ting! ting! My wrist is hurting. My shoulder aches. I can hardly feel my legs now. Time for a short rest. I look down at Lou 15 metres below and swing my lamp beam left and right across her face to draw her attention. But she's noticed already and I relax back onto the rope and move in my harness to try and restore circulation. Cold. I wonder how Lou must be feeling, and I want to shout an "are you alright?". But there's no point; she can't hear. So we just look at each other across the void, Lou all the time trying to second guess what I will do next. I start to move up into the etriers again, slowly at first to exaggerate the signal in the rope, and the slack comes in careful inches.

Ting! ting! ting! ting! ting! It's so close now, the bolt half done. The last bolt, I think. I hope. I can hardly hear myself hammering now against the thunder of the water. With every bolt I've drawn myself up and across in a relentless diagonal towards the top of the waterfall. With every bolt a moment of painstaking progress up the overhanging wall towards, well who knows? Seven hours of relentless hammering.

Ting! ting! ting! ting! ting! Below me Lou stands on a ledge belaying, working to keep awake against the gnawing cold. A painful, nothing sort of work. No movement, no rest, just concentration and cold. Eight hours of concentration and cold. My shadows dance monstrously in the spray behind: spray that fills the huge jagged chamber into which the entire 2/7 streamway thunders as it has done for thousands of years. Eight hours ago we started bolting a route up the daunting left hand wall of Viagra Falls, its overhang partially sheltering us from the spray. Fifteen bolts later, a task that had seemed like an absurd dream had now almost made its eerie transcendence into reality. We are going to make it.

Ting! ting! ting! ting! ting! When Lou and I had set out from the camp, four hours downstream, we could only guess what would face us. As we climbed the last cascades into Viagra Chamber the sheer power of the place started to impinge. We felt fragile creeping round the spray washed ledges of the huge chamber, shouting against the thunder of the falls. At first sight the improbability of the task ahead was overwhelming. The bright light we had brought to help spot the best route merely accentuating the anger of the air, as it pulsed feverishly in the spray. In the past week two teams had already reached Viagra with the aim of attempting the climb, and shied. Already exhausted by three days underground, and cold from immersion in the deep waters between here and the camp, the remoteness and scale of the task had been too much. So still the darkness beckoned.

First faced with the violence of the falls we, like the teams before us, felt weak. And we knew immediately that as soon as we became wet we would be powerless against the cold, our resolve uncontrollable, incapable of the technical demands of the climb. Weeks ago in Britain's pub comfort we had tried to plan for this; tried to imagine how we might best defend our physical and

psychological reserves in so remote and inhospitable a place; a place we had never seen. In the event, we had struggled down the 750 metres of shafts and rifts with a full set of buffalo garments each, and two sets of extra thermals for the belayer, all sealed inside Daren drums. More importantly, we had determined to stay dry as long as possible even to the extent of bolting a traverse route over the deep waters in the streamway. To our amazement with this defence, and the luck of finding a relatively dry take-off ledge by traversing behind the waterfall to reach the far side of the chamber, it worked. The cold was bitter, but not incapacitating.

Ting! ting! ting! ting! ting! Now I was near the top of our improbable route. *We* were near the top. I was alone: every decision of the last eight hours was made in solitary silence against the background thunder. But we were a team: every decision relied 100% on the reactions and resolve of Lou, belaying from the edge of the maelstrom below. Back in the known cave, our relief team, Hilary and Rich, were right now settling into camp after the seven hour trip from the entrance located high up on the slopes of Jultayu mountain. And as the rest of the fifteen strong, six-week expedition busied themselves carrying food or rope or carbide up from Base Camp into the jagged limestone of the higher peaks, or melting snow simply to survive in the dry mountains, everyone knew that the time for pushing was almost over. Soon it would be time to start the hard days of derigging, and leave the cave to its darkness. Alone and in a team, it was now or never.

Ting! ting! ting! ting! ting! Beyond Viagra? It is 3am, and tiredness sucks at my eyes, but my heart is racing. A year ago when exploration of this most magnificent system of the Picos was stopped abruptly by 20 metres of sheer pounding water, the question formed itself. Ever since it has been the focus of cavers' thoughts, the nexus around which an entire expedition has gathered and functioned. Viagra, at once the frustrator and the key. The dream, beyond Viagra. Now the dream is just one bolt from reality, and the driver is almost in up to its collar. Ting! ting! ting! ting! ting!

To minimize weight we had brought just fifteen bolts. This was the last. Tap! Tap! I cleaned the teeth and pushed the wedge from between my lips into the anchor. Tap! tap! tap! tap! The bolt firmly in and hanger attached I clipped first the rope then one etrier into the maillon a metre above me. I paused for a moment and looked down at Lou's lamp shimmering through the spray below, wondering what she was thinking about this threshold moment between dream and reality. Would "beyond Viagra" live up to the dream? She signalled back. This was it. Time to go. Push up, in comes the rope, clip in to the bolt with a carabiner, and look up. Over the lip was a smooth slope, and perhaps three metres away another obstacle: a short wall, the real lip. It had been a false horizon after all. Damn. I stared at the slope. Too steep to free climb. No more bolts. If I fall I die. I'm tired. I mustn't do it, but the blackness beyond is levelling out, and it's huge. I look again at the wall and see a spike of rock. In desperation or determination, I can't tell which, I decide to try and lassoo it with a tape. Several attempts later I've failed to get a good hold on it. This is madness. I'm tired. I try again, and this time the tape hooks. But its not the spike, its something behind the spike, I can't see what. I pull hard and it stays. I should flick it, I know, to see if it will dislodge. But I might not get it again. I'm tired. I decide to put my full weight on it, but still attached to the bolt by a cows-tail. It still holds. So I go for it. Pulling up on the tape I climb up the slope and over lip of the falls roaring beside me. I grab the spike and hug it, breathing heavily with the fear for a full ten minutes. The tape is caught on a smaller spike beyond. I belay to the larger spike, and tie off the rope. Now that I'm safe, I look up into the passage. Beyond Viagra. A huge jagged limestone canyon curves away into the distance as far as my light will penetrate, carrying the stream in a graceful green meander out of the unknown. I did it. We did it.

Tim Guilford

Upstream 2/7 Description from Oregano Pitch

After descending Oregano Pitch the streamway is joined. Heading upstream there are a couple of cascades to negotiate, followed by a superb section of streamway. After about 80m a "showerbath" gives away the presence of an inlet to the left of the passage, Coral Corner.

Coral Corner

Beyond Oregano pitch the main 2/7 streamway reaches a large chamber known as Coral Corner. A climb up on the right (true left) leads to huge chocked boulders above the stream, across which the left wall can be reached and traversed up to a roped climb up to a well decorated rift. This continues up to a short (5m) pitch back down. On the right at the head of the pitch a squeeze up through boulders reaches a very large alcove overlooking the main streamway with a large fossil passage visible above.

At the base of the pitch a wide high rift passage turns right with a low mud crawl on the right. The main passage continues a short distance to a tall narrow popcorn covered oxbow rift on the left and a drop down ahead. The passage ends at the base of a waterfall inlet with passage continuing at the top. On the right before the waterfall a narrow rift passage carries the stream past a tight right turn to a junction where ahead links back to the low crawl at the base of the pitch whilst a phreatic passage to the left bifurcates. The lower route carries the stream and becomes too tight whilst the upper route passes a decorated squeeze to link back with the main streamway.

Upstream of Coral Corner

Continuing upstream on the main route a deep pool in a chamber is reached. Looking ahead a rift is visible; progress is possible at the base of the rift (aqueous), or a rope climb gives a dry but more strenuous alternative.

A traverse in the rift beyond gives way after about 100m to a wider passage with some bouldery breakdown. Beyond this the passage continued in a straight line for another 100m or so until a more substantial area of breakdown. A boulder choke appears to completely block the passage, but the way on is a sideways step to the right into a parallel passage. This also appears to be blocked, but a climb up and backwards leads to a loose hole.

Beyond the hole is a massive chamber, Fear and Loathing in Las Brujas. This chamber has not been thoroughly explored, but in one direction a gentle bouldery slope leads to the continuation of the streamway. The streamway is wide at this point, and the next significant feature is an inlet coming in at stream level on the right, Holier Than Thou.

Holier Than Thou Inlet

The inlet is level for around 20m; it then widens to a chamber at the bottom of a 15m pitch. A trickle of water can be seen, but a rope has been rigged to the left of the stream. At the top of the pitch at least two avens are visible but these would not be practical to climb. From here a thin rift passage, "Surfing To...", continues to a small chamber. Here an extremely loose climb to the left earns the chamber its name - "Choss.com". *At the top of the climb a passage leads off, but soon ends in a congomerate filled alcove with no way on.* Back in Choss.com, the way on is found directly opposite the entry point - an obvious 1m high tube. After 20m the tube opens out vertically into a section of rift where there is an exposed traverse over water. From here two vertically parallel phreatic tubes meander separately until they join up again. The upper tube was followed during surveying. The passage then continues to a deep clear rising sump, "Full Moon Rising. Several potential ways on were spotted in the phreatic section before the sump and this area would justify more thorough investigation. In particular, around 50m back from the sump there is a climb up through boulders that appears to take most of the strong draught that makes the whole of Holier Than Thou so cold.

Main Streamway above Holier than Thou

The main streamway above where Holier Than Thou comes in becomes more broken, with large boulders having to be negotiated to carry on. A cascade is met that can be climbed on its right hand side, before a final slow moving section, then a chamber and waterfall, Viagra Falls.

After Eight Series

From the top of Viagra Falls the passage continues upstream as a tall rift. Following the water, the first hundred metres or so of progress is made in passage whose width varies between 1m and 4m, traversing over fast flowing water on the left and right walls in alternate sections. A series of meandering bends leads to a 90° left-hand corner, and Wriggly Spearmint rock, a projection on the right hand wall which can be climbed over for continued (dry) progress.

Continuing upstream, the passage bends to the right and the route continues by climbing up the left hand wall and traversing on the inside of a 90° left-hand bend before returning to stream level, while on the outside of the same bend the water passes Bendick's of Mayfair, a deep pool in an alcove. Shortly afterwards the passage opens out into a large, quiet chamber, The Royal Mint. The water in this chamber covers most of the floor and is shallow on the left hand side.

At the upstream end of the chamber the water emerges from a sump near the right hand wall but a vertical slot to the left of the sump can be passed and leads to Tic Tac Choke, a boulder pile with large and easy routes through.

Upstream of After Eight

The explored route through Tic Tac Choke cuts down to the right to rejoin the water straight away and a deep pool can be traversed. Once across the pool the explored route turns to the left and follows the streamway out of the boulder pile and round a right-hand meander into Revenge of the Apes, a wide section of passage with a large monolithic rock in the centre.

Continuing upstream leads to Tales For The Pub, a large stream passage which leads round several slight meanders to a sharp right-hand bend and several large boulders. The passage becomes narrow (0.75 to 1m wide) and a dead straight rift (Me, the Compass and the Clino) is traversed for some distance. Eventually a left-hand bend is reached and climbing up three small cascades leads to a junction. From here Vanilla Inlet leads off to the left, Catheter Canal to the right.

Vanilla Inlet

This is a dry rift which quickly becomes tight at floor level. There was a minimal trickle of water flowing down the rift to join the main streamway when explored. The rift has been investigated for approximately 40m by climbing progressively higher, and shows no signs of closing down, but walls and chockstones are loose and chossy.

Catheter Canal

The streamway continues to the right from the junction. Visual investigation for perhaps 40-50m suggests the water is too deep to wade and the walls impossible to traverse unroped at stream level. Higher up (about 5m above the water) the rift becomes narrow enough for bridging, but exposed.

Lou Maurice, Tim Guildford, Hilary Greaves & Joanne Whistler

My First Expedition

I was pretty nervous about going to Spain. I'd vaguely learnt how to use all the ascenders and descenders and stuff on a bridge and I'd been on a short trip using Single Rope Technique down Sell Gill Hole, but the cave 2/7 was ten times as deep. Seven hundred metres underground is probably not the best place to be making mistakes while climbing big pitches. Someone worked out that a stretcher rescue would take three months.

However, it was just too good an opportunity to pass up. How many people get the chance to go on a major expedition exploring parts of the world never before seen? Well, it sounded more exciting than stacking shelves at Sainsbury's, anyway. So, with financial assistance from my lovely college and the A.C. Irvine fund, I bought all the necessary equipment and headed for sunny Spain.

After a few days of carrying large rucksacks up the steep hills to Ario camp, I had had quite enough of the heat. With a lust for the cold and damp, Lynn and I decided to go on a short trip down 2/7. The pitches were huge and the tight section (Seventh Heaven squeeze) incredibly awkward with SRT gear on. I had a moment of panic when my generator caught on something and Lynn was out of hearing distance at the bottom of the pitch…

"I'm stuck"
"Rope free"
"No, Lynn, I'm STUCK"
"Rope….Free…!"

…but otherwise our trip went swimmingly. Back at Ario camp I collapsed, exhausted, in the hut and announced proudly to the others that I had made it all the way to Paradise squeeze. They laughed. Someone dug out a survey to show me exactly how far I'd gone. It was only a tiny fraction of the cave. I realised I'd have to get a lot fitter if I wanted to get down to Big Ledge camp.

I spent the next few weeks exploring surface shafts, doing more carries and slowly getting further into 2/7. The first few pitches were starting to look almost friendly now. To my delight, Jo decided that I would probably just about manage an underground camping trip. This would be my last trip before I had to catch the coach back to England.

Going down wasn't so bad, apart from the niggling thought that you would eventually have to climb back out again…That night, I experienced my only moment of claustrophobia when I awoke to find myself trapped in my sleeping bags. Heart pounding, I flailed about trying to find the zips to first my inner, then my outer, then my bivvy bag. After that, despite the cold, I left my face open to the air.

Next 'day', we set off upstream to survey "Holier Than Thou". This was the scariest caving trip I had ever done. Round every corner was another frightening obstacle to be passed. An hour into the trip…

Jo: "Pip's fallen in! She's swimming!"
Me: <strangled gasp>
JC: "Oh. Is it cold, Pip?"
Me: <strangled gasp>
JC: "Well, better keep moving then."

This didn't help to improve my opinion of the cave.

There were some beautiful places to see on the way, though. Echo Beach was my favourite – a golden crescent of sand by an absolutely clear blue pool. We couldn't stay to rest long, however, as the air temperature was around 3°C and I was still very soggy.

Holier Than Thou turned out to be a particularly winding and draughty section of passage, which made surveying a long and arduous task. I was very grateful for the fleecy hat my Mum had made for me. Once all the distances, compass bearings and clinometer readings had been recorded, we made our way back to the comforts of Big Ledge camp as fast as I could go.

Crawling out of a nice, warm sleeping bag to put on a damp undersuit has to be one of my least favourite aspects of camping underground, but once we got moving I found that knowing the way made the second trip upstream a lot more pleasant. JC made a start on hammering in bolts up a waterfall while Jo and I slowly drifted towards hypothermia. Caution prevailed, and we went back to camp, leaving the rest of the bolting for next year's expedition.

Our last day underground started (about 1pm real time) with a delightful culinary fest of Sosmix and pasta. Feeling slightly ill, Hils and I (the slowest two) set off out of the cave with the four massively heavy tackle bags from Hell. When the others caught up with us five hours later, we had only climbed around one hundred metres.

Then followed one of the nastiest experiences I have ever had – almost on a par with being forced to do cross country at school – "The Hundred", a ninety metre assisted rope climb through dripping water. My carbide lamp wouldn't stay alight so I switched to my electric, which threatened to run out at any moment. As I climbed the huge, grim and forbidding pitches, all I could think was

"I'm never doing this again. Never."

After eight lonely hours of prussiking, it was almost a relief to get to the rift section. Cold, hungry, unable to think straight and with an exceptionally uncooperative tackle bag, I was fading fast. At 3am, halfway through the rifts, I gave up. I could move no further. Fortunately, my irritatingly cumbersome tackle bag contained an entire set of sleeping bags. Dick stayed to look after me while JC continued out of the cave to change our callout time.

Fuelled by our last bar of Thornton's special chocolate fudge, Dick and I finally emerged at midday and whooped with joy at seeing the sun again. All the colours seemed strangely brighter and the previously unnoticeable buzzing of the flies was somehow musical. We'd made it out! Alive!

Even then, I knew I'd have to go back…

Pippa Crosby is leading the next expedition to Spain.

GSP - A Personal History

Pozu Jultayu starts with a series of pitches and tight rifts down to Flying Rebelles. Here the original route down to the lower reaches of the cave continues down the pitch, while GSP branches off half way down. Gavin Lowe describes his involvement throughout the exploration.

GSP was originally found early in the 1989 expedition. I was on a trip with Su-Yong Lee - a young Korean caver, visiting Oxford for a year - carrying a 200m rope to the end of the rifts.

We struggled down through the entrance series, jumping on the huge tacklebag to force it through the squeezes of Paradise. At Flying Rébellés, things became easier. I added a deviation, which gave a freer hang; more significantly, it also allowed a better view of the rest of the shaft, and revealed a ledge to the left, half way down the pitch. We had a job to do, so we continued to the end of the rifts, but on the way out we decided to take a look.

We penduled over, and tied off the rope. A passage continued: an awkward climb up, and then a constricted rift, only passable at floor level. The going soon became easier, as we were able to climb up into a wider part of the rift. After a few minutes of traversing, we reached the end of the rift, at a cobble blockage.

An interesting addition to the cave, but of no particular significance.

We then realised that the final hole we'd traversed across was deeper than the rest of the rift. We tossed a rock down.

Bang, bang, ..., BANG!

We had no rope to rig the pitch, so we traversed back across, rather gingerly.

Dave Horsley, Jon Tombs, Roy Taylor and Tony Seddon returned and rigged the pitch, some 40m deep, and named Serendipity. At the bottom, a climb and traverse over moonmilk led into a short section of rift, before widening at the top of an 8m pitch. This was soon rigged, to reveal another short "Blind" pitch, for which they did not have enough rope.

It was on this trip that the series obtained its name: GSP, which I claim stands for Gavin's Splendid Passage; if anyone tells you that it stands for something less complimentary then don't believe them.

A few days later, I returned with Dave, Jon and Roy. While the others started the survey, I rigged and explored "Blind Pitch". Contrary to expectation, the passage continued down climbs and along crawls, and then… well it looked like a crawl to the top of another short drop. As I crawled out, a handhold detached itself and fell. I instinctively backed away. Then realised that I hadn't heard the rock land.

BOOM!

I threw more rocks down from a safer distance; it sounded deep.

I tied a rope round a chockstone, to give an illusion of safety, and traversed out to place two bolts for the decent. Thirty metres lower, I landed on a ledge, from where the pitch continued. Rocks tossed down fell for about four seconds; unfortunately, I was now out of rope.

With such a good lead, I was keen to return, so the next day I was back, with Steve Roberts, Fred Wickham, and a longer rope. I rigged the pitch, down into a large rift passage, with more water entering from above; the water dropped down a short climb ... and into an impassible squeeze.

Suddenly GSP had gone from a storming lead to nothing. We started to survey out. Steve dislodged a rock on the way up the big pitch - although he claims it fell spontaneously - and so it gained its name, Tumbling Dice.

A few days later, GSP was derigged.

In subsequent years, no return was made to GSP, as pushing at the bottom of the cave became the priority; eventually that too was dropped, as the club moved on to other caves. But, GSP still nagged on my mind: the club had become much better at pushing tight passages in the meantime, so maybe we could get through the squeeze; there also appeared to be a window into a parallel shaft half way down Tumbling Dice, which might bypass it; and the pile of boulders at the base of the pitch had not been thoroughly checked out.

In 1998, the club returned to 2/7. I mentioned GSP to Fleur Loveridge, and she became interested; she and Harvey Smith carried in several bags of rope, and rigged to the bottom of Blind Pot Series. But when Fleur got involved with the dig in Choke Egbert, and Harvey returned home, I decided it was up to me to see what happened at the bottom.

I quickly rigged Tumbling Dice, followed the water down to the squeeze, and started hammering. The rock was fairly chossy, and flaked off fairly easy, so after a couple of hours, I was ready to give it a go. With harness off, I squeezed in, breathed out to get my chest past, and then wiggled my bum through; tight, but technically straightforward. After checking I could reverse the squeeze, I turned my attention to the way on: an awkward section of rift, which I passed feet first.

Beyond, the passage returned to more reasonable dimensions: a pleasant stream rift with an easily passed boulder choke, leading to an easy climb down, and then, a slightly longer drop. I considered free climbing down, but decided I'd pushed enough, and that this would provide a good limit of exploration for the year.

In 1999, with little appetite for the exploration upstream in the main streamway, GSP was my main goal. I had strong hopes that it might drop into the start of the London Underground, thereby providing a much easier and faster route to the bottom end of the cave.

I rigged as far as Tumbling Dice with Lou Maurice, and then a few days later returned with Pippa to descend a 5m pitch and explore more stream passage to the head of a 10m drop.

Lev and I pushed on two days later, exploring more sporting streamway to an inviting black hole. We lobbed rocks through, and were delighted to hear them fall for five seconds and then bounce for a further two seconds.

"Are we throwing rocks into Just Awesome?" asked Lev.
"Sorry Jo!" I called down the pitch.

We were back the next day, but the weather had turned bad in the meantime, and the cave had become much wetter. Serendipity was distinctly damp. Tumbling Dice was worse, as it was hung directly in the water. I waited on the ledge for Lev to catch up.

"This cave is awash", he said, "let's jack."

The next day the cave was still wet, but passable. Lev and I decided to spend some time trying to find a bypass to the squeezes: I believed that the boulder choke beyond might coincide with the boulders at the base of Tumbling Dice. I left Lev at the base of the pitch, went through the squeezes, and then climbed up into the choke.

"Hello?" I called.

"Hang on; you sound very close" came back Lev's reply. Five seconds later he appeared in front of me. A way had been open all the time. How different things might have been if we'd looked a bit more closely ten years earlier.

We continued to the big pitch, and soon rigged a rope off a couple of naturals. Twenty metres down, I rigged a deviation to pull the rope away from the water; the water had other ideas though: it was diverted by the rock, so as to follow the line taken by the rope. The shaft belled out, and I descended, well away from any walls. The pitch became wetter, but I was in no mood

to waste time re-ascending to sort it out. Eventually, 80m down, I reached a wall, and was able to pendule away from the water and put in a rebelay. Fifteen metres lower the wall cut away, so I added another rebelay, using a very convenient thread. Below, I spotted a ledge, and on the far side of the ledge ... a rope!

My first thought was that the top of my own rope had become detached and was hanging down the pitch.

My second thought - when I had regained my calm - was that Lev had dropped the spare rope.

My third thought was that I was about to land in the London Underground, and that the rope was on some climb up from there.

Eventually I recognized where I was: the ledge was the drippy ledge 20m above the First False Floor, and the rope was rigged on The Hundred. Two days earlier, we had been throwing rocks down onto the First False Floor.

GSP had failed to provide the bypass to Just Awesome we had hoped for, but it does provide a significantly easier and faster route than the original route, saving about an hour in each direction. And as I've always said, it is a splendid passage.

Gavin Lowe

GSP Description and rigging guide

To the left of the shaft, an inlet enters about half-way down Flying Rebelles. A pendule into the inlet enters a rift. Two ways on are possible: a strenuous thrutch in the base of the rift, or a pitch up for 10m, best rigged with a ladder. Both unite in a rifty traverse level.

Just before the end of the rift is a hole in the floor: this is a 40m pitch. The natural hang lands in a pit at the base of a climb; the climb can be avoided via a pendule and a short, slippery traverse over white moonmilk formations.

A couple of short climbs and crawls lead to Blind Pot series: an eight metre pitch, a six metre pitch (named Blind Pot, because the original explorers inexplicably thought it to be blind), and another six metre pitch, landing in a pool.

The route continues down a climb, a short crawl, and a second climb, to the top of Tumbling Dice pitch (p30, p70). At the bottom is a very large, inclined rift chamber. The original route was to descend short climbs lead down to an amphitheater-shaped chamber, where water enters from above. The water descends a short drop, then flows beneath a squeeze, That Tuesday Afternoon Feeling, the 1989 limit. The hammered squeeze is tight, but technically straightforward. Beyond, is a further constriction, best passed feet-first, and requiring the caver to pivot at the hips to drop into the bottom of the rift; moving tackle is awkward. Beyond, a short section of easier rift arrives at a choke.

Alternatively, from the base of Tumbling Dice, it is possible to descend between the boulders: start by climbing down with the water; then follow horizontally for a few metres before descending a slightly exposed climb. A string has been laid through the choke to help route finding. The choke itself is fairly solid, but there are plenty of loose rocks at the top of the final climb - one at a time through here. The bottom of the route through the choke unites with the original route.

Descending a short, loose climb leads to a short crawl through the base of the choke. Beyond is a short section of open rift, to a climb down to a 5m pitch. The streamway continues with further climbs, and soon reaches a 10m pitch. Beyond is a longer section of stream rift, with yet more climbs - a couple of them rather interesting.

Eventually, the rift reaches Space Trout, a 105m pitch, starting with an 83m freehang - the longest in the cave - in a 5m diameter shaft; the shaft widens further down as it joins the main shaft. The pitch lands at one end of The Drippy Ledge, 20m above the First False Floor; the original route down the shaft lands at the other end of the ledge.

Pitch	*Rope*	*Rigging*
Pendule (P15)	20m	Rigged from two bolts at top of Flying Rébellés; deviation 5m down; lower end secured to bolt and thread backup.
Ascent into rift (P10 up)	15m	Three natural belays.
Serendipity (P40)	60m	Natural backup; 2-bolt Y-hang; bolt rebelay; natural deviation; natural deviation; wire through thread at start of traverse; two spike belays on traverse; thread belay at end of traverse.
P8	15m	Spike and bolt Y-hang; spike deviation to right at -15m1.
Blind Pot (P6)	10m	Spike belay.
P6	10m	Spike and thread Y-hang.
Tumbling Dice I (P30)	120m	Natural backup; thread for traverse; two bolt Y-hang; natural deviation; natural deviation.
Tumbling Dice II (P70)	"	Spike belay; spike belay; bolt belay; natural deviation; natural deviation.
First streamway pitch (P5)	10m	Natural backup; 2-bolt Y-hang.
Second streamway pitch (P10)	15m	Natural backup; 2-bolt Y-hang.
Space Trout (P105)	120m	Natural backup; Y-hang off thread and spike; spike deviation at -15m2; bolt and spike rebelay at -83m; thread rebelay 10m lower.

In addition, a couple of the climbs in the streamway could do with handlines.

Gavin Lowe

Dem Bones, Dem Bones: The Story of 10/9

The cave had been languishing as just another unpromising entry in the shaftbashing guide for many years, but in 1998 Huw came across the cave whilst on the way to 27/9. He found he was able to kick the loose rocks down the pitch, and so he sent Keith down to have a look. Keith descended the pitch, a drop of around 5m with no way on at the bottom, but he discovered that it was possible to step off the ladder part-way down the pitch into a passage with some old bones in it, and thereby reach another pitch of about 6m depth. A few days later, I went up with Huw to place some fluorescein in 27/9, and he suggested that I might have a look at 10/9 afterwards. This I did, and at the bottom of this pitch I found an awkward piece of rift passage, which clearly continued, but the correct level to take was not obvious, and I didn't feel too happy pushing it on my own (and the sound of thunder from the surface didn't help). However, I was quite taken with the potential of this cave, perfectly positioned to provide a connection between 2/7 and C3/C4, and it needed to be pushed properly, so I talked Dave, no stranger to tight caving, into accompanying me on another trip. We had only a bolting hammer by way of tools, so it was slow work enlarging the rift enough that I could pass. When I finally did drop through I was quite convinced that I would not be able to return without a lot more hammering. I didn't let this stop me, however, and went off to explore the continuing passage, Dave staying behind and shouting helpful comments such as "Don't do anything silly - there's no way I can squeeze through to help you!" and "Is it still going?". I carried on in for a little way, and then was surprised to find Dave standing behind me: clearly he wasn't going to let me carry on pushing new cave on my own, so he'd found an easier way through the rift at a higher level. Relieved that I didn't have to reverse that squeeze, we continued until we were stopped by another constriction in the rift. This one proved to be too difficult to tackle with just a bolting hammer and although we bashed at it for quite some time, we were making slow progress. We were finally forced to give up when Dave dropped the hammer into the squeeze. Before we left we spent some time throwing rocks through the squeeze, and managed to convince ourselves that there was a big pitch just around the corner. There were no more trips in 1998, because it was then time to derig 2/7 and head back to England.

For the rest of the year, I found it difficult to get 10/9 out of my head. The promising location and tantalising echo at the terminal squeeze kept gnawing away at me, so much so that I went to the trouble of putting together a Hilti-capping system, specifically with 10/9 in mind. At the first opportunity on this year's expedition, I set off up Gustuteru. I managed to convince Lynn and Pip to porter my gear to the entrance for me, but despite my great enthusiasm, no-one was keen to come down with me, leaving me to push the cave solo, while they relaxed on the surface (having left their caving gear at the 2/7 entrance). This was a bit of an inconvenience, when it came to transporting the drill, battery and Hilti-system through the awkward rift passage (which was worse than I remembered), but once I had everything in place, it was a simple matter to use the caps to enlarge the difficult constriction. I hit the rod once, and with a little *pop* I had a much enlarged hole. I looked at it, a tight-looking vertical squeeze. I'd promised Lynn and Pip that I'd come out as soon as finished capping, to let them know I was ok, and it would really be a bit reckless to push this on my own, but I couldn't leave without seeing if the pitch was really there… I inserted myself into the squeeze and breathed out. It was a perfect fit - a true "Lev-shaped hole"! On the other side of the squeeze was another similar squeeze, which I hammered with the bolt-hammer Dave had dropped the previous year, and then I dropped down to inspect the pitch head. The pitch itself was around the corner, so I couldn't judge the depth, but I was overjoyed to have passed the squeeze and to have proven the pitch's existence. I returned to the surface triumphantly brandishing the recovered bolt-hammer.

On the next trip I returned with Lynn to rig the pitch - maybe she didn't like the idea of me blowing myself up on my own. When we reached the "Lev-shaped hole", Lynn found out that she is not quite Lev-shaped, and soon decided that she would like to retreat in order to allow some further enlargement work. At this point, she was slightly alarmed to discover that retreat did not seem to be an option, as the sharp walls caught at her oversuit, and gravity sucked her inevitably further into the squeeze no matter how she struggled. It seemed that the only option was for me to remove her belay belt and hope that she could drop all the way through the squeeze. Thankfully, she could, and with her safely on the wrong side of the squeeze, we set to work enlarging it. This was quite easy, since we were able to attack it from both sides and the rock was weakened from the capping. Soon we had created a "Lynn-shaped hole" and she could escape to cave another day. Despite claiming to hate tight caving, it wasn't hard to persuade her to return to 10/9. On the next trip, we finally managed to rig the pitch, an echoey 20m drop, with a tricky loose climb at the bottom and another tight pitch which we were unable to rig.

The next exploration trip consisted of Pip, Tim and Rich G. They quickly rigged this final pitch, and found another vertical squeeze which needed hammering. After much work, Pip managed finally to force her way through, though it was still tight enough to cause her to squeak as she passed—immediately leading to the obvious name of "Pipsqueak" for this squeeze. Once Pip was through, Rich felt compelled to follow at any cost and, with a lot of effort, he joined her. The continuing passage was a flat-out crawl over sharp spikes, which badly shredded his oversuit, and more work with a hammer is needed here. No more exploration was done in 1999, but the derigging trips and some other tourist trips into the cave were not without incident, notably when Rich and Pip spent some time using the "turn the air blue levitation trick…to retrieve the sacred chalice of Dobar" (they dropped a camera into a narrow slot), and when Steve spent a few hours waiting at the top of the pitch for Rich D to do the derigging, a misunderstanding about the number of pitches having occurred. I can't wait to get back there in 2000.

Lev Bishop

Cueva de los Huesos (10/9) Cave Description

Location: On a bearing of 126° to Jultayu and 172° to Cuvicente. Below rillenkarren on west wall of rift valley between two rocky shakeholes. The valley runs N-S below summit of Gustuteru with view north to Lagos path and south to Cuvicente. Labelled "OUCC 10/9" with badly faded red paint.

Description: The obvious hole above right of the actual entrance goes nowhere. The small rectangular entrance opens into a small chamber with a rubble floor. Squeeze down to the first pitch, using a ladder from a dubious projection and lifeline rigged from large boulder on surface. Pitch is 5m to a rubble floor and too-tight rift, but a swing off the ladder 2m down gains short low passage with some dry bones, leading to the second pitchead. This is a 6m pitch, rigged using the lifeline from the previous pitch, belayed to another dubious projection. The landing is in a spacious chamber with Y-shaped canyons in the floor (a good place to remove SRT gear).

The way on is climb down into awkward rift, where it is possible to progress at high level for a few metres before swinging your legs down at only one place and dropping down to the bottom of the rift. *From here one can double back to get to the base of the awkward climb, where a small hole can be used for passing tackle*. Continuing into the cave, there follows a short section of straightforward descending rift with a small stream and intermittent draft, leading to a capped squeeze the "Lynn-shaped hole". This is a tight vertical squeeze downwards, leading to another similar, but wider, hammered squeeze down and a short climb down to the third pitch head. Pitch is rigged from spike at top of the previous short climb, then thread on the left and large flake on the left. Immediately, the rope is deviated from a desperately small popcorn protrusion on the right (needs bolt). Pitch is spacious echoey 20m drop landing on sloping boulder floor. The loose, tricky 5m climb at bottom of this slope would be better rigged as a pitch (2 bolts needed).

The awkward fourth pitch, of 15m, follows immediately. At the bottom of the pitch is a small chamber and a short climb (which can be hand-lined using the rope from the previous pitch) followed by a very tight vertical squeeze "Pipsqueak" and a choice of direction. One alternative is a crawl leading to an aven, the other is a flat-out crawl over very spiky rock—a hammer could help here. This leads to a chossy chamber with a descending crawl to a second chossy chamber. The small stream flows under a large boulder with possible ways on.

Pitch	*Rope*	*Rigging*
1st pitch	P5	Short ladder from dubious protrusion on left (medium wire); 20m lifeline from boulder on surface (long wire).
2nd Pitch	P6	Belay previous pitch lifeline to dubious protrusion on left (medium wire)
3rd Pitch	P20	40m rope, belayed to spike (medium wire), thread on left (short wire), large flake on left (long wire); deviation from popcorn on right (needs bolt) after 1.5m.
Climb	P5	Use previous pitch rope. Needs two bolts on opposite walls for Y-hang.
4th Pitch	P15	Natural rebelay half way down would be better as deviation.

Lev Bishop

Small Caves Explored in 1999

Notes

1. Complete description for each entrance are given, except where it says *"add to description"*
2. References are given as a date followed by L for a description in the Ario 1999 log book, S to one in the 1999 shaft bashing book. A name refers to the person who looks best placed to provide further info, usually the person who wrote the description of the last visit.
3. Bearings are quoted as given in sources (shaft bashing guide and this year's log books) without attempting to correct for magnetic deviation.
4. Note from Gavin 23/7/99L: I've noticed a number of discrepancies in naming between the Adrados and Mapa Topografico Nacional maps: MTN's Cabeza del Burro is Gustuteru's twin peak whereas Adrados's Cabeza del Burro is further west. MTN uses the name Las Salmonetas for the ridge marking the southern edge of the Top Camp area, whereas Adrados calls it Las Cabrones; MTN's Cabrones is further West. MTN called the F7 bowl Jous de Peña Blanca, whereas Adrados calls it Jous de Jorcada. Adrados uses the name Jous de Peña Blanca for the bowl to the South of F2. When describing locations of caves, please make it clear from which map you are working to avoid ambiguity.
5. Area 9: The Adrados 1:25000 map appears to show La Jayada about 300 m NW of its true location. Several entrances in Area 9 visited this year appear the wrong side of La Jayada when bearings to peaks measured from them are plotted onto the map.
6. Additions to the descriptions of 2/5, 11/5 and 30/5 are from memory.

⊗ **2/5** *Add to description:* Water sinks into a 2 inch wide rift in floor of final chamber. (William, 1980 observation)

∅ **11/5** Location not in shaftbashing guide: probably on Al Cousins' 1979 map (likely to be in archive). Worth another look during low snow levels. I (William) went there in 1980 but couldn't find it this year.

⊗ **30/5** **Pozu Optimisto** Chris D, Tony(?)
Final rift beyond Unclean, Unclean pushed to sump in 1993. Extension not surveyed.

∅ **69/5** **Pozu Jenga** Ref: 20/7/99L Tim, Jo; 19/8/99 William, Steve Phipps
Add to description: Final chamber dug in 1999 to vertical choke. Entrance pitch is very loose and needs properly shoring up to permit further exploration in safety.

O **77/5** Ref: 20/7/99L Gavin
Location: Go past 29/5 and continue along the edge overlooking the Valle Extremero. Cave is in a shallow rocky valley heading on a bearing of 60°. Bearings: Cabeza Verde 30°, Cabeza Llambria 64°, start of prow sticking out into Trea Valley 116°.
Description: 10 m shaft which needs medium sized rock removing to gain entry. Well placed but doesn't look massively promising.

⊗ **8/7** Revisited 1999 Ref: 12/7/99L Lev, JC

⊗ **40/7** Ref: 16/7/99L Hilary
Location: Reached by going up and to the West of 7/7, 25 m to the West of 21/7.
Description: Entrance under a very large boulder gives access to a 16 m pitch down a twisting rift. At floor level, a squeeze leads to a blind 10 m pitch.

Unmarked Cave Ref: 16/7/99L Hilary

Location: Just uphill from 40/7 in same rift. Reached by traverse over 2-3 m deep hole *ca* 2 m in diameter.

Description: Small hole going diagonally downwards leads to maze of boulders with daylight shaft. From here, a 10 m free climb in rift leads to gravel floor. Rift continues back under entrance but quickly becomes too tight.

⊗ **12/8** Ref: 23/7/99L, 5/8/99L Gavin

Location: There are two 12/8s, this one and cave D1 wrongly labelled as 12/8. The real 12/8 is located on a bearing 40° to Pozu del Xitu, 90° to Cabeza Llambria, just upslope from the Martini Pool by the route to the top of Gustuteru.

Description: A 10 m pitch down to a snow plug with a 3 m climb up one wall to reach a crawl blocked by a boulder choke.

⊗ **3/9** Ref: 13/8/99L Gavin, Richard D

Add to description: Revisited during 1999 and no way on found.

∅ **6/9** Ref: 14/8/99S, 20/8/99L Simon, Richard D

Location: Two large pits in karst outcrop on North edge of medium sized bowl about 60 m down valley from Tras la Jayada.

Description: Climb down into the pit which sometimes contains a snow plug. A 5 m ladder pitch leads to a tight rift which could probably be pushed by a thin and determined party.

∅ **10/9** See description and survey earlier in this report.

○ **35/9** Ref: 23/7/99L Gavin

Location: Approx 50 m South of the large shakehole *ca* 50 m SE of La Jayada. Alternatively skirt round from 2/9 to the E. Near the bottom of a karst area sloping at 30°.

Description: Undescended 10 m shaft.

⊗ **36/9** Ref: 23/7/99L, 19/8/99S Richard D, William

Location: Near lower end of valley running down from La Verdelluenga containing many shakeholes. Bearing: La Verdelluenga 232°.

Description: 10 m shaft rigged on naturals leads to chamber with snow plug and no way on.

⊗ **37/9** Ref: 23/7/99L, 20/8/99S Richard D, William

Location: In valley roughly 200 m E of twin peaks of Gustuteru (called Cabeza del Burro on Mapa Topographica Nacional). No peaks visible from entrance, but bearings from 10 m upslope La Verdelluenga 221°, Cuvicente 150°. Down valley from 41/9 and Cdo Jermoso (on Adrados map).

Description: Short climb down to walk in daylight entrance to small chamber with snow plug. Two daylight shafts enter from above. 3 m climb down (bolted) to right of snowplug lands on bouldery floor with too tight rift heading off horizontally at floor level. Choked after 1 m. Possibly barely perceptible draught. Snowplug was still quite large at end of 99 expedition – possible source of water if we ever decide to camp nearby.

⊗ **38/9** Ref: 14/8/99S Richard D, William

Location: Large walk-in animal shelter to the right (true left) of La Jayada, over a small ridge. Bearings: Cuvicente 127°, Ario Pastors' Huts 048°, La Verdelluenga 243°.

Description: Large entrance 6 m wide x 2 m high which slopes upwards at rear. Small grovel on right goes nowhere. Sloping squeeze on left at rear leads to a small sloping chamber.

At the base of this chamber, a way through to a climb of about 5 m in loose rift goes nowhere. Also from the chamber, a way back into the left hand side of the entrance can be found – climb over dead sheep. Unpromising.

⊗ **39/9** Ref: 14/8/99S Richard D, William

Location: Small shaft about 1.5 m across and 5 m deep in karst outcrop to right (true left) of La Jayada in same valley as 36/9 about 150 m up valley in direction of La Verdelluenga. Bearings: Cuvicente 135°, La Verdelluenga 229°.

Description: 5 m deep shaft has too tight continuation at bottom. Piddly little rift may connect.

⊗ **40/9** Ref: 14/8/99S, 15/8/99S Richard D, William

Location: Obvious shaft on lhs of large bowl where La Rena ridge forms rhs of bowl (Jou los Purriellos on Adrados map?). Very faded SIE mark and cairn near entrance. Bearing from entrance: La Verdelluenga 246°. Bearing from lip of bowl to cave 197°, La Verdelluenga 234°, Cuvicente 119°, Ario pastors' huts 48°, Cabeza Llambria 70°.

Description: Large shaft 6 m x 3 m rigged using bolt with boulder back-up at upper end of shaft. 15 m drop onto snow plug – bolt rebelay 10 below lip, 2m below ledge. Continue down steep snow plug under a rock arch to a narrow drop through into another steep snow-floored chamber 6 m x 4 m. Various ways off were examined but were either choked with snow or stopped. Explored at end of expedition with low snow levels – return visit only worthwhile with exceptionally low snow levels.

⊗ **41/9** Ref: 15/8/99S, 20/8/99S William, Steve Phipps

Location: Large boulder filled shakehole with open shaft in one corner in rocky outcrop on Cuvicente side of Cdo Jermoso (Adrados Map) between 36/9 and 37/9 near green patch. Bearings: Cuvicente: 140°, La Verdelluenga 227°, Cabeza del Verde 61°, Jultayu 110° (?).

Description: Shaft is 12 m deep and rigged on bolt with natural backup. Bottom of shaft is rubble floor with remains of snowplug. Two little crawls (one each side) go nowhere. Removing a few rocks from under snowplug revealed solid floor with tight squeeze (probably passable by thin caver) to a body sized cavity with a rock ceiling and rh wall and rubble floor. Possibly diggable.

William Stead

Assessment of the Vertical Techniques used during the Extremero 1999 Expedition

The majority of Pozu Jultayu was rigged using Single Rope Techniques on 8mm expansion bolts. One pitch was laddered due to the constricted nature of the pitch head in order to facilitate easier access on and off the pitch. All members of the expedition used the Frog (sit stand) system for ascending the rope. Whilst not being as efficient as the American Rope Walking system it provided the manoeuvrability required by the often intricate rigging style employed within the cave.

Variations between individual's SRT kit were based upon personal preference for a particular piece of equipment.

The most common type of descender used was the Petzl Stop. This auto-locking device provides the user with a valuable safety feature halting the caver's descent in the event of loss of control. Other cavers used the Petzl Bobbin (a simplified version of the Stop without the auto-lock handle) and the Caving Supplies Five Bar Rack. The Rack is a larger more cumbersome device but the caver has the advantage of being able to alter the amount of friction that it provides. This enables the caver to have greater control over the rate of descent providing a much smoother abseil, which is preferable on longer drops.

Petzl jammers were used by all of the expedition members. Some cavers attached the Petzl Basic Ascender to their foot-loops whereas others used the larger Handled jammer. The Handled jammer can encourage a poor prussiking technique but is a more versatile piece of equipment particularly in a rescue situation.

The latest Petzl jammer, the Pantin foot ascender, was also used by some members of the expedition. This device is rapidly becoming respected as a worthwhile addition to any caver's SRT rig. By ensuring the rope pulls through the chest jammer every time it increases the efficiency of the Frog system and was greatly appreciated on the long haul out of Pozu Jultayu. It is most useful when prussiking close to a wall but also comes in very handy when passing re-belays.

The remote nature of the cave system and the lack of a local cave rescue meant that members of the expedition would have to be proficient in self-rescue techniques and also carry a sufficient amount of individual emergency equipment.

Most of the cavers employed a third jammer attached to their long cowstail. This quick attachment safety (QAS) is more commonly used with the American Rope Walking system where ascending gear is not normally worn whilst rappelling. Due to the restricted nature of some of Pozu Jultayu's entrance pitches however, ascending gear was often removed to make negotiating them easier. The QAS became a very useful piece of equipment for negotiating these pitches and was often used in other situations too. Whilst not an essential component of the Frog system it does provide a useful service and deserves to be more widely adopted by British cavers.

Some cavers carried an emergency micro ascender in their prussik bag. The Wild Country Ropeman and the new Petzl Tibloc both saw use in Spain but only in circumstances of convenience or familiarisation rather than actual emergency. Most of the expedition also opted to carry a rescue pulley along with other items of emergency equipment such as a knife, a first aid kit and a survival bag.

Richard Gerrish

Medical Report

Introduction

This was a very bijou expedition to Northern Spain, a glittering area full of exciting caving (i.e. technical), quartz splinters, and very basic facilities. The club has been caving here for nigh on 40 years. The standards of exploration are very high with the expected aches and pains, scratches and bruises that come with 'the job'.

The Club ensures that members in Oxford at least are invited to a first aid course. The Club runs its own rescue training weekends with some specific medical training provided. The bulk of expeditioners are able to get to these meetings.

Statistics

Incidents

- Usual short term (one day) jippy tummy. Kept properly hydrated (used Rehydrat).
  4 cases.
- Toe blisters
  2 cases.
- 'Ario hands' i.e. multiple, small, infected grazes (often aggravated by quartz crystal splinters). This is fairly wide-spread and entirely unavoidable.
  Multiple.
- Allergy to wound dressings. Sought medical attention on the way home.
  1 case.
- Heat/sun stroke. Took a day off and maintained full hydration with Rehydrat.
  1 case.
- 'Jock rot'. Used Mycil to remedy it successfully.
  1 case.

Accidents

- One boulder slip. No injuries reported.

Potential Accidents:

- 2 events involving nearby boulder falls. No injuries reported.

Synopsis

- There were twelve real events and two potential incidents for a total of 319 person days.
  One event per 22 person days.
- Three events (including two close misses) occurred in a total of 1572 person hours spent underground, with no injuries sustained.
  One event per 22 person days where a day is 24 hours, not a 'working day'.

Future Actions

- Near misses with boulders have been noted and there will be a focus on avoiding such problems in next year's training.
- Despite the current high levels of first aid training, there are plans to increase this next year, possibly with the help of a caving doctor.
- The current rescue medical kits are cumbersome for transport underground, and we will be looking at how to resolve that problem.
- We need to seek advice on more appropriate pain relief for serious injuries.

Conclusions

- Given the small number of people on this expedition, and the extent of the difficult caving that they did the stats are very impressive.

- The events underground were potentially serious. The fact that the potential was not borne out is a credit to the caving skills of the Club members. **However, it raises again the issue that we carry very few powerful pain relief drugs. Were there to be a serious accident we are still badly underfunded with the drugs we would need to ensure the welfare of the victim during the considerable length of time that a rescue from underground would take.** We will seek the opinion of the Cave Rescue Organisation's medical advisor on this issue, and act accordingly.
- The Club has had a real focus on learning rescue techniques and first aid over the last few years and this seems to have continually improved both general safety, hygiene and first aid. It is clear that the Club is not complacent in this regard.
- It would be very difficult, given the primitive circumstances of the camping, above and below ground, to reduce the hygiene problems.

Joan Arthur
Medical Officer

Nicola System

The tragic flooding of the Gouffre Berger in 1996 led to the loss of two lives, Torda Istvan and Nicola Dollimore (an OUCC member). Nick Perrin, Nicola's husband, set up a fund to finance research into the development of communication systems for use in caves, in particular to send warning messages into the Berger. On this year's expedition, we were lucky enough to be able to borrow a pair of the latest prototype sets produced by the resulting collaboration, which we used for communication into 2/7.

The underground set was located at the Big Ledge campsite (-700m), and the surface set was in the Jou del Jultayu, leading to a through-rock distance of around 600m. The underground set was equipped with an earth-current antenna system, with about 40m of wire run out in total and connected to lengths of electrical fence tape, one submerged in the pool below the campsite and the other at the pool above camp (where the water is collected). The surface set used a magnetic loop dipole antenna in the first instance, for locating the site with best reception. Once this site had been found, after about 20 minutes of searching, an earth-current antenna was constructed, using 4 wires of approximately 40m length, laid out in roughly perpendicular directions. These were attached to metal pegs which were hammered about 15cm into the nearest convenient patch of vegetation and wetted with about 250ml of water. As soon as the first pair of wires was connected, immediate 2-way communication was achieved, which was very clear and easily intelligible in both directions. The settings of the controls on the radio after adjusting to give the best communication indicated that the surface antenna had good coupling to the earth, and the underground antenna, while not quite as well-coupled, was still perfectly acceptable. The occasional word was lost on the surface due to lightning-induced static, and any problems with comprehension at the underground set were due to the poor radio style of those involved (nobody had any experience with radios of any kind). In total, it took about half an hour from when the underground station began transmission until we had a working 2-way link.

The use of these radios was surprisingly simple, even for inexperienced radio operators, and the equipment is compact, the radio and batteries occupying a pelican case, and the pieces of antenna taking up about the same amount of space again. Everyone involved was impressed with the sound quality. Lynn and I found it very surreal to sit in the evening sun in the Jou del Jultayu, talking so casually to Jo, who was shivering at the underground campsite. Everyone agreed that this kind of technology would be a great aid to expedition safety in case of a rescue, and would be very helpful with the logistics of running an underground campsite. Unfortunately, due to time constraints, only one radio conversation was attempted this year before the derigging of the camp had to begin. It would have been useful to try to see how far we could push the system, since we were clearly using it well within its capabilities on this occasion.

Lev Bishop

Radon Experiment

Background and rationale

^{222}Radon is an inert radioactive gas, both odourless and colourless, and is produced by the decay of ^{238}Uranium via several intermediate stages. ^{238}U is present in small quantities throughout the earth's crust. The resulting seepage of radon into the atmosphere from rocks and soil only becomes hazardous to health when airflow is restricted, for example in a house or cave, allowing radon concentrations to rise.

Given the long periods of time spent underground on expedition, we decided to investigate if there was a significant risk from radiation. From the geology of the area we expected to find low levels of radon in Pozu Jultayu, but if this were not the case it would have told us that the geological model of the area was not complete. Our third reason for carrying out the experiment was to investigate how practicable it would be to do a more detailed study of radon in the caves of the area – for example better knowledge of air flows within the caves would improve our understanding of the area. We did not intend to do a detailed or comprehensive study of the radon concentrations throughout the cave; this was simply an initial investigation of the possibilities.

Method

We used alpha sensitive film to detect the radiation produced when ^{222}Rn decays. This is the most accurate method of determining radon concentrations that is suitable for use in caves. The film was enclosed in a commercially produced badge which protected it from some of the mud and water. Before and after exposure the badges were kept in plastic packets and the packets sealed inside metal canisters. This prevented the radon, and hence the alpha radiation, from reaching the film.

Each badge was exposed by removing all the packaging. The start and finish times and the location of the badge were recorded. Some of the badges were exposed at specific locations throughout the cave; others were worn by cavers on long camping trips and therefore moved through the cave. At least two badges were placed at each of the fixed locations, in order to check the consistency of the results. The badges at the fixed locations were protected from some of the water by small shelters.

Two control badges were also exposed: one was placed in the shakehole at the entrance to the cave, 2/7, and the other was exposed at the Ario camp (i.e. away from the significant caves).

The badges were returned to the laboratory of TASL, the company that supplied the badges, to be processed.

Results

The table below shows the calculated radon concentration in Bq m^{-3}, the location/carrier of each badge and the exposure time in hours. The results are ranked by concentration. In general, the results are fairly consistent (i.e. badges exposed at the same location have recorded approximately the same concentrations). In addition the relative results are plausible: the concentration of radon increases further into the cave as we would expect.

In the entrance series Gripper Pitch comes first (nearest the entrance) followed by Graham's Todger Pitch and the First False Floor. So, apart from 26724, radon increases as we go into the cave. Deeper into the cave and heading upstream we first encounter the Paris Metro, then Echo Beach and finally Coral Corner. In other words the Paris Metro seems to be out of sequence. However, the air is very still in the Paris Metro compared with both Echo Beach and Coral Corner: above these last two are inlets which would tend to increase air circulation.

Badge number	Location	Exposure time (h)	Concentration (Bq m-3)
26723	Paris Metro	45	2187
26726	Carried by LB	81	2053
26721	Paris Metro	45	1435
26734	Carried by LM	81	1273
26718	Coral Corner	79	1166
26717	Coral Corner	79	1153
26729	Echo Beach	149	1094
26727	Echo Beach	149	1069
26733	Carried by JW	83	867
26728	First False Floor	71	764
26725	First False Floor	190	348
26722	Graham's Todger Pitch	147	348
26719	Graham's Todger Pitch	147	325
26730	Gripper Pitch	199	302
26724	First False Floor	190	300
26731	Gripper Pitch	199	155
26732	Surface control (at camp)	222	116

Nevertheless, there are some problems with the accuracy of the results. There are three main sources of error:

1) Low exposure times. The low readings mean that we are amplifying small differences between the background, which can fluctuate, and the measured track count. This will introduce a significant statistical error in the results. Further analysis of the results will be carried out to quantify this statistical error.
2) Water. It was extremely difficult to keep the badges dry. Water on the film will absorb some of the alpha radiation, leading to an underestimate of the reading.
3) Contamination. In the time between exposure and processing, radon may have leaked into the badges if the seals on the canisters were not perfect. This would result in an overestimate of the radon concentration.

It seems likely that contamination has affected some of the results – the surface control is surprisingly high. This contamination is likely to be of the order of 100Bq m^{-3}.
Further statistical analysis will be carried out to quantify this statistical error.

Preliminary Conclusions

Health

As can be seen from the table below, the mean concentration of 927Bq m^{-3} is lower than that in the main caving areas in Britain. This is likely to be a fairly inaccurate figure, but the level is nowhere near as high as in Derbyshire, the only area of real concern in Britain. The highest concentrations are found deep in the cave, but less than half of the time spent underground on expedition is in these deep regions. The concentrations are low but significant, and cavers spending a lot of time (many days per year) in this cave should be aware of the potential risk. It will be interesting to compare the average radiation dose received by an expedition member with the recommended maximum for radiation workers (a very strict standard).

Region	Mean ^{222}Rn Concentration (Bq m^{-3})	Maximum	Minimum	Standard Deviation	Number of Readings
North Pennines	1115	27136	14	2089	370
Mendip Hills	1129	3621	99	1057	15
South Wales	2561	19968	127	2773	249
Peak District	8868	46080	9	10724	168

Fig. 1: *Summary of cave radon concentrations measured using passive radon detectors.*[1]

Geology

As we expected, the levels of radon are low. However, further investigation will be required to determine if this is as low as the geology would suggest.

Methodology and potential for future studies

There are some problems with the method we used which would need to be overcome before a more detailed study was carried out:

1) Low exposure times. To reduce the statistical errors to an acceptable level, the exposure times would have to be increased to at least a few weeks. This would have significant logistical implications for the expedition. The maximum exposure length currently possible is four weeks, which would be a big improvement on what was possible in 1999. However, a more detailed experiment would require many more test locations and this would be time consuming, therefore reducing the exposure times that are possible.
2) Water. It was extremely difficult to protect the badges from splashes, despite the protective shelters we erected. A more sophisticated solution needs to be found to keep the badges dry whilst still allowing the air to circulate freely. Badges worn by cavers are even more difficult in this respect, but any future experiment might find that fixed locations are more appropriate anyway.
3) Contamination. The main problem was that water and mud on the tape for sealing the canisters reduced the effectiveness of the seal. A better way of stopping air from reaching the badges should be found. The badges should also be processed as soon as possible after returning from the field.

In conclusion, a more detailed study would require careful planning and implementation – problems cannot be easily rectified in the field.

Joanne Whistler

[1] Hyland and Gunn, 1994

Dye Tracing Report

During the expedition an attempt was made to determine if the Sistema Verdelluenga (C3/C4) streamway entered Pozu Jultayu (2/7) and if so where? This was done using fluorescein dye as a tracer with nylon mesh bags of activated charcoal being placed in the streamways as detectors. This technique has the potential for extremely high sensitivity but this advantage means that care must be taken to minimise contamination and controls used to determine background levels of dye/organic contamination.

Collection

Before this year's expedition added any fluorescein to the C4 watercourse charcoal detectors were placed at the three sites of interest and then removed at the time indicated below.

Position	*Time in*	*Time out*
Big Ledge	24:00 18/07/99	10:00 20/07/99
Holier Than Thou	18:00 19/07/99	18:00 20/07/99
Viagra Falls	18:00 19/07/99	19:00 20/07/99

After the removal of the blank samples new detectors were installed in the same locations and fluorescein added to a streamway in the chamber preceding the C4 breakthrough point of 1996.

Position	*Time in*	*Time out*
Big Ledge	10:00 20/07/99	12:00 28/07/99
Holier Than Thou	18:00 20/07/99	20:00 26/07/99
Viagra Falls	19:00 20/07/99	22:00 26/07/99

All the samples were stored, wet and double bagged, for ~3 months before analysis.

Preparation and Assay

The charcoal bags were washed with tap water then cut open and a portion of the contents emptied into labelled plastic tubes. The open tubes were then placed in an oven till dried. To elute any bound dye a solution of 1-propanol 100% assay, deionised water, and ammonium hydroxide 28-30% assay mixed at a ratio of 5:3:2 was used. Enough solution to cover the dried charcoal was added and the mixture left at room temperature for one hour. A portion of this solution was then removed and placed into eppendorfs and briefly spun in a microfuge to remove any suspended charcoal particles. The clarified solution was then assayed using a scanning spectrofluorophotometer which had been calibrated using known dilutions of fluorescein.

Results

All the blank samples and controls gave negative results suggesting that no contamination of samples has occurred and any background level of dye in the streamway was undetectable. The samples collected from the Big Ledge and Viagra Falls gave very strong positive results while that from Holier Than Thou showed a very faint positive at the limit of detection and giving a signal approximately 1000 fold less than the other two. These results support the idea that the C4 streamway does not connect with the Holier Than Thou inlet but rather enters with the water at Viagra Falls.

Conclusion

The dye trace proves the hypothesised connection between Sistema Verdelluenga and Pozu Jultayu, and confirms the presence of a cave system over 20km in length. This is exceptional for this mountainous region, especially as it is a hydrologically active system, carrying a major watercourse, yet it is perched 700m above the district's base level.

The potential for human exploration is reconfirmed as being high. This connection is almost certainly large enough to allow human passage, although the route followed by the water is known to sump ultimately. However, fossil levels are a common feature of this system, and so the chances of forging a dry connection are good.

Having established the ability of this karst region to sustain large horizontal streamway caves, there is renewed scope for further major discoveries, both of the currently active conduits, and of the ancient abandoned routes.

The centre line surveys on the following pages provide an overview of both Pozu Jultayu and of the rest of the area of study. Dye traced connections are also shown on the plan of the area.

Andy King

Expedition Accounts Summary

Up to 31/3/00

Income		
Grants (Core)		
GPF/ David Hood	£	900.00
Oxford University Initial Grant	£	685.00
Oxford University Subsiduary Grant	£	957.00
Royal Geographical Society	£	650.00
BCRA Research Fund Grant (for Radon Project)	£	75.00
Total	**£**	**3,267.00**
Members Contributions (Core)		
Deposit and Insurance	£	2,132.00
Travel	£	800.00
Surplus On T-Shirt Sales & Food Kitty	£	10.44
Report Sales*	£	30.00
Total	**£**	**2,972.44**
Members Contributions (Additional)		
Equipment purchase evening	£	1,135.00
Gear Order	£	2,582.08
Individual Travel	£	1,740.00
Food Kitty	£	1,040.00
T-Shirts	£	172.86
Total	**£**	**6,669.94**
Other Incomes (Additional)		
Float	£	300.00
Gear Order (other organisations)	£	480.00
Total	**£**	**780.00**
Total Income	**£**	**13,689.38**
Discounts Negotiated	*£*	*1,410.00*
Sponsorship, Goods In Kind Received	*£*	*170.00*
Total discount & sponsorship received additional to incomes	***£***	***1,580.00***

Expenditure

Core

Insurance	£	231.00
Travel	£	2,396.91
Rope and Rigging Equipment	£	1,674.91
Underground Camping Equipment	£	140.00
Surface Camping Equipment	£	115.24
Underground Food	£	241.34
Camping Fuels	£	77.10
Surveying	£	280.11
Photography	£	163.01
Cave Radio & Electronics	£	169.90
First Aid	£	169.57
Radon Project & Misc Science	£	253.09
Publications*	£	102.70
Shortfall on Gear Order	£	4.65
Administration	£	219.91
Total	**£**	**6,239.44**

Additional

Float	£	300.00
Gear Order	£	3,062.08
Equipment purchase evening	£	1,135.00
Individual Travel	£	1,740.00
Food Kitty	£	1,040.00
T-Shirts	£	172.86
Total	**£**	**7,449.94**

Total Expenditure	**£**	**13,689.38**
Total Income	**£**	**13,689.38**
Balance		**NIL**

Core transactions affect the expedition's assets, and pass through the expedition's accounts. Additional transactions have a neutral effect on assets, (eg costs passed directly to members); not all of these transactions pass through expedition accounts, but are included to give a fair representation of the expedition's overall finances.

* Projected figures for report cost and income.

The expedition consisted of 16 members, and about 320 person-days,
this was fewer than expected, putting additional strains on the expeditions resources.
The average cost to each member was £602.50.