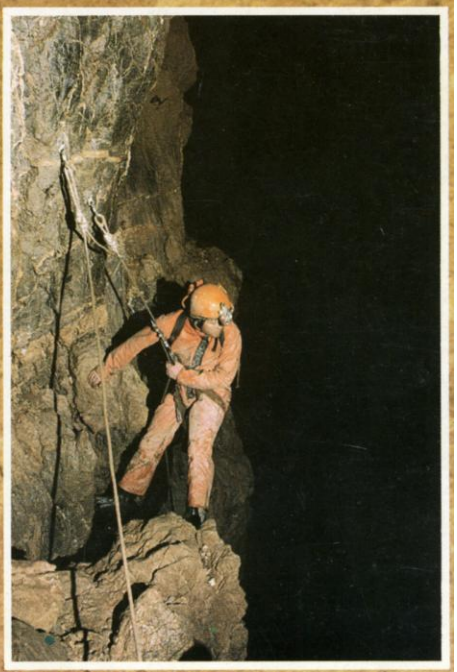
POZU DEL XITU



Flat Iron Shaft – from the bottom up. Inset: the descent of Flat Iron Shaft – 90m of free space below his feet!

OXFORD UNIVERSITY CAVE CLUB

Club Rooms: 13 Bevington Road Oxford OX2 6NB

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OUCC PROCEEDINGS 10: 1980-81

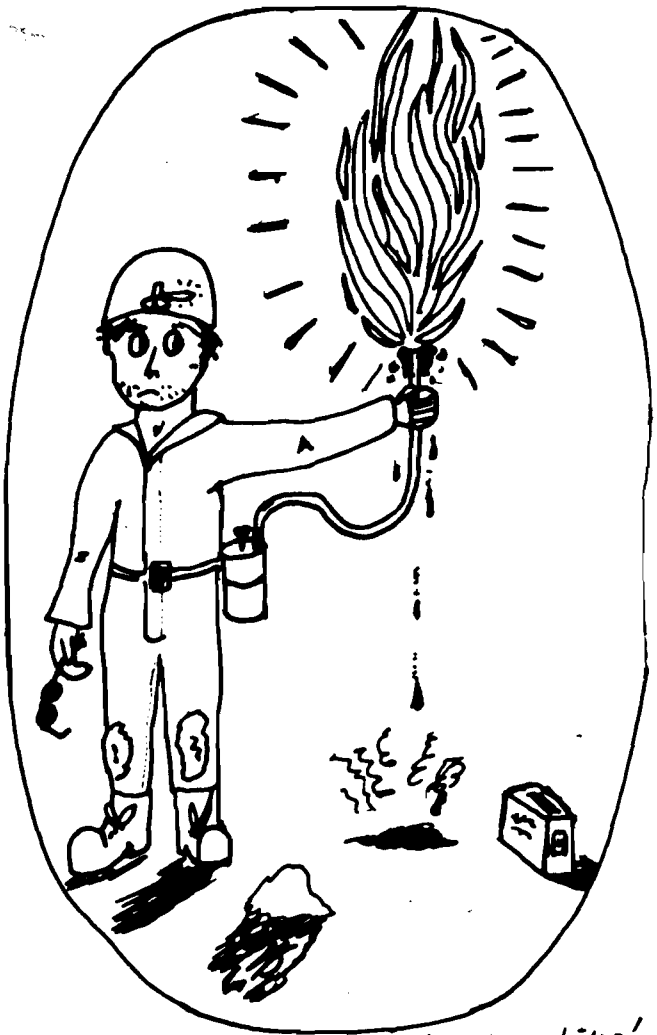
Contents

The Editorial

In the two years since the last OUCC proceedings, the Club has concentrated almost all its efforts on one cave, Pozu del Xitu in Asturias, Northern Spain. There have been two expeditions to Xitu in that time and the one in 1981 finally saw us reaching the terminal sump at -1139m.

As in 1979, the base camp for both expeditions was at the road head at Lago de la Ercina (see map). At first in 1980, our upper camp consisted of a few tents around the Refugio MVA Ario but after a heavy snow fall demolished two of them, many of us moved inside. The Refugio provided bunk beds for those who could afford them, a water supply (a dripping spring), plenty of vino, an occasional "El Puritan" and a large room to chat, cook and draw surveys up in, all great bonuses on any Expedition.

Our transport was as usual slightly eccentric. In 1980 Dudley's "hip" fur lined VW van and a smashed up Datsun courtesy of Martin (he did the smashing) and Rae (she supplied the car) gave useful service as tackle carrying vehicles. Some of our expedition members in 1980 were even privileged enough to be passengers on the Viscount which crashed returning to England from Santander. In 1981, the Club managed to buy a Land Rover called Rosemary to carry the 2km of rope, ¼km of ladder and numerous bits of camping gear required to push Xitu.



The Singleton 'Bettalite'.

By crafty tricks such as hiring cars in Spain, sending people by Transalpino and cramming three people and tons of gear into the Datsun just for its trip onto and off the ferry, we managed to have the lowest travelling costs per person of any Expedition to Spain in 1980 and 1981.

That is probably all that needs to be said by way of introduction apart from repeating my predecessor's observation in Proc. 9. After 20 years of Spanish Expeditions, OUCC have finally hit the Big Time and found the seventh deepest cave in the world. But that's not all; we're all still good friends after three Expeditions. That counts for a hell of a lot when you're pushing a cave like Xitu.

THE XITU EXPLORERS

Chris "I wish I hadn't bothered" Ankcorn (Skippy) WMCEG (79,80,81)
Mike "I'm so depressed" Boase (Marvin) SUCC (80)
Mike "Oh Ah Ah Ah Ah Ah OOOrgh..." Busheri OUCC (79,80)
Mick "Oh me guts" Clarke (Skunk) TSG (79,80,81)
Chris "Talking on the great White Telephone" Danilewicz OUCC (81)
Ian "My tights keep me warm" Dumbleton SUCC (79)
John "One can only cringe" Forder OUCC + Whernside Manor (81)
Simon "Someone go and look down William's Hole" Fowler OUCC (79,80,81)[1]
Mark "What pioneers" Godden OUCC (79,81)
Stephan "I prefer a good mine" Green OUCC (79,80)
Richard "Can I lance it?" Gregson OUCC (81)[2]
Amelia "Oh I'll go myself then" Grimshaw OUCC (81)
Sean "I don't like the belays" Heaver OUCC (81)
George "Pass that (50kg) pebble" Hostford OUCC (81)
Kevin "Where's the crapper?" Hostford OUCC (81)
Jan "Where's my sun tan lotion?" Huning OUCC (81)[3]
Pete "Do you think I've melted this car battery?" Hanson SUCC (81)
Martin "A short barbarous trip" Laverty OUCC (79,80,81)[4]
Liz "Cavers are so....." Lloyd-Jones SUCC (79)
Tony "I'm a balance caver" Moult OUCC (81)
Graham "Er, er, er, um yes, well perhaps er... not really" Naylor (79,80,81)[5]
Trevor "Squalid Days at Ario" Neatherway SUCC (80,81)
Colin "Which cheeky bugger interrupted me in mid flow?" Nicholls OUCC (79,80,81)[6]
Dudley "I think I know how this van works" Page SUCC (80)
Rae "Watch this for a handbrake turn" Parkinson ? (80)
Russell "Wish they had Guinness" Penney OUCC (80)
Keith "I like mine mutilated" Potter OUCC (80,81)[7]
Andy "Woooarrr... Wicked!" Riley OUCC (81)
Dave "I think you're a twot at the moment" Rose OUCC (80,81)[8]
Kathy "This is better than cooking for you lot" Senior SUCC
Kev "Take it well SIE! He He" Senior SUCC
Jim "I've a wife and kids to think of" Sheppard OUCC (1806,79,81)
John "Oh me piles" Singleton OUCC (79,80,81)[9]
William { "I don't want a fire hazard in my luggage" / "but I always wear pyjamas in bed" / "I say, is this the master cave" / "I say, has anyone got a large magnet?" / "Why...? Where...? What...?" } OUCC (80 81) Stead (BedStead)
Joy "Earth Movements" Tasker OUCC (80)
Val "You're not going caving, Dave" Tee SUCC (80)
Dave "Any more washing up?" Thwaites OUCC (79,80)[10]
Daryl "....." Thomas SUCC (80,81)
Dave (Val says it all for him) Uglow SUCC (80)
Richard "I don't always see eye to eye with..." Walters (Roo) YUCPC (81)
Hywel "I'm going to bed" Watkins OUCC (81)
Clive "I remember when EPC was really squalid" Westlake TSG (81)
Jerry "Let's have a firkin" Williams YUCPC (81)
Dick "Some caves are designed for ladders" Willis (81)
Anni "Anyone want any tortilla" Willis (81)

1) Secretary 1979, Leader 1980. 2) M.O. 1981. 3) Secretary 1981. 4) Leader 1979, Advisor 1980, Adviser 1981. 5) Secretary 1980, Tacklemaster 1981. 6) Tacklemaster 1979, Treasurer 1981. 7) M.O. 1980. 8) Tacklemaster 1980, Press Officer 1981. 9) Treasurer 1980, Leader + Editor 1981. 10) Treasurer 1979.

Acknowledgements

We would like to thank the following sponsors who have helped us over the past three years:

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The Observer Colour Magazine
The Sunday Times

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Cowburn Bers and Bray (Printing Facilities)

Proc. 10

Many thanks to Al Cousins and Sandra, who, although not part of the Expedition, did a magnificent surface survey of the Ario area in 1981. Thanks also to Tom Houghton for doing the pasting and Steve Cope for the typing.

General

We would like to thank the BCRA, CNE and CRNE for allowing us to work unhampered in the Picos de Cornion.

Many thanks to all our friends in Spain especially

Sr. Amador Gonzalez (Ramos) of the Refugio Entrelagos who gave us many fine meals, hot showers and mucho vino during the three Expeditions.

Manolo and Eduardo, wardens at the Refugio MVA, Ario, who tolerated several smelly English cavers messing up their superb hut for six weeks at a time with good humour.

Thanks are also due to Skunk, Rae, Dudley, Dave T., Clive, Sean, Oxford University Department of Geology and Mineralogy, Pete, John F. and George for providing Expedition vehicles at one time or another. We are especially grateful to Nick and Alison White, who gave many hours of their time to renovating the Club Landrover in time for the 1981 Expedition.

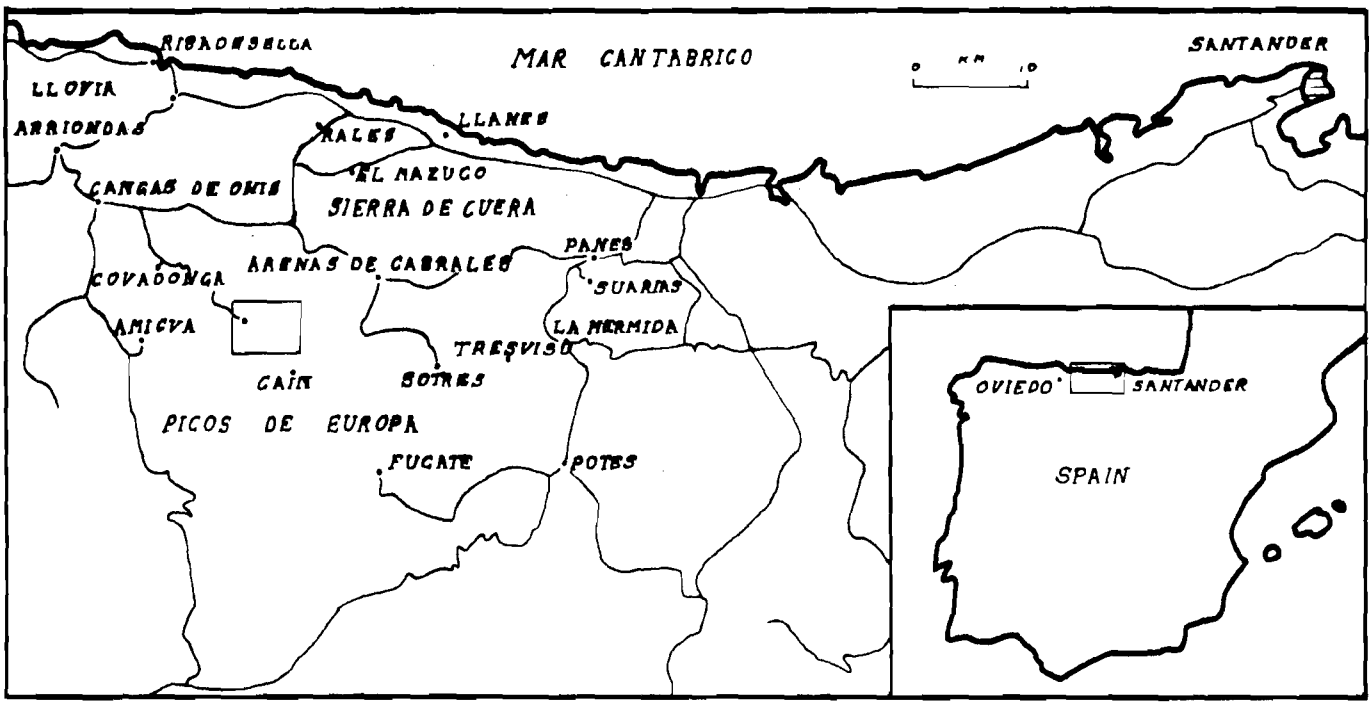
Geography

The Picos de Cornion is the western massif of the Picos de Europa mountains in northern Spain. The expedition was to the part of this area covered by the Province of Asturias (Oviedo), but Leon and Santander also have territory there. The mountains rise to 2596m within 30km of the aptly named Costa Verde: the Green Coast. The climate is strongly influenced by oceanic effects and is rather wet. Rainfall at Bufferara near Los Lagos is recorded as 2119mm per annum, with June, July and August being slightly drier than other months. Despite this, the summer can bring periods of prolonged drizzle and fog, as well as severe thunderstorms. The latter may be accompanied by hailstones or winds of prodigious size and intensity: both have been seen to wreck tents with great ease! Permanent snowfields are a prominent feature of the peaks and snowplugs persist in dolines and shafts down to at least 1250m in some cases. The spring thaw must be an important time for continuing cave development with impressive flooding. The evidence for such annual events is particularly clear in caves at lower levels, where new vegetation chokes appear each year in sites far above observed summer water levels. Vegetation is generally sparse above the level of Los Lagos, and is probably decreasing in extent with overgrazing by goats, sheep, cows, and sometimes, horses.

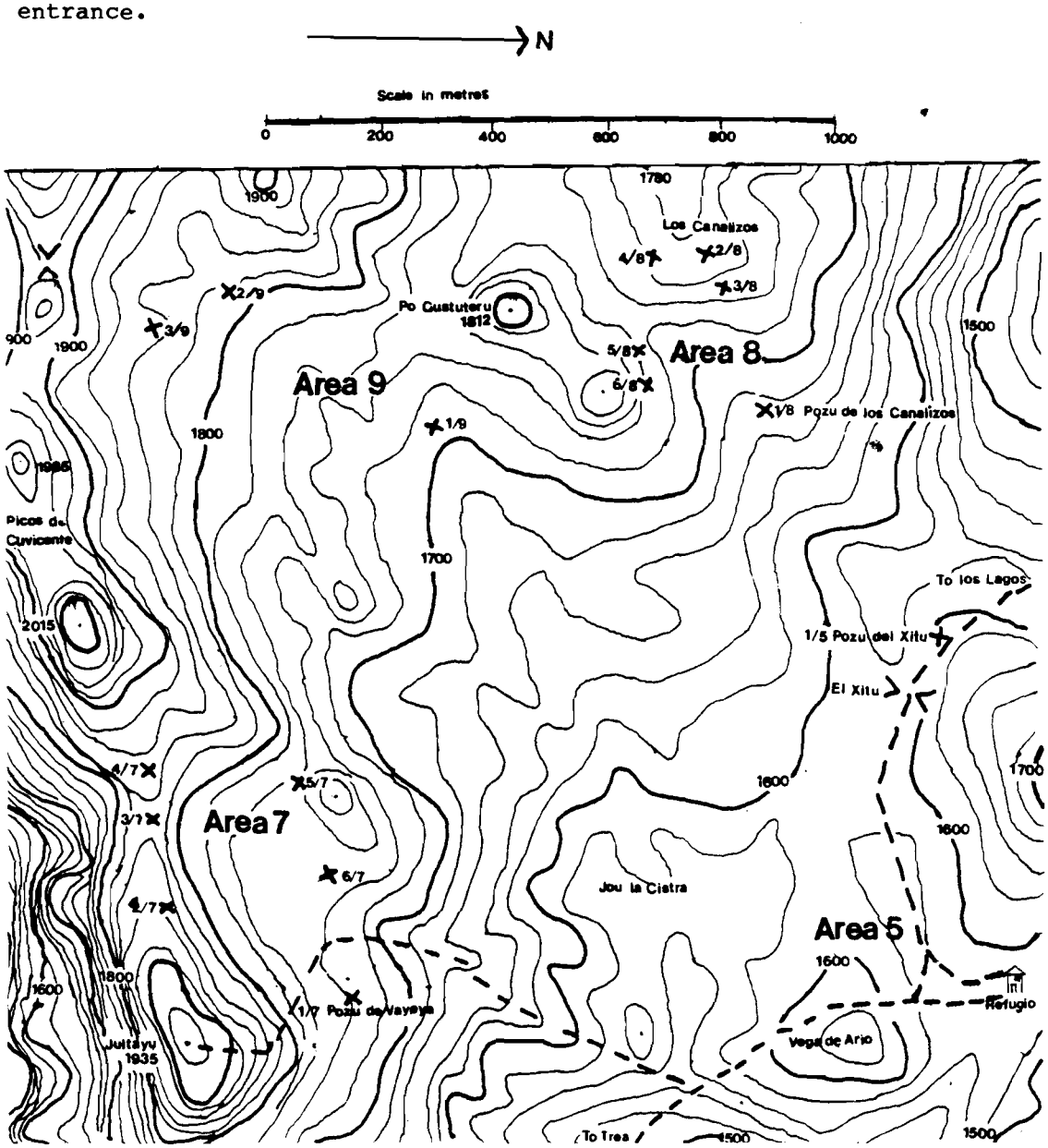
Further details of the biology of the area are contained in: Proposals for the Biological Management of the Parqua Nacional de la Montana de Covadonga, Asturias, Spain. Discussion Papers in Conservation, University College, London, No.25 (1979).

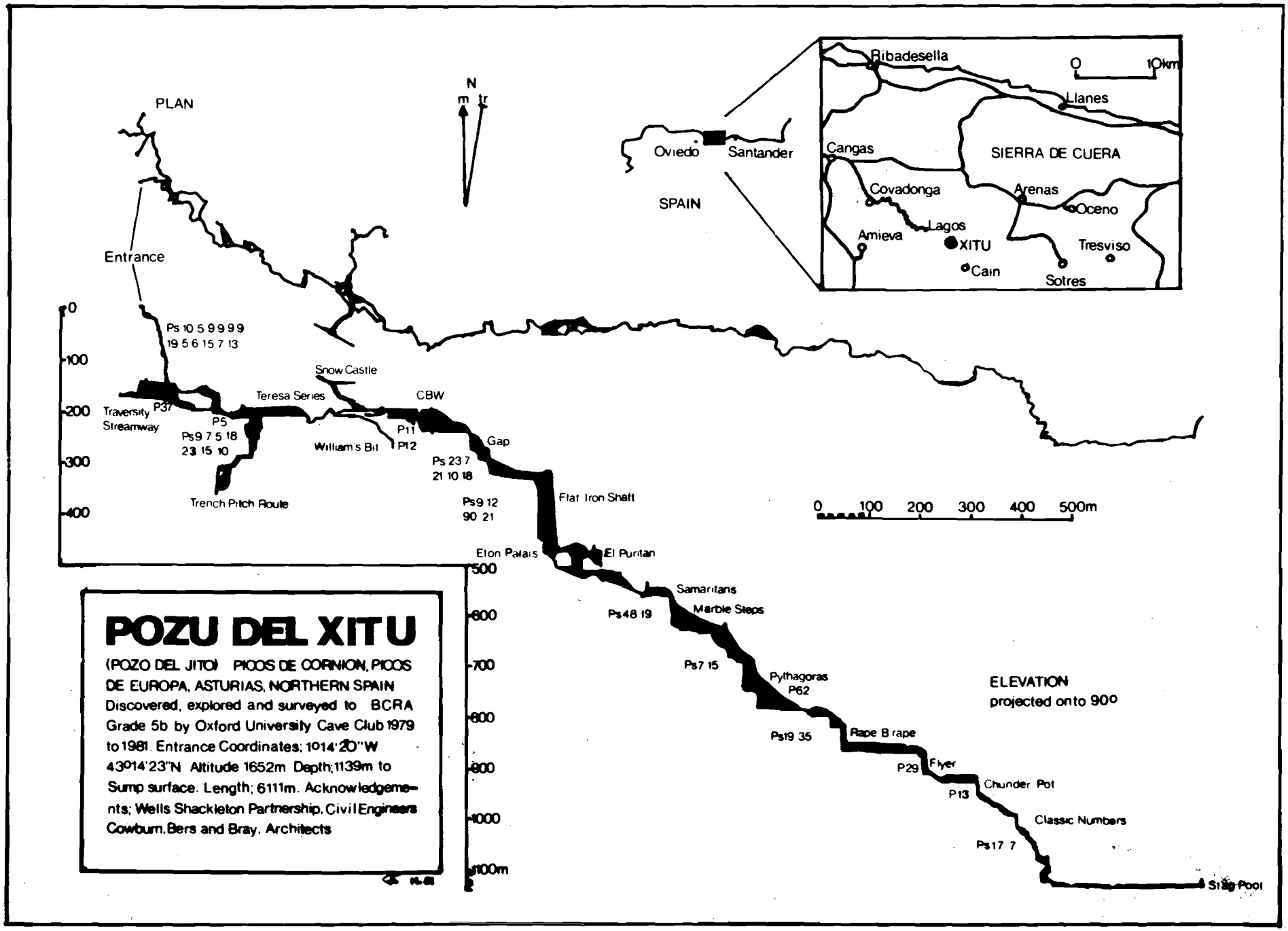
A Note on Map Coverage of the Area

In order to reach the expedition area, road maps obtained from the Spanish National Tourist Office or made by Firestone (Costa Verde y Picos de Europa - 1:250,000) are quite adequate, and usually in agreement one with another. At a more detailed level, no really accurate maps appear to exist. The most accurate looking map is the Mapa de los Tres Macizos de los Picos de Europa at 1:50,000 scale produced by the Federacion Española de Montañismo (Alberto Aguilera 3, Madrid 15; the same address as the Comision Nacional de Espeleologia, from whom permits are required to cave in Spain). This map is on sale only in Potes, Aliva, Posada de Valdeon, and Arenas de Cabrales, and is basically the same as the relevant portions of the Mapa Nacional sheets 55, 56, 80 and 81. However, the Lambert grid on those is not reproduced, so map references must be given in terms of latitude and longitude (W of Madrid, not Greenwich!). Another 1:50,000 map is produced by the Federacion Asturiana de Montañismo (Melquades Alvarez 16, 1. Izda., Oviedo) and this gives full details about the network of mountain refuges. Its contouring is far less detailed than the other map, but the rivers, settlements and paths are generally more accurate. The most used map of the area, and the most easily available, is the 1:25,000 Mapa Topográphico - Excursionista produced by Editorial Alpina (Apartado de Correos, 3, Granollers) entitled Picos de Europa I Macizo Oriental. This comes complete with a guide book to walks in the area, but can be rather misleading or confusing to use. This problem is exacerbated if comparison is made with the other maps! The map which is considered best by experienced members of the SIE group of cavers from Barcelona is another 1:25,000 map produced by J.R. Lueje for a book called Picos de Cornion, published by Gijon in 1968. Unfortunately, this is not easily available.



Map Coverage of Area Studied:- Above: Map of General Expedition Location. The small rectangle indicates the area covered by the map on the large Xitu survey. Below: Map showing Areas 5,7,8,9(See Small Caves in the Ario Area). A more detailed map of Area 5 is enclosed folded inside the back cover. Key to lower map: Contours at 20m and 100m intervals. Pass. Well marked path. x 1/6 Cave entrance.





POZU DEL XITU

(POZO DEL JITO) PICOS DE CORNION, PICOS DE EUROPA, ASTURIAS, NORTHERN SPAIN
Discovered, explored and surveyed to BCRA Grade 5b by Oxford University Cave Club 1979 to 1981. Entrance Coordinates; 1°14'20"W 43°14'23"N Altitude 1652m Depth; 1139m to Sump surface. Length; 6111m. Acknowledgements; Wells Shackleton Partnership, Civil Engineers Cowburn, Bers and Bray, Architects

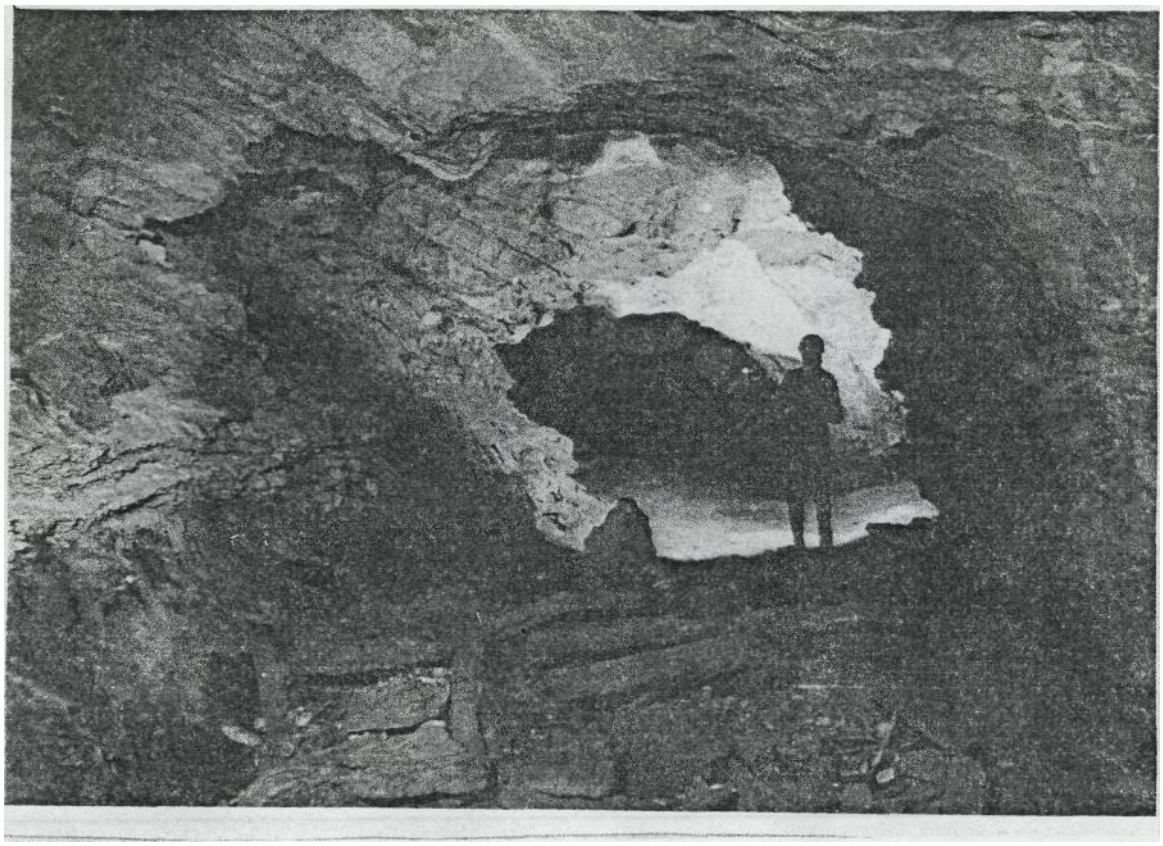
XITU - THE CAVE

Main Route(A Summary of the routes marked * is given after this article)

Follow the Ario-Los Lagos path until the view indicator is reached. lOQn along the path beyond this, and 5Cm to the left is Xitu[1] s large entrance cleft. The Entrance is a short free-climbable drop to the head of a 1 Cm pitch into Crow Chamber. At the end of the Chamber, a tight rift conceals one of the deepest caves in the world. Climax Rift, as it is known (possibly due to the noises made by Mike in it), is probably the reason why Xitu hadn't been pushed before 1979: certainly it isn't easy on the first attempt. The trick is to keep as high as possible although there is a narrow route lower down used for lifting stuck cavers from below. After 2On or so, Climax Rift widens out into a rift of much larger proportions which sets the character of the rest of the Entrance Series.

Five nine metre pitches bring the budding Xitu explorer to a short traverse to the head of a 19m pitch. At the bottom, care must be taken not to abseil too far to the left (facing the wall) or else you end up at the bottom of a blind pot (or in mid air if the rope isn' t long enough). Opposite the blind pot, two short pitches (5m, 6m) in corkscrewing passage descend to the final drop in the Entrance Series, rigged in three stages (13m, 3m, 7m) from large ledges. At the final ledge, reached by penduluming across a 37m blind shaft, the entrance shaft has luckily cut through an old oxbow which is part of the first streamway in Xitu. The water which comes down the Entrance Series in wet weather vanishes down

Left: Jan in Climax Rift. Right: Jan on the 19m Traverse Pitch



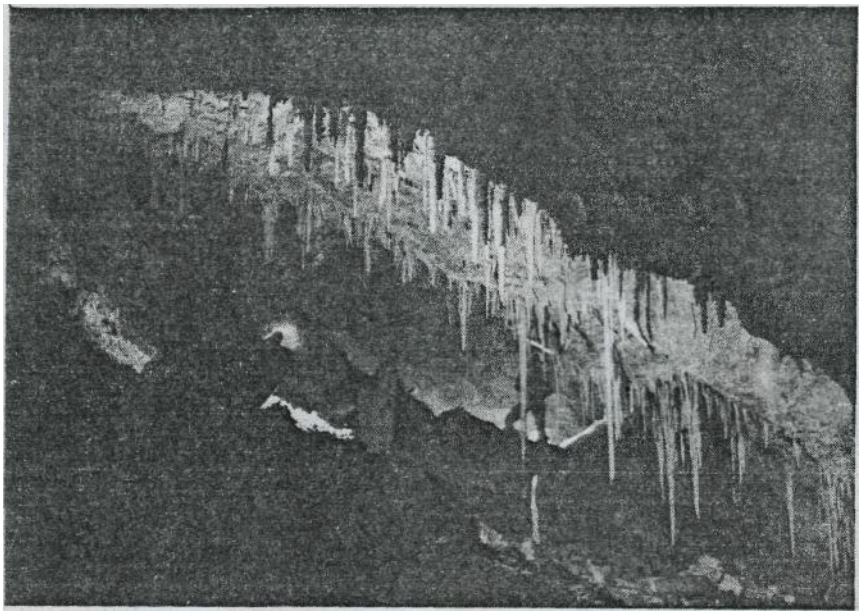
The Teresa Series

the blind pot and seems to have little influence on the first Xitu stream.

A scrabble past some dirty fossil stal (the Pretties) gives access to Customs Hall, a huge old phreatic tube containing a deep trench emitting the faint sound of... a stream! Several interesting routes lead off here, the most important being Ming Piece Passage* and Traversity Streamway* but the way on is to traverse to the right of the trench, round a large rock barrier and then climb down into the rift down to the left. There are several oxbows entering the passage which follows: sticking to the most obvious route gets you down to the Streamway via a short pitch (free climbable if you're desperate) in the shortest time.

The stream is in narrow vadose passage and the carrying of tacklebags is facilitated by traversing above this where there is a phreatic tube. Care is required, as there are some nice stalactites in exposed positions hanging from the roof. The stream is descended to after a short distance for a small climb through flakes (Leper Scab Climb). Body-wide vadose trench leads past a shower-bath aven on the left and some interesting blood-red formations to *a* short (5m) pitch in the stream. After this, traversing above the stream again makes life easier, and provides a fine view of Cover Picture Aven and some large imbricated pebble beds. Below these, the stream leaves and makes off down the Trench Pitch* (1979) route. Traversing ' just beneath the pebble beds it is necessary to cross a bold step over the Enterprise Series* to reach a boulder choke. The easiest route through this involves a 3m climb up into the rift and then traversing past some stal into a small hole, which marks the beginning of the Teresa Series.

The Teresa Series is a succession of fossil vadose and phreatic developed streamways. First a vadose trench is followed which degenerates into a small sand filled tube, known as Piezo Squeal Squeeze due to the strong draught. The shifting sand and small passage size mean that you



The Boulder Chambers below Eton Palais

generally have to take tackle bags off here if you don't want to get stuck. The passage gradually increases in size and a few metres after the Squeeze a sandy climb on the right is ascended to a flowstone aven and a steep downhill slope with some black gour pools. At the bottom, William's Bit* leads off down to the left. Avoiding pools and holes in the floor, a small chamber with a crawl leading off the opposite side is reached. A climb back towards the entrance from the chamber gives access to Snowcastle*, the most beautifully decorated part of the cave.

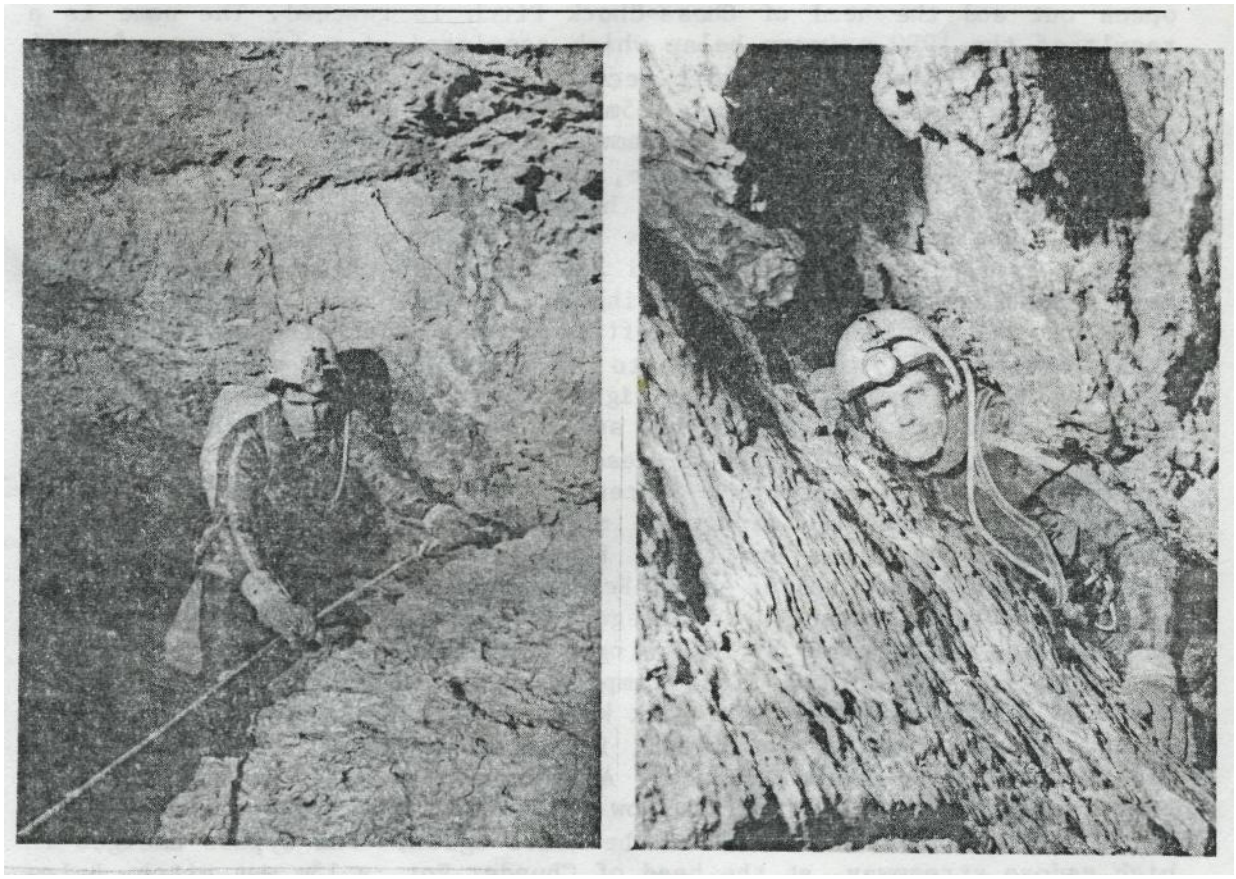
An easy 7m climb marks the end of the Teresa Series: to the left at the bottom is New Orleans, named for its rising sump ("There is a house in New Orleans, they call the Rising Sump..."), and the way on: to the right is the White Nile (jet boats not required), which chokes. More holes in the floor, all interconnected, and a 3m overhanging climb (The Overhang) are encountered before a left fork leads to the head of Servicio (lavatory) Pitch. This 13m pitch breaks into a much more spacious passage named CBW Series. To quote from Caves and Caving No.11: 'The landing was in a magnificent ten metre wide rift whose ceiling soared up beyond the range of an electric beam. To one side a great, black aven... sucked up the draught from the Teresa Series. Picking their way along the high corridor in considerable awe the first explorers were brought down to earth by John's broad Lancashire tones, "Eh, it's big enough to fit in a constipated Blue Whale".' And so CBW Series got its name. A small stream, the first seen since the Trench Pitches, comes down the aven mentioned and trickles back under the floor of CBW towards Servicio, to vanish tantalisingly down a crack.

To the left, just opposite the aven, the route on enters an unstable vadose passage known as The Changeling. Many small shower-bath avens enter here and this marks the start of Xitu's second streamway. Finally, the now knackered caver finds the passage closing down to a small hole in the boulder floor. This is the head of the Gap, a fine freehanging 23m pitch which drops into a large chamber, formed by collapse. Two more pitches of 7m and 21m, the second known as Graham's Balls-Up (or Sporting Pitch, if you're Graham), follow in quick succession and lead to what looks like an impenetrable boulder choke. In spite of its discoverers'

pessimism, there is a way on which is reached via an unstable (handline needed) climb, the Pilling Slip. A small hole at the top leads into solid rock and the 40m unstable shaft of Dream Lake (pitches 10m and 18m), named after the puddle at the bottom, into which the stream drips. The streamway strides majestically to three climbs, the first preferably laddered, and then to what looks like the End of the World. In the words of Dave Rose, club journalist, "Roof, walls and floor simply vanish: a cold wind blows up spray from utter blackness. Tentatively the first explorers threw a stone over the edge, and felt a thrill of terror mixed with euphoric excitement as six seconds were counted before a deep boom sounded from the depths..." Stirring stuff, eh?

This is Flat Iron Shaft, 138m of huge elliptical tube. The longest single hang of 90m is made less interesting by featureless walls of moonmilk, so that the prusik can be a bit tedious.

A final pitch in the shaft (Pregnancy Pitch: imagine what happened to the sheath of one rope used here) drops into Eton Palais, a large boulder floored Concert Hall-like chamber. High up at the far end is the beginning of El Puritan*: the way on is to head down the boulder slope at its steepest point. Some unstable climbs (one took a dislike to Jerry) give access to the stream again and a slippery climb called Combined Tactics. A succession of boulder floored chambers, the largest of which is called Hall of the Mountain Dwarf stretch off into the distance from this point and the stream is not seen again until Randy Ass Passage, distinguished .by its fine 0.3m long helictites. The next obstacle is Lemmings' Leap, a climb over a pool (if you're a lemming, you leap).



Left: Keith on Traverse of Truth. Right: Keith in bypass to Ferdie's Delight

Beyond, narrow decorated vadose passage makes tackle carrying hell. Relief soon appears however in the shape of the Samaritans (pitches 48m and 18m), the first one of which is reached by traversing up from the stream. The Marble Steps, a succession of wet, sporting climbs provide more annoyance for tackle carriers until Dampturation Aven and Pitch are reached. An ungainly manoeuvre involving swinging round a knob of rock on the right hand wall above a 15m drop gives access to the pitch head.

Beyond the drop wider streamway continues to the abrupt blackness of Pythagoras Pitch (62m). This is again rigged by traversing up over a very bold step to achieve a free hang running down the apex of a huge right angled buttress. At the bottom, the stream runs down a steep, slimy green waterfall into blackness. To bypass this keep to the right and squirm down Archimedes Traverse to reach a flat boulder floor. Beyond this, an entropy increasing scramble down boulders and mud (care; large things can start moving) gives access to Camp I, our underground home. It isn't advisable to look for a small dry chamber in the roof just beyond here, however. The Galleria Amador, as it was known, was used as a latrine and there are several potentially unhealthy sealed plastic bags buried up there!

The next distinguishing feature of the stream is PAFS (Piles Arising From Suspension) Pot, a flake obscuring a would-be easy climb (that is, if the flake wasn't there). In the latter part of the 1981 Expedition it was laddered to give an extremely wet, short pitch.

The stream then runs into a tight, sharp rift, the Cheesegrater, which is best bypassed by following an old fossil high level. After a short section of Cheesegrater necessary to avoid a dire climb the passage opens out and the head of Choss-Chock Pitch is reached. The name is a result of the 1980 primary belay which consisted of a few lumps of soil and pebbles. Below this a short section of clean washed streamway leads to the top of Rape B'rape Pitch (35m), the limit of exploration in 1980. A long section of high vadose streamway with some deep pools, the largest of which is called The Emerald Lake, and a few cascades follows and leads to The Flier, a fine 30m free hanging pitch in a fairly spacious chamber. Just before The Flier, the stream falls down a slot. This isn't the way down unless you're Richard and insist on throwing your and your mate's prusik bags down it and having to get them back. Instead look for a set of small holes up in the left hand wall. Squeezing up through the least obvious one gives access to an inclined rift with the trench carrying the stream down to the right. The head of The Flier is at the far end where the rift opens out and a traverse line should be rigged from a natural in the rift to reach it. From The Flier, a series of cascades in dark slippery rock descend to the top of a 5m drop, which is bypassed via a traverse along the right hand wall (Traverse of Truth). The passage, which has until now been fairly roomy, degenerates into another tight, sharp hading rift. Ferdie's Delight (the name is a result of its effect on oversuits) is longer and nastier than the Cheesegrater but can also be bypassed by following a high level.

From the log of the first camping party: After Traverse of Truth, there is a rift bisected by a rock known as the Pentahedron. "Instead of going straight down to the stream, follow a horizontal crawl which soon widens out into a boulder chamber. As soon as the water is reached again traverse up about 4m and then follow the rift at its obvious widest point until the roar of the stream can be heard again." The Bypass emerges in high vadose streamway, at the head of Chunder Pot, a 13m wet pitch. Below the base of Chunder Pot (a pool known as the Old Pacific Sea; very good for losing tackle in, isn't it, Skunk?) is the steepest, wettest, most sporting part of the whole cave. This is the series of climbs known as

the Classic Numbers as the magic one kilometre depth was broken on one of them. The technique and routes for the climbs are many and various but two, Campers' Pitch and Cobbler's Pitch, must be rigged for SRT.

Eventually one encounters the Depthscalator, another (but thankfully roomy) hading rift down which the stream runs. At the bottom of the Depthscalator, an interesting climb at the far left of the rift drops one into another rift running at right angles. After a few metres the stream runs down a 0.3m wide pitch and a succession of climbs, all of which can be free climbed with difficulty, down to the final section of streamway. To bypass this, it is best to keep up at the same level as the climb out of the Depthscalator on the left of the stream. When a small hole in the left hand wall is encountered, a squeeze down through it leads into a small unstable chamber. The way on from the chamber is to double back under the first hole through an even smaller one, which leads to a ledge with a fine view of the slopes which have just been bypassed. Keeping to the left at 90° to the water, a climb down leads to a large boulder filled chamber. After 20m the stream can be heard in a deep trench which is easily free climbable. The whole of this area is Xitu's Last Stand. A slackening of gradient means that the stream flows sluggishly and that there are many deep pools. Traversing above these for over 100m, one eventually reaches a brief section of wide passage with a shingle floor, which leads to the terminal sump (known as Stag Pool as it was found on Prince Charles's stag night). Keith swam in the sump, which is a clear deep pool and measured its depth to be at least 9m. In spite of much searching, only phreatic loops could be seen at high level: no bypasses were found.

The stream drops a further 200m before resurging as a much larger torrent at Culiembro, 2km away as the crow flies.

The route out of the cave is the same but in reverse and is rather more tiring. The whole trip, without tackle, would take about 28 hours' continuous exertion.

Tackle

The tackle for Xitu is listed below as it was rigged in the 1981 Expedition. All the pitches which were laddered were also equipped with doubly belayed self lining and abseiling ropes (i.e. SRT rope). For the length of rope used, add 2m to the length of ladder specified. This lining of all pitches is very important as we found out when one member of the Expedition crocked his leg at the sump. Climbing ladders was very painful for him: however he was able to prusik one legged up the lining ropes with ease.

The reader might then ask "why ladder the things at all?" The answer is that throughout the 1981 Expedition most of the work was done deep down in the cave and the Entrance Series was merely a highway used to get into Xitu. At the expense of more complicated rigging we speeded up exits from the cave enormously, as whatever your prusiking system, you can always get up a short (under 20m) ladder quicker than prusiking up the same length of rope.

Pitch	Name	Rope	Belays
10m	Entrance Pitch	10m ladder	Naturals (Bolt useless)
-	Climax Rift Tackle line	20m	a Bolt at either end of rift and one in middle

9m		10m ladder	1 Bolt
9m		10m ladder	2 Bolts
9m		10m ladder	2 Bolts
9m		10m ladder	2 Bolts
9m		10m ladder	2 Bolts
19m	Traverse Pitch	20m ladder	3 Bolts: 5m traverse line at top bolted also
5m		5m ladder	Huge flake
6m		7m ladder (5 if pushed)	2 Bolts
15m	BW I	15m ladder	2 naturals. 10m Traverse line (to another natural advisable at top
7m	BW II	7m ladder	1 Bolt and natural
-	Traverse	10m traverse line	1 Bolt
13m	BW III	15m ladder	1 Bolt and natural
37m	Blind Pot	40m	Naturals
8m	Climb out of Customs Hall	8m handline	1 Bolt
7m	Inlet Climb	7m ladder	2 Bolts
5m	Stream Pitch	5m ladder	2 Bolts
7m	Climb in Teresa Series	7m handline	Natural
11m	Servicio	15m	2 Bolts
23m	The Gap	27m	2 Bolts
7m		8m ladder + 8m rope	2 Bolts
21m	Graham's Balls-Up	25m	2 Bolts and 2 Rope protectors
10m to 18m	Dream Lake I / Dream Lake II	35m	Natural; Rebelay to Bolt 2m down / 2 Bolts
9m	Flat Iron I	15m	3 Bolts; Rope secured to ledge at bottom by natural
12m	Flat Iron II	120m	2 Bolts
90m	Flat Iron III		2 Bolts
21m	Pregnancy Pitch (Flat Iron IV)	25m	2 Bolts; CAT useful
48m	Samaritan I	55m	Naturals: one sling must be 10m long
19m	Samaritan II	20m	Naturals
7m	Mantleshelf	8m ladder	1 Bolt

15m	Dampturation	16m	2 Bolts; CAT useful
62m	Pythagoras	65m	Naturals
5m	PAFS Pot	5m ladder (optional)	Naturals
19m	Chosschock	23m	Naturals
35m	Rape B'rape	40m	2 Bolts then rebelay to 2 Bolts 5m down
29m	Flyer	40m	3 Naturals; long traverse line at top
-	Traverse of Truth	10m handline	Naturals
13m	Chunder Pot	15m	2 Bolts
17m	Campers' Pitch	20m	Naturals
7m	Cobblers Pitch	10m	3 Naturals to give freehang

Traversity Streamway

The way to gain access to this part of the cave, which represents Xitu upstream of the Entrance Series is to climb about 3m down in the vadose trench in Customs Hall (Caution: it's deep!) and to traverse upstream (to the left). The trench is about 1.5m wide and can be followed at various levels past some superb moonmilk covered stal. Because of the difficulty of traversing several metres up in a moonmilk covered trench, the place was named The Easy Slider. Shortly afterwards, two inlets are encountered on the left hand side of the passage. Eventually these become too tight. A traverse down to the stream finally leads to the upstream limit of Xitu, a large impressive aven.

Tackle: None required.

Ming Piece Passage

Instead of turning left after the rock barrier in Customs Hall, carry straight on to reach the sandy floored entrance to Ming Piece Passage. The passage is characterised by numerous brittle sandy plates jutting out of the walls: these projections were claimed to be like Ming pottery since they are rather old and ring when struck. (An alternative explanation for the name came from feelings in the passage after a hot curry.) The other property of these projections is to make carrying tackle bags rather a strain on the patience.

The passage continues in its persistent way losing height in short drops and progress seems most difficult at whatever height you're traversing at. Finally a pitch is reached with water pouring down the first hole encountered and a dry rig further on. The discoverer claimed at this point (he didn't down go the pitch) that he could hear a stream below. Descending the pitch about 13m, a flat floored chamber is reached with a vadose trench meandering through it. Climb down the trench and you fall into... a streamway! Unfortunately it's Xitu streamway, just after shower-bath aven (the wet pitch in Ming Piece). This is a little annoying, since you have just dragged those b....y tackle bags through an awkward bit of passageway for nothing. (In fact we had picked the bags up from shower-bath aven in the first place!) It's an irritating piece of cave. (Ask Simon.)

Tackle

Pitch	Rope Length	Belay
13m	15m	Naturals

William's Bit

From a hole in the floor of the Teresa Series a 7m climb, which is best bypassed via a squeeze down through a small tube drops into William's Bit. To the left, a short section of chossy trench leads to, in Trevor's words, "a grotty little sandy chamber". Straight ahead is a small dead rising sump. However the interesting portion is to the right where a few hundred metres of very steeply sloping small passage finally arrives at a fifteen metre tight loose pitch and a small sand choked sump. As the pitch is very loose and the sump chamber very small, it is imperative to have only one person down there at once. The whole of this part of William's Bit is characterised by dry blackish silty sand, which becomes very slippery after a few people have climbed on it.

Tackle

Pitch	Ladder	Belays
15m	15m + lifeline	Massive piece of false floor

William's Other Bit

The draught which is very evident in the first half of William's Bit streams out of a small gravelly hole in the left hand wall about half way to the sump. This is William's Other Bit. The passage consists of about twenty metres of crawling through sand and mud in a howling gale until a small, loose aven is reached.

Tackle: None required

GOETHE Passage

(GOETHE = Greatest Oxbow Ever To Have Existed.) This passage starts a couple of metres up from the floor in the left hand wall of William's Bit, a few metres along the route to the sump and ends a bit further on. Wow!

Tackle: None required

Trench Pitch Route

The Trench Pitch Route starts just underneath the large pebble beds described above. The stream cascades down a hole in the floor: on the Teresa Series side of this a short climb leads to the head of the first Trench Pitch. The two others follow quickly enough for a single 60m SRT rope to be used for all three pitches. If one ignores a small crack down which the stream vanishes, 20m of fairly tight passage, with one climb in it, leads to the head of Pearl Pitch, which has a fine nest of cave pearls just above it. At the base of Pearl Pitch, a tight rift is seen heading off to the left. Avoiding various large drops below (the 1979 rigs of Chopper Pitch) a lined traverse through this gives access to the Potter MkII super rig of ChopperPitch, which cuts the number of rope protectors needed for the pitch from three eighteen inch ones to one thirty-six inch one, used at a ledge halfway down. Chopper Chamber is a large and wet place, containing, among other things, a large lump of rock 2m x 1m x 0.5m knocked by Simon's heavy breathing from the top of the old Chopper Pitch in 1979 (luckily Skippy can run quickly). The way on is to follow the stream out of the chamber to thefour rather loose Somme Climbs. As on the Classic Numbers, the routes taken on these climbs are best worked out by each individual user. After the final climb, the "Good-old -one-stinkie-each-if-you' re-lucky-and-ripped-nylon-boilersuit-

-1979-style-caver" is faced with two routes: ahead a chossy rift opens out over the sump chamber several tens of metres below and to the left, the wet, clean washed Grey Pitch (imaginative name, eh?) drops into the final section of stream in this part of Xitu. A succession of grovels and muddy bits lead to Sump I, a deep, oppressive water-filled shaft in a large muddy rift. If you, the tourist caver, are ever down there, it's worth finding the inscription "OUCC 16/8/1979" (or something like that) carved in the filth on one of the walls. Although the sump was less than 30m away, we hadn't found it then and that's why we went back in 1980.

Tackle

Pitch	Name	Rope	Belay
9m	Trench (Marlow) Pitches	10m	2 Bolts
7m		12m	Natural for a Traverse line; then Natural and Bolt
5m		5m ladder	2 Bolts
18m	Pearl Pitch	21m	2 Bolts*
23m	Chopper Pitch	30m	Natural for the Traverse line through rift then 2 Bolts
15m	Grey (Happy) Pitch	17m	2 Bolts*
13m	Sump Slide	15m	Various bits of choss

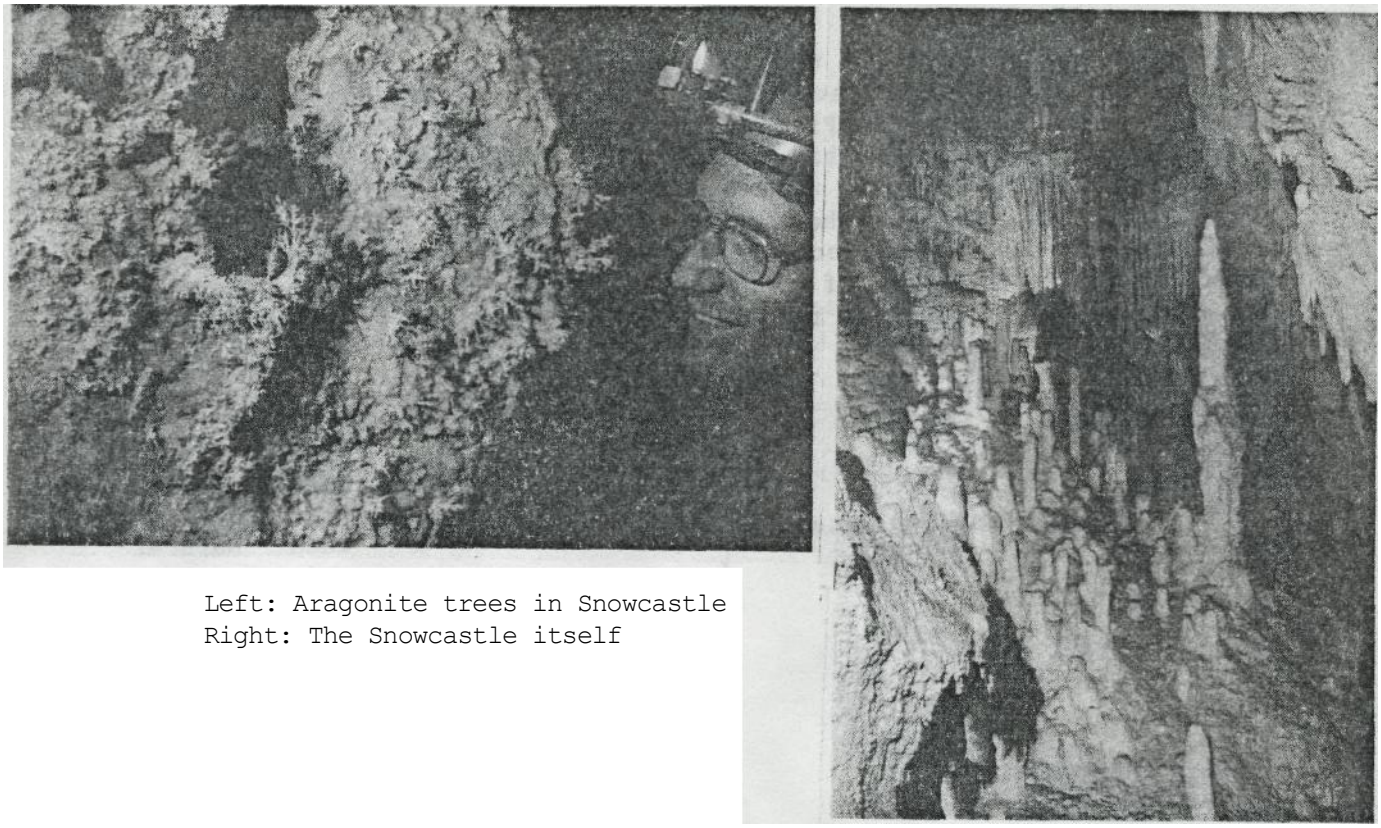
* Although two bolts are mentioned, there are in fact three anchors at the heads of these pitches, one of which is unusable. All anchors were left ungreased.

Enterprise Series

A few metres back from the "bold step" in the Teresa Series, a climb down a rift leads to the exposed head of the first pitch in the Enterprise Series. A broken second pitch, best laddered, starts from the ledge at the bottom of this and immediately gives access to a 10m pitch belayed to boulders jammed in the rift, which is now high and of impressive size. The fourth pitch is rigged from a large stable (we hope) false floor through a now broken wall of calcite to give a beautiful hang in free space. A nice, large clean washed ledge (The Music Room) contains the head of the fifth and final pitch (beware the rub point half way down) in this entertaining little route which lands in Chopper Chamber. The Enterprise Series provides a much easier and although still drippy, drier route into the bowels of the Trench Pitch Route.

Tackle

Pitch	Name	Rope	Belays
19m	First	21m	Natural and bolt
13m	Second	15m ladder	Natural and bolt



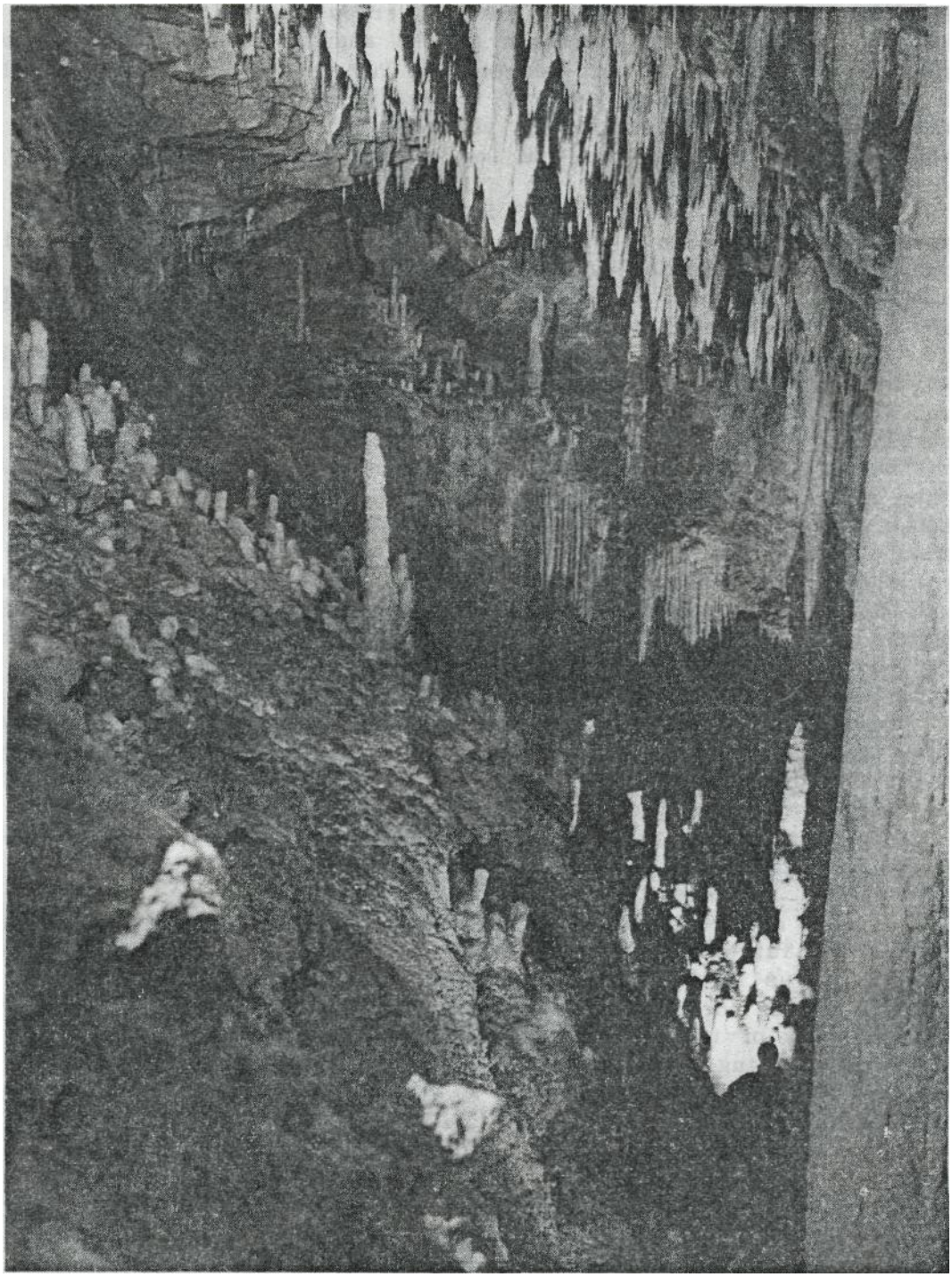
Left: Aragonite trees in Snowcastle
Right: The Snowcastle itself

10m	Third	12m	Naturals 2 bolts: protection needed
19m	Fourth	21m	at pitch head 2 bolts. One rope protector needed Snowcastle
14m	Fifth	16m	From the chamber mentioned, climb back towards the Entrance Series to a boulder wedged in the

trench. Continuing up and to the left, one emerges in a chamber with fine mud formations (don't touch!). A stooping stagger to the right leads to a four metre drop (best laddered) into a series of large chambers. Clambering uphill in the chambers (one of the climbs is best laddered) the formations gradually become more and more impressive until the Snowcastle itself, a large pinnacled citadel type object, is reached. The formations in this part of the cave range from tiny Aragonite "trees" to huge, pure white stal buttresses, all unmarked by grubby hand. In many expedition members' opinions, they outclass anything seen in British caves, including Otter Hole.

Tackle

Pitch	Ladder	Belays
4m	5m~	Naturals
4m	5m	Naturals
(both optional)		



The Snow Castle, Main View

El Puritan

Instead of heading down the boulder slope in Eton Palais, keep up to the right to enter El Puritan. Several trips entered this part of the cave and retired, scared to death by the abundance of potential caving disasters. All seemed to conclude that El Puritan is an old high level of the stream below wending its way to Randy Ass Passage: eventually El Puritan was abandoned due to fear of death. To give the character of the place here's an extract from the log by the persons who discovered it, Dave and Richard:

"...so to the "black space" left from last year. The back of the chamber tapers off into a rift about 1-2m wide at the top of the boulder slope. This was descended by a thrutchy climb into a sizeable passage and chamber. This and the following series are to be known as EL PURITAN (Ed's note: his underlining, not mine!)

"The way on is at first a hair raisingly loose exposed 15m climb down into a chamber - LA SALA DE LA DISCIPLINA INGLESE - beneath an aven. There is a hole in the floor (which) emits the sound of a stream - probably the noise from Combined Tactics in the known cave.

"Beyond La Sala de la Disciplina Inglese El Puritan bends decisively to the right, away from the streamway which can no longer be heard. Two further climbs in a second chamber - LA SALA DE LA ROPA INTERIORE - the second of which has a very nasty exposed mantleshelf traverse move head into a definite passage, a high, ancient brittle rift of considerable depth below the traverse point - GALLERIA DE LAS MUJERES PEVERSAS. Progress is variously walking on jammed boulders, crawling and climbing to a very nasty climb at a T junction where I (Dave) nearly went to the bottom (about 40') with a large boulder which was the main hand hold.

"Beyond this point we took the left hand way until it loked like a ladder would have to be rigged down to the bottom of the widening rift. The pitch (LADY DIANA'S MONEY BOX) will be 40'+ and wants bolting. There is a considerable draught..."

Subsequent trips, all lasting over seventeen hours, renamed one of the chambers LA SALON DES INCONTINENTS VOLEURS DE BORDEAUX but I'm not sure which one. However, I digress. Dave concludes:

"...So - discovery of the century at Concert Hall? The peak of human boldness and intrepitude (No! baldness (Richard) and ineptitude (Dave). K.M.P.)? For us it is above all a giant step along the path towards the knowledge of the porno-geology of Ario, and the culmination of work which needs the luck of the Argonauts and (why not?) a certain deontology. Now the f...ing thing will have to be pushed properly and above all surveyed. About 100-200m of passage took us over 2 hours there and back - it's that hairy..."

Tackle

Pitch	Names	Rope	Belays
Several around 15m	Various (all landing in streamway below)	about 15m	tend to be large sofa size lumps of rock which move down the pitch or Hostford chocks

THE TRUTH

Many people will know, through reading the articles of Dave Rose and John Singleton, the story of the exploration of Xitu, and how Simon found it in the mist not 50 yards from the path in 1979.

But what went on behind the scenes? Below I have printed a few extracts from the Club Log Book, to answer this question. The first account deals with the rather fruitless last pushing trip of 1980, on which the club tackle ran out. John is the author:

"Friday 1st August - Saturday 2nd August. John, Dave - Xitu. Pushing? (for about 20m)

Keith and Graham emerges at around 11 with Keith muttering "50ft pitch, 180ft pitch, 200m of streamway, pitch with natural belays, 000 me balls" and so armed with this information we departed for the cave at around 12.30. Dave forgot the chocolate and by the time I'd walked back to the Refugio for it we were thoroughly entangled with the surveying party. At the bottom of the entrance series Dave and I led off with a tackle bag "full" of knife, tape and chocolate. The others kept pace with us until the bottom of the Big Pitch. After the 60ft we cut the remaining length off the Bluewater III (there was no club rope at all left) and stuffed it in the tacklebag. The descent to the 50 (now Dampturation) was uneventful and even entertaining as the wet climbs are good fun. At the 180 (now named Pythagoras), we hung the BWIII from the secondary and Dave abseiled down to see if it was long enough to replace the knotted ropes. After getting stuck at the knot for a while, he relayed the information that the BWIII was too short and I dropped it to him. At the bottom, I climbed down a waterfall as far as a pitch like object where Dave traversed across to a pile of boulders. We rigged a traverse line with the handline picked up with the bolt kit and then climbed down to the stream from the boulder pile we had emerged on. As Keith's description had included nothing of this we thought that somewhere we had bypassed his pitch and as it was muddy, we started to think (and hope for) a sump. Anyway, after a bouldery 40° rift, the stream emerges into nice marbled streamway with deep clear pools and some formations. There are also some cascades with a nice dark green slimy deposit contrasting with the clean limestone and calcite. After a wet overhanging climb (later PAFS Pot), the stream cascades into a tight, sharp rift, where it looks still and muddy. While Dave fiddled with his light, I thrutched through for about 20m and emerged in a boulder filled chamber. Climbing over the boulders leads down to more marbled streamway. I went back for Dave and advised him to leave the tackle and come and have a look. Five yards beyond where I'd reached, we found a pitch and had to thrutch all the way back to the bags. By this time of course our suits were in tatters. By traversing up over the pitch, the rig was done with a secondary tape round a large calcite projection and a primary tape round an obvious chock. We abseiled down (it's about 15m) and 20m further on found another pitch which at first Dave tried to free climb. It could be rigged from natural belays by again traversing up into the roof, to give a free hang of about 20m. Having no further tackle we then exited. I slipped while climbing the overhang and got my sit harness wedged in the water (Ed: As a result I got piles: hence the name!). In the end Dave gave me a hand and I thrutched out, soaked through. The pitches soon warmed us both up, although Samaritan I made us think that we were both knackered as we had been told that it was 100ft when in fact it's 159 feet! There were two

badly frayed ropes noticed on the way out, one at the top of the 60ft on the BWIII (Pregnancy Pitch) which I reknotted (it was through to the core) and one on Graham's Balls Up at the top. We caught the survey party at the entrance series and all got out around 10 o'clock Saturday morning. The soup at the top of the Big Pitch is a bloody good idea."

By OUCC standards, that was not a particularly long trip. For example Kev, Simon and Keith spent 24½ hours surveying the 1980 bottom and Skunk and Dave were down for 28 hours derigging: almost everyone on the latter half of the 1980 Expedition did at least one trip of 20 hours or more. The Club record was set by Skunk and Keith's 35 hour rerigging/pushing trip in 1981, the last one before camp 1 was set up. In the Log, thoroughly knackered after a day and a half of caving, Keith lists a set of spare parts to be taken on long pushes:

"Tackle recommended for extensive tackle lugging, pushing trips in Xitu -
a) 4 times normal cigarette supply.
b) Ammo box of either Valium or Librium.
c) Cyanide capsule (only to be used in extremis).
d) Bionic limbs - not susceptible to damage when belted against rock walls.
e) Spare boots, light, undersuit, oversuit, SRT gear, knickers (Ed's note: could read "knackers").
f) Replacement crutch - to be used when the first one is chafed out of existence.
g) Replacement brain - to be used when the first one is worn out of existence by lack of sleep..."

Some of the long trips obviously produced total brain death in the log writers, eg:
"Sunday 26th and a good part of 27th July. El Puritan. Dave, George, Colin. Descended around 12.30, a smooth trip down to Flat Iron..." followed by a blank half page, a diagram looking like an octopus screwing some bagpipes and: "60' pitch higher route down and leads to another pitch (40-50') following left after the climb and trending downwards, leads to a stream..." Informative, eh?

Dave sums the philosophy of doing long trips from the surface up quite well in an account near the end of the 1980 log:

"This Expedition has been all about extending psychological barriers...: when I think back to Otter in May and the small banquet we all thought necessary for a trip of less than twelve hours!"

It might be thought that the Log would get less interesting once the camp was established and the long trips were over. Not at all! The only three night camping trip account consists of a continuous debate between Jan and Keith, pushers on the first "day", and Richard, Skunk and Graham, surveyors on the first "day". For example, from the second "day's" log, when the duties were supposed to be reversed:

"...we returned to camp, not meeting Keith or Jan on the way. This was because they were still in bed, having failed to get up, even though they were awake during our breakfast. Having destroyed two hammocks, done no surveying, they left to go to the surface: "Oh sorry, John, the cave

ends, we didn't do any of the wet surveying because we slept for 25 hours. By the way, stitch these two hammocks together"..."

At the end of Keith's rather lengthy reply to this is:

"With the compliments of the pushers, useful maxim to bear in mind when reading caving log - "Accounts of rigging, work done by pushers etc. given by tourist cavers (eg R. Gregson) should be taken with a pinch of salt" (the size Skippy has with tomatoes)."

Needless to say, we're all friends really and the rivalry definitely isn't serious!

Epics don't just happen underground either; Trevor writes after trying to plant dye detectors in the Cares Gorge:

"Thurs/Fri 16th/17th, The Trea Campaign. Trevor and Jan.
A tale full of horror, suspense, mystery. The horror: the "path" we followed down to Trea involving vertical bits, horrible loose scree slopes and generally bloody lethal all round.

The suspense: would we get down without breaking our necks?

The mystery: where the .... had the path gone?

Hints for "walking" from Ario to Cain:

1) Go the right way at the beginning - it's quite easy (i.e. as easy as the hardest bit from Lagos to Ario, all the way) (Ed: i.e. very hard).
2) Don't follow the stream bed down from Trea.
3) The best way to find the path is guess.
4) It's easier by road. (Ed: The road is about 40km!)

Anyway, the net result was that Jan and I absolutely knackered ourselves and nothing went right at all. A total abortion all round. Still, we found the Trea Resurgence..."

If you, the reader, go on any expeditions, do keep a log book: it's not too much of a bind and can provide some great memories and laughs afterwards. (Ed's note: It's handy for filling up spaces in journals left by lazy buggers not doing articles in time as well!)

References

1) OUCC Proceedings 9, 1979, Expedition to Asturias, Northern Spain.
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3) Rose D., Nov. 1980. Pozu del Xitu. Caves and Caving No.10.
4) Rose D., Apr. 1981. Caving International No. 11.
5) Rose D., Jul 1981. Descent No.49.
6) Singleton J., Nov. 1981. Xitu '81. Caves and Caving No.14.
7) Singleton J., Pozu del Xitu. El Topo Loco. To be published shortly (in Spanish).

Small Caves in the Ario Area

In Proceedings OUCC 9 (1979) many small caves around Pozu del Xitu were noted as explored by the SIE, a Barcelona Caving Group. This was in fact untrue, due to a drunken mistranslation session up at Ario one evening. The caves shown as explored by the SIE were merely noted by them on previous expeditions. To add to the confusion generated by the previous article, someone randomised the cave numbers so that the descriptions didn't fit. After a couple of years of sorting the mess out and exploring around forty surface shafts, William gives the true story below.

The cave numbering system is cave number/area. As some of the areas have slightly dubious boundaries, it was a regular occurrence to return to explore 28/5, say, and find that it had been changed overnight to 3/9 by a different OUCC "hole banging" party. Anyway, see if you can make anything out of the confusion!

Area 5 (the region near Ario (see map inside back cover))

Cave 1/5 is Pozu del Xitu and is dealt with elsewhere.

Cave 2/5 (see survey) is an obvious hole in a shakehole near the Ario-Jultayu path. A slippery 3m entrance climb leads to a ledge above a bolted 14m entrance pitch. At the bottom is a small chamber with a large snow plug. A crawl under boulders leads to a second 15m pitch with a good natural belay, landing in a small chamber with no way on. Entrance noted by the SIE in the 1970s.

Tackle

Pitch	Rope	Belays
14m	16m	2 bolts
15m	17m	Naturals

Cave 3/5 Snail Pot (see sketch).

The name is derived from the snail shells in the entrance and the tortuous nature of the cave. The entrance is in a small pit right by the Ario-Jultayu path a few metres from 2/5. A small, steeply-sloping, chossy rift leads to the 1st Pitch (bolted by the SIE) of 7m which lands in a small chamber, all of which is in range of the many stones dislodged from the entrance rift. A tight, descending squeeze soon opens out into a series of short drops emerging in a large, clean-washed 12m shaft with a flake belay. Two previously undescended canyons lead off but quickly rejoin and a left-hand fork leads to a 5m pitch with a flake belay. A series of climbs of 3m (rope needed), 5m, 5m, 8m, 3m lead to a small chamber with a damp crawl going off. The crawl immediately arrives at the 4th pitch without any warning, a large 12m drippy clean-washed shaft with a very awkward take-off. Use an 8m belay to a flake on the other side of the crawl. After the pitch, the cave quickly closes down to a tight rift with a little water in the bottom. By turning left, a series of very loose climbs may be descended for 15m ending in an undescended pitch, probably rejoining the stream. By following the rift, however, one soon reaches a 5m pitch into a decorated chamber (Pool Chamber). The way on leads to a flat out crawl under a false floor to head of the 6th pitch, which is a smooth-walled 12m shaft with an awkward take-off. Tunnel up through false floor to obtain a belay. At the foot of the pitch, three

small climbs lead to a meandering stream passage and a 12m climb down a heavily cherted shaft. The 8th pitch is 6m long with an awkward take-off and lands in a bell-shaped chamber. The cave continues for 10m down a tight rift which then widens and drops 2m. Following the water, the passage goes back on itself and chokes after 10m. The rift continues for 5m before becoming too tight but seems to broaden beyond the squeeze. Further progress could be made by blasting.

Tackle: 1st pitch — bolt, hanger, 7m ladder
2nd pitch — short wire belay, 12m ladder
3rd pitch — sling/short belay, 5m ladder
climb — 5m rope
4th pitch — 8m belay, 13m ladder
5th pitch — 5m ladder, belay
6th pitch — 13m ladder, belay
7th pitch — 13m ladder, belay
8th pitch — 7m ladder, belay

Cave 4/5 is a large, obvious pothole about 20m deep in a small valley between two limestone outcrops. It chokes.

Cave 5/5 is an obvious 4m x 4m hole in the bottom of a dry valley which can be descended easily for 5m to a small snowplug. From here a passage to the side drops further but was not investigated due to a lack of illumination. Noted by the SIE in the 1970s.

Cave 6/5 is a 2m wide, 8m deep rift which seems to be a continuation of the rift in cave 3/5. The rift chokes at all levels a few metres in.

Cave 7/5 consists of a narrow rift with a boulder floor that diverges into two tight passages a few metres in. The left hand passage is too small for humans and the right hand one chokes almost immediately.

Cave 8/5 Cheese Cave (see survey)

The cave lies at the base of a small cliff in a dry, rocky valley. The entrance is covered with boulders to keep sheep out and the first crawl is occasionally used as a shepherd's cheese store. Removing the largest boulder allows a legs first squeeze into a crawl past foul smelling cheeses, which emerges into a rift containing the first pitch of 10m. The second pitch (20m) follows immediately and is a nice free hang from two bolts (ungreased anchors left). At the bottom, an awkward climb down is followed by a section of wider, more spacious rift which soon narrows down. Another 5m climb down the rift leads to the top of the third pitch (15m). The rift chokes at all levels 100m beyond this.

Tackle

Pitch	Rope	Belays
10m	11m	Huge wedged boulder
20m	21m	2 bolts
15m	16m	Naturals

Cave 9/5 (Colin's Calamity) is a small, unobtrusive hole in the ground on one side of the small hillocks near the Cares gorge. The 7m entrance pitch lands on a small pebble bed sloping into a small passage. The only possible way on rapidly becomes too tight.

Cave 10/5 is a large, obvious pothole about 20m deep in a small valley between two limestone outcrops noted by the SIE in the early 1970s. The entrance shaft was bolted by OUCC in 1981. The bottom of the shaft chokes, but halfway down a ledge gives access to a number of passages. Behind the ledge, a rift can be followed for about 10m until it becomes too chossy and tight. Along the ledge gives a short crawl to a choke. Traversing across the shaft gives another tight crawl which chokes after 10m.

Cave 11/5 is a shaft 22m deep with a double natural belay long enough to make a 30m rope too short. The bottom is choked by a huge snow plug. A number of parallel shafts join up underground but no way past the snow could be found. It may be worth digging out during some future expedition.

Cave 12/5 Cueva del "Near Miss" (see sketch)

The entrance is located on the top edge of a very steep slope. Descending two pitches (8m, 15m) and several climbs in a small passage, one reaches a narrow crack in the floor which is too tight to go through but has an eight second drop in four stages beneath it. By traversing over the climb and climbing over a 5m high "hobby horse" like stalagmite, one reaches some passage which, however, quickly chokes, ending under a small aven with a huge beehive flowstone formation.

Tackle

Pitch	Rope	Belays
8m	8m ladder	Natural (long belay)
15m	15m ladder	Bolt

Cave 13/5 is situated below and to the right of 12/5. It consist of a narrow 7m deep rift which widens out at the bottom. Unfortunately, it chokes rapidly at all levels.

Cave 14/5 is a small chamber in boulders in the rift containing 10/5. A choke leads into the 10/5 shaft, but this self-destructed when John tried to get in.

Cave 15/5 consists of twin 11m shafts in bare limestone. One of these is free climbable and can be descended to a connection to the second shaft. Lots of plastic bags full of refuse completely cover any way on there might be.

Cave 16/5 is the same cave as 5/5!

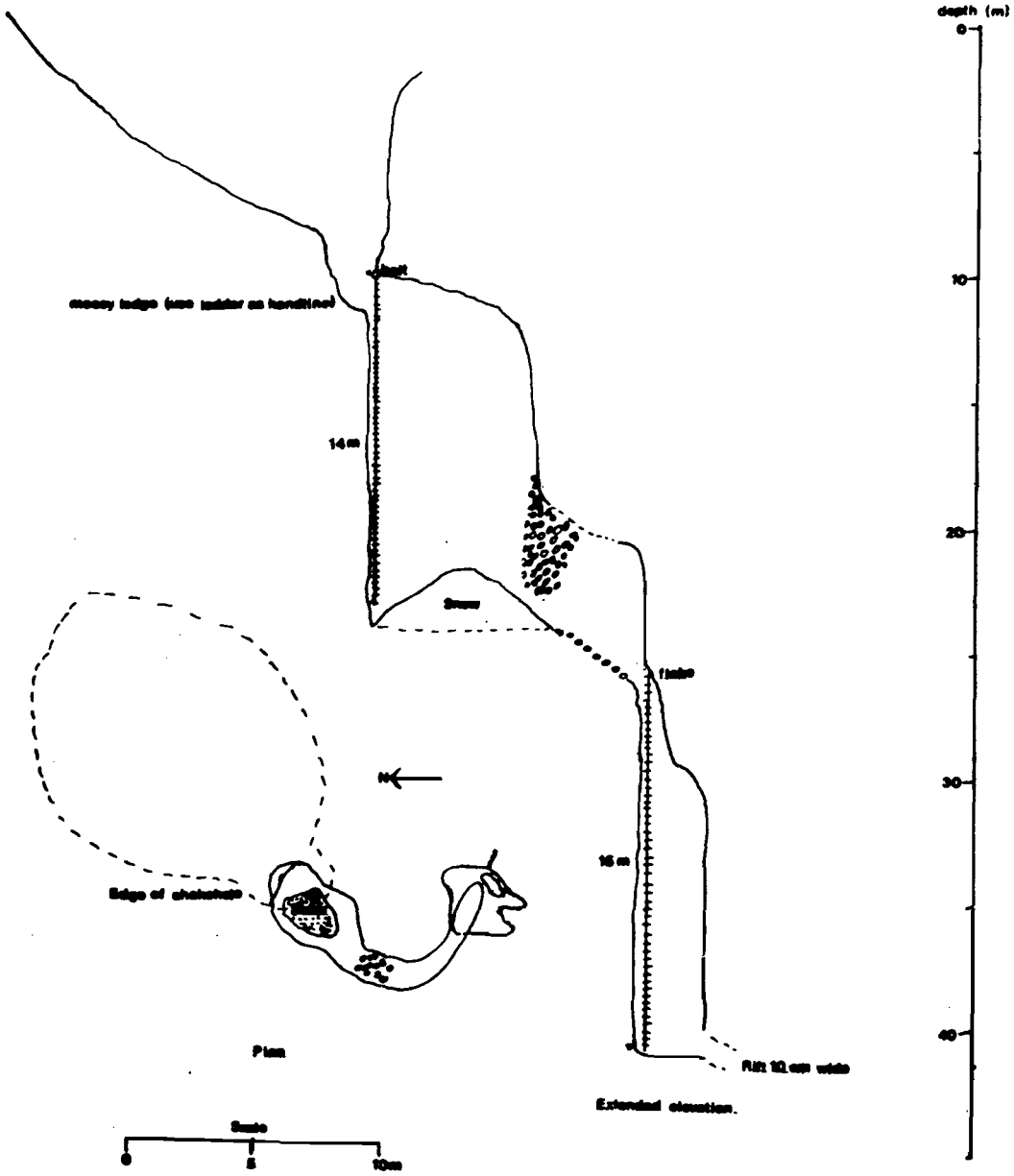
Cave 17/5 is a small entrance that terminates within a few metres.

Cave 18/5 is entered via a rift running S/W. A 12m pitch beneath a spectacular rock bridge leads down onto a snow plug. The rift divides into two small passages that choke immediately.

Cave 19/5 has a spectacular entrance consisting of an 8m shaft which connects with a rift running NW-SE. The shaft can be climbed with care, as the rock is greasy and slippery, to a snow plug from which two ways on are seen. The left-hand one is a steeply sloping passage which leads to a junction a few metres on. The right-hand route is a rift which quickly

CAVE 2/5

Survey to Grade 5 carried out by C. Ancorn & W.J. Stead. Drawn by W.J. Stead



CHEESE CAVE

ASTURIAS NORTHERN SPAIN

SCALE 1:500

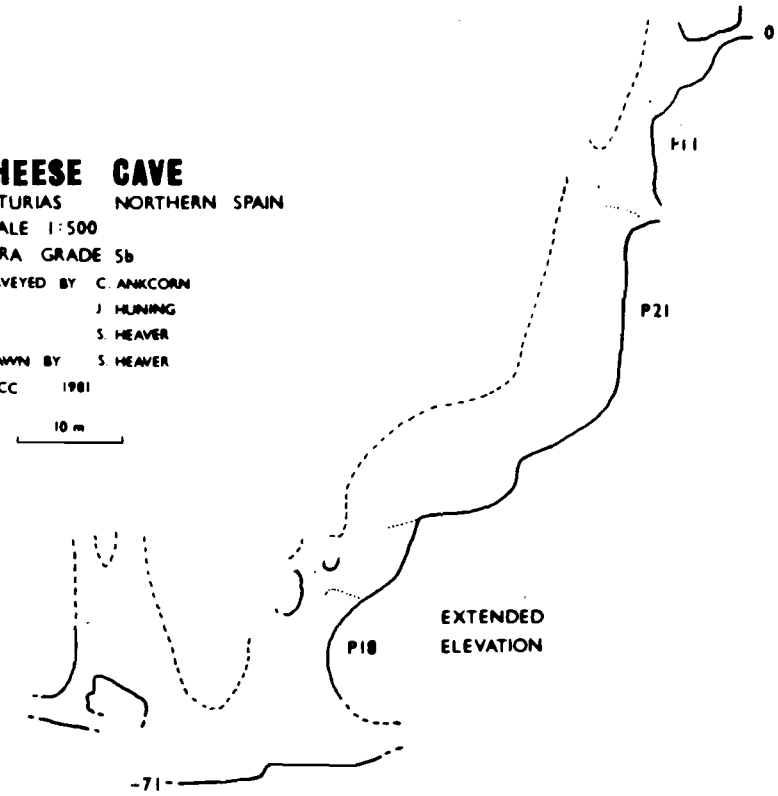
BCRA GRADE 5b

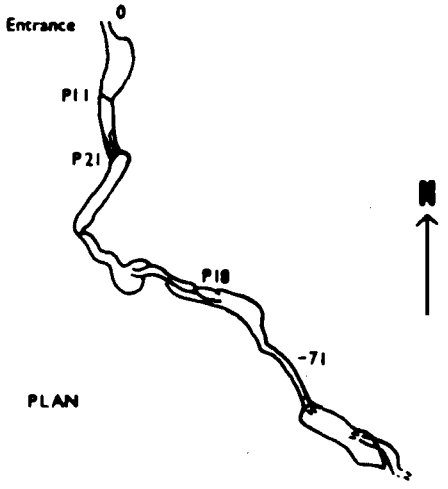
SURVEYED BY C. ANKCORN
J. HUNING
S. HEAVER

DRAWN BY S. HEAVER

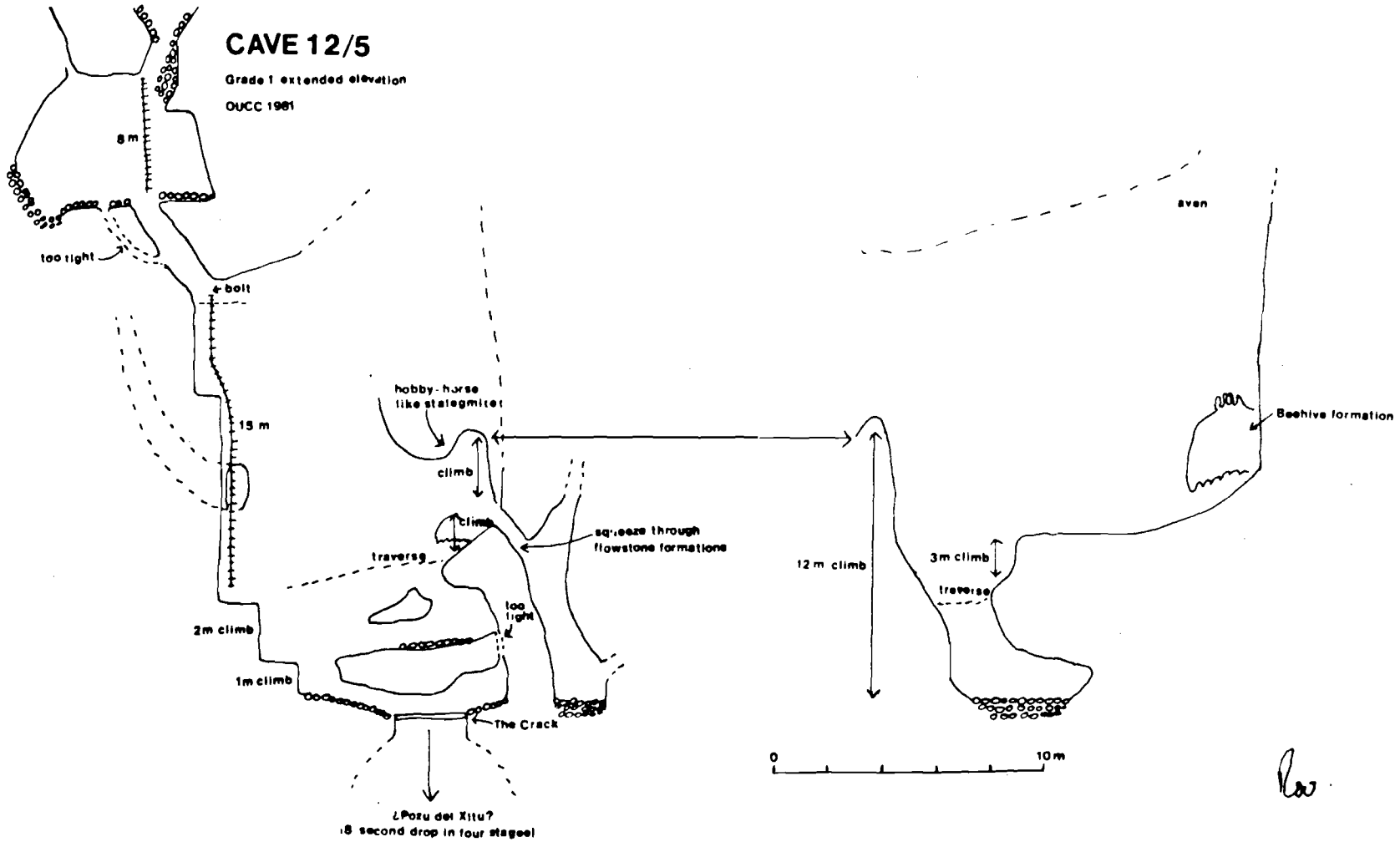
OUCC 1981

10 m





PLAN


CAVE 12/5
Grade 1 extended elevation
OUCC 1981
8 m
too right
bolt
15 m
hobby-horse like stalagmite
climb
climb
squeeze through flowstone formations
traverse
2m climb
too tight
1m climb
The Crack
¿Pozu del Xitu?
18 second drop in four stages!
sven
Beehive formation
12 m climb
3m climb
traverse
0
10m

becomes too tight to follow, but the left-hand route is more promising. This ends in a small chamber with a boulder floor, through which another chamber, about 2m high, can be glimpsed.

Returning to the snow plug, the rift may be followed down the snow for about 5m, when the passage ends in a pebble bed where the roof closes right down to floor level. A line is essential for a safe ascent of the snow plug. This cave may be worth digging some time.

Cave 20/5. A small hole emerges in a tiny chamber after 4m. From here a 10cm rift leads off.

Cave 21/5 is entered via a crack which is virtually indistinguishable from the clints and grikes around it. This crack is in fact a 20m pitch which emerges via a slender aven with an alternative horizontal entrance. Two small chambers occur below a climb down from the bottom of the pitch. One of these can be climbed to a small aven, at the top of which a small crack of light is visible.

Cave 22/5 consists of two intersecting rifts in an area of heavily shattered and jointed limestone. A 9m pitch at the centre of the cross lands on a snow-plug. At this level, the W-E rift closes up, and only the NE-SW is left.

Cave 23/5 begins in a small, unpromising hole facing south. Those with large hips will find it much easier to approach the entrance slope feet first and on their back, but should beware of the immediate 2½m drop into a rift. The rift slopes gently eastwards away from the main Ario depression and many small roof collapses impede progress. After 50m such a fall effectively blocks the rift, although various small holes may lead on. This cave is unusual because all the development appears to be horizontal.

Cave 24/5 was noted but not pushed (Ed: or found again!).

Cave 25/5 is a large, open shaft 8m deep, 8½m long and 2m wide. A passage at one end quickly leads to a boulder choke.

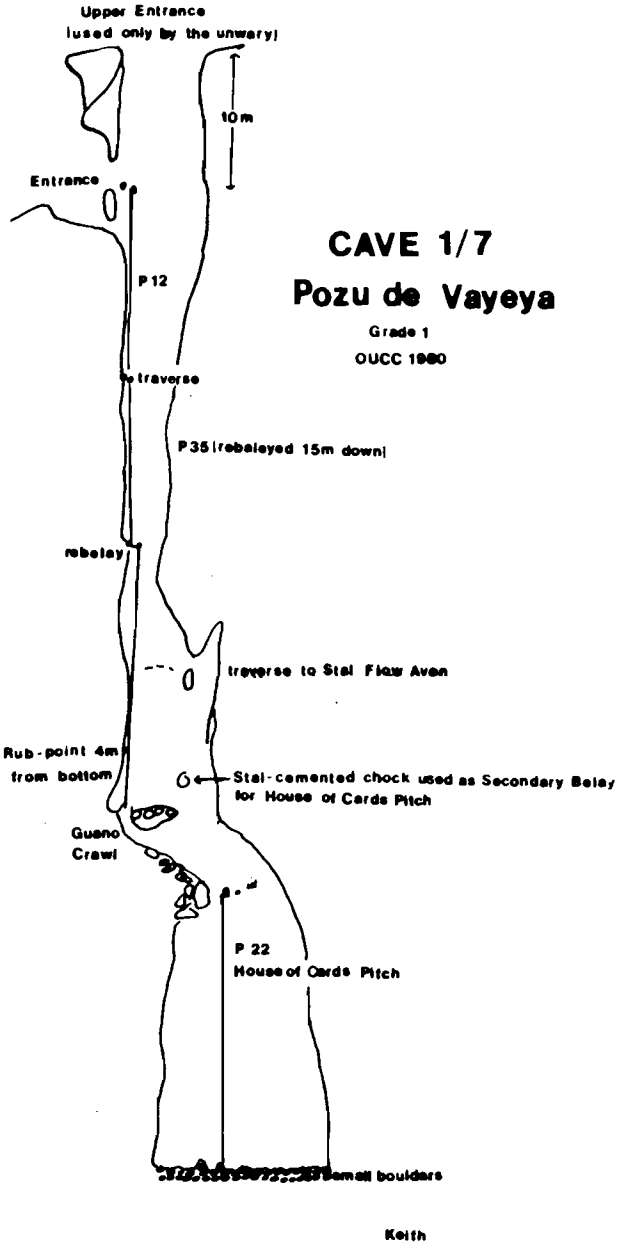
Cave 26/5 has an entrance of a horizontal slot 1m by 0.3m. Descending this one reaches an earthy rift inclined at 45° ending in a 10m pitch. At the bottom is a small chamber containing a narrow vadose trench 20m deep with a small stream at the bottom. Descent is only feasible in one place and the trench is much too narrow to follow.

Cave 27/5 is a large doline full of shattered rock which leads to two choked holes emitting a strong draught.

Cave 28/5 has been renumbered 3/9.

Cave 29/5

The entrance lies 100m off the Trea path at a bearing of 202° to Jultayu. The entrance is a 14m SRT pitch with one rebelay point. At the bottom, a scree slope leads to the second pitch which is 37m long and bolted. No way on from the bottom of the second pitch was found, and a parallel shaft system part-way down the second pitch also chokes quickly.

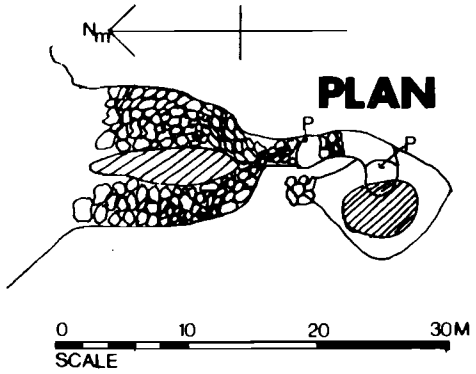


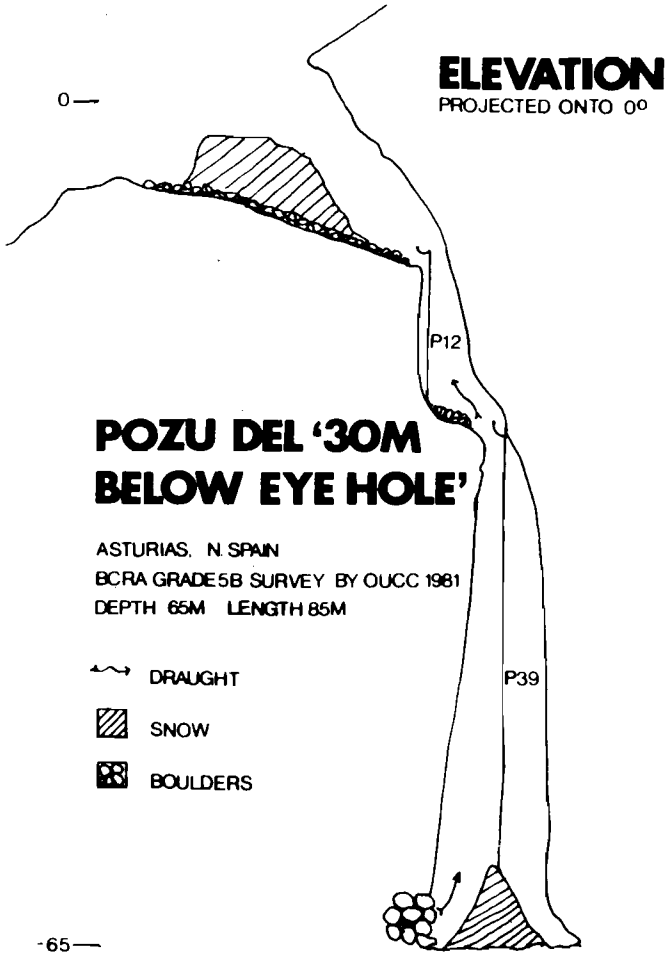
CAVE 1/7

Pozu de Vayeya

Grade 1

OUCC 1980





POZU DEL '30M BELOW EYE HOLE'

ASTURIAS. N. SPAIN

BCRA GRADE 5B SURVEY BY OUCC 1981

DEPTH 65M LENGTH 85M

DRAUGHT

SNOW

BOULDERS

Tackle

Pitch	Rope	Belays
14m	18m	Huge roc back up. Bolt primary. Rebelay at bolt 5m down
37m	38m	2 bolts

Cave 30/5 (Red Circle Cave) is named after the SIE red circle outside the cave. The entrance is a stoop under a pile of boulders which leads to a chamber with a hole in the floor 5m deep leading to a rift. Both ways in the rift soon become impassable. A second entrance of a 5m climb is situated 10m from the main entrance on a bearing of 300°.

Suicide Pot is opposite 12/5, half way between the path and the Jou de la Cistra. It consists of two small holes under a pile of loose boulders near a small scree slope. The entrances are just about body sized, stones rattle down for 12m and dripping water can be heard.

Area 6 arose from an unlogged walk by Dave Rose along the main ridge of the Picos de Cornion where he found two caves right near the top. Cave 1/6 is Ridge Cave whose exact whereabouts have remained a mystery despite subsequent attempts at location.(!)

Area 7 (the region around Jultayu (see map on page 6 for areas 7,8,9))
This area has been thoroughly searched, so further discoveries are unlikely.

Cave 1/7, Pozu Vayeya

This is the Northward facing ridge connected to the summit of Jultayu. There are two entrances: one is a walk into an eyehole; the other is a concealed shaft (don't approach from the Jultayu path which runs above).

The sketch and description are by Keith from the 1980 log:

An awkward straddle climb in the entrance fissure leads to a precarious perch beside the bolts on the first pitch. It is best to use the perch as a psychologically reassuring tertiary belay loosely tied with a bowline so that you can clip your cow's tail into it as soon as the pitch is climbed - this guards against a tendency to fall off the top of the pitch. Two closely-placed bolts give a free hang to a mossy ledge; scramble down to a further slippery ledge while still on the rope. Don't prusik/abseil because of a dangerous rub point. At the level of the ledge, a sporting straddle traverse leads to two bolts at the head of the second pitch (35m) rebelayed at a ledge 15m down. 10m up from the bottom of the pitch, a traverse or pendulum is possible to a chocked boulder, and from here an exposed climb upwards leads to an area with walls of flowstone which appears to close up after eight or nine metres.

At the bottom of the second pitch is a boulder covered floor. A small hole leads to a dung-ridden crawl and out onto a steeply sloping ledge composed of boulders. All the boulders are supported by three largish ones; the fact that the latter remain in position defies all laws of physics. A straddle climb (as opposed to scramble) down to the next bolt is necessary to avoid bombarding it with too many boulders. A rope protector is essential on a rocky out-jut just below the belay point. This is a superb pitch with walls of good quality flowstone and a terminal boulder floor. The surface of the flowstone is heavily pockmarked in places with bang marks resulting from falling rocks.

Tackle

Pitch	Rope	Belays
12m	16m	Traverse line tied round ledge: two bolts
35m	38m	Two bolts. Rebelay at two bolts
22m	25m	Long tape to natural above Guano Crawl: 1 bolt

Cave 2/7, Pozu del 30m below eyehole (see survey)

The entrance lies 30m below the eyehole on the Jultayu Ridge and is a large doline on a steep slope with a rift leading into the slope. The first pitch into the rift (12m) has two bolts and is followed by a short, very loose scree slope to the head of the second pitch (39m) which is blocked by a snow plug. The bottom draughts strongly into a boulder choke designed for suicidal midgets.

Tackle

Pitch	Rope	Belays
12m	15m	Natural for traverse over loose boulders then 2 bolts
39m	40m	2 bolts

Cave 3/7 lies roughly 200m from 2/7, further along the ridge away from Ario and slightly lower. It is very near the lowest part of the ridge at the head of an obvious gulley.

The entrance is an open shaft 9m by 3m. A snow plug is visible about 20m down, probably on a ledge. Stones thrown over this took between five and twelve seconds to hit the bottom, hitting the sides several times on the way.

Cave 4/7 is situated near 3/7 slightly higher and further along the ridge in a shallow depression filled with rocks. Clearing away rocks from against the wall in one corner revealed a small chamber just below the surface. In the floor of this small chamber is a rift, probably easily climbable averaging about 0.5m wide and 7m deep. Stones dropped down the rift apparently hit a stony floor.

Cave 5/7 lies on the opposite side of a large depression from Jultayu, almost up to a small col. All the rocks in this vicinity were very broken or fragile. A climb down through very large boulders leads to a shaft 25m deep with a cool draught. Stones thrown in hit the bottom in 2½ seconds and don't continue.

Cave 6/7 is an open rift near the bottom of a depression surrounded by collapses. The rift is 8m deep to a massive snowplug, but it is just possible that a way on could be found from the deeper (downslope) end of the rift with a bit of snow clearing.

Area 8 was arbitrarily designated as the area opposite el Xitu on the other side of the valley (see map).

Cave 1/8, Pozu del Canalizos

This cave had previously been explored by the SIE but OUCC decided to look at it to investigate the side passages noted branching off part of the way down the shaft. No significant passages were found.

Cave 2/8 lies 50 to 70m above 1/8 and is a large, obvious rift somewhat less obviously choked at the bottom.

Cave 3/8 lies 40 to 60m above 1/8 and has a large, obvious entrance with a short decending passage to a choked rift.

Cave 4/8 is a fairly small hole in the lowest corner of a large shakehole. Its 10m entrance pitch remains undescended due to lack of ladder.

Cave 5/8 is an obvious entrance with snow in which chokes with boulders almost at once.

Cave 6/8 is a 20m shaft with snow at the bottom. Bottomed by the SIE in 1980.

Area 9 was chosen as the next valley along from area 8 in the direction of the Cares Gorge. Many unmarked stone-filled shakeholes litter the area.

Cave 1/9 is a large shakehole in the middle of the valley. A way on through boulders leads to a pitch 5m long landing on a snow plug. A way on may just be possible.

Cave 2/9 is a huge cavern visible from just about everywhere on the slope heading to the main ridge of the Picos de Cornion with a huge snow plug in the bottom. No visible ways on but who knows! It is known as La Jayada and is a good landmark to aim for when walking to El Joon.

Cave 3/9 was numbered 28/5 until explorers of areas 8 and 9 "rediscovered" it. The entrance lies 100m to the left of 2/9 roughly 200m above el Xitu. A 20m ladder belayed to a huge boulder forms a useful aid on the (10m) scramble down to the head of the first pitch (10m) which can be descended on the rest of the ladder to a snow covered ledge. A 25m pitch (care needed at top due to unstable ledge) drops into a huge rift filled with snow. Nasty 10cm wide holes down the sides of the snow plug go a long way so that the plug may be wedged in a large shaft. Ooerr!

Tackle

Pitch	Rope	Belays
10m	20m ladder	Long belay round large boulder
25m	26m	2 bolts

TOO DEEP OR KNOT TOO DEEP?

One sunny afternoon, after one of his recce trips to the south, Tony came bounding into the refugio with a look of evil glee on his face, announcing that he had found a massive, open shaft down which rocks seemed to rattle for at least five minutes. The shaft had a bend at about -60m, so you couldn't lob things directly down it, and also had the distinction of a tree growing out of one side of it, trees being somewhat rare at this altitude. Because the entrance looked a bit like Mere Ghyll, that's what it was called from then on.

On the following two days Keith, Roo, Jim and John Fowler rigged pitches down one side of it, the shape of the shaft being such that lots of bolt changeovers were necessary. Jim, who likes nothing better than making a simple rig complex, was in his element with plenty of scope for knocking in hundreds of bolts and devising the most awkward changeovers he could. The result was pitches of approximately 14m, 14m, 10m, 15m, 14m and 7m to a small ledge overlooking a big drop. Jim and John spent a happy hour attempting to shorten the shaft by lobbing rocks down it, returning with news of a six second drop.

The following day Keith and Jan returned to continue work and rig the big pitch, which they more or less completed. The next day was earmarked for a trip to the bottom and Keith invited Dave and I to join him, an invitation we accepted eagerly with some reservations.

Unfortunately the weather turned misty and Keith was the only one who knew where Mere Ghyll was. However, after walking round in circles for an hour or two we accidentally stumbled across the entrance and got geared up. Keith was by now in a sulky mood as Dave and I had been making the odd slight criticism of his navigational abilities.

Because there was lots of loose rock about, we each abseiled down to the ledge before the next one followed down the series of pitches. On arrival at the ledge Keith set to finishing the rigging of the big pitch. Because we had no really long lengths of rope available, we tied together a 90m, 60m and a 30m rope, making a total of 180m which we hoped would be sufficient for a 6 second drop.

Dave and I waited on the small ledge whilst Keith tied on the 30m rope we had brought with us, as there was only room for one at the belay.

Because Keith had pushed most of the shaft so far, we unselfishly insisted that he descend it first.

It became apparent that Keith was getting a little psyched up over this, and after spending an hour rigging the pitch with secondary, tertiary and quaternary back-ups, he spent another 30 minutes adjusting and checking things whilst we stood shivering on the ledge, passing helpful comments like "For Christ's sake hurry up" and "I don't think this rope's going to be long enough".

At last he clipped his rack onto the rope, but this was only a prelude to another 15 minutes of alterations and adjustments. By now we were blue with cold, and after threatening to castrate Keith and throw him down if he didn't get on with it, he was finally ready.

We agreed a complex whistle code so we would know what was happening: 1 blast for the first knot, 2 for the second, 3 for I'm at the bottom, follow me, 4 for I'm at the bottom, don't follow me, 5 for I'm coming back up etc. etc.

Keith disappeared slowly into the void. We couldn't see much from our precarious position on the ledge, and shivered for another 15 long minutes. "ARE..... YOU..... O..... K.....?" (faintly) "YEEEEES!" "Well what the bloody hell are you pissing about so much for then?" we thought.

At long last came 1 blast on the whistle. 10 minutes later, 2 quieter blasts. We waited eagerly for a further 10 minutes. By now he had been on the rope for 35 minutes.

I was shivering so violently that I nearly fell down the pitch twice. We discussed what might have gone wrong. Finally Dave peered down the pitch, and with a shout more devastating than curried beans, bellowed down the abyss: "IS..... THE..... ROPE..... LONG..... ENOUGH.....?" Back came a very faint reply, tinged with a note of paranoia: "NOOOOO!"

Dave and I looked at each other. "Serve the sod right for making us wait so long" he said. "Glad we let him go down first" I said.

We waited impatiently whilst Keith prusiked back up to communication distance, when he told us what kept him so long. He had abseiled past a minor rub point some 70m down, then decided to prusik back up to it and insert a rope protector, taking a long time to decide whether or not it was in the right place before continuing his abseil. Managing to stop before the end of the bottom rope, he said he had dropped something down the pitch and estimated a further 70m to the bottom. He didn't say exactly what it was he had dropped. We got quite excited now. The total depth of the whole shaft must be over 300m! Must be the deepest single shaft in Europe!

I prusiked out, desperate to warm up after doing 3 hours' hypothermia research on that tiny ledge. Dave and Keith followed quickly, knowing we had left some food at the entrance, and having no trust in my integrity. We discussed plans to chuck yet more rope down this shaft and jubilantly returned to the refugio, only getting lost a couple of times on the way. Back there, we received the sad news that the Spaniards had bottomed the place last year, it ending in a boulder choke. We had seen no evidence of their descent as they had chosen a route down the other side of the shaft. Disappointedly we drowned our sorrows.

Still, it could have been worse. Be interesting if it had been a wet pitch...

(The pot which we called Mere Ghyll and then Sima Katalina (after a Mrs. K. Senior had moaned about not having anything named after her after three years) was in fact Pozu Tras La Jayada, the second deepest shaft in Europe. It is approximately 306m deep so that Keith would have probably made the bottom with another 50m of rope!)

Reference:

Puch, C. El Topo Loco, Las Grandes Cavidades Espanolas, p.207.

Studies of Cave Fauna on the 1979-81 OUCC Expeditions

Summary

Collections were made in four caves at varying altitudes; one of the few biospeleological studies to have been done in this area. Four species new to science were discovered, two belonging to a new genus, and some more specimens of a species discovered by Lancaster University cavers were found at a new site. Possible reasons for the low diversity of the cave faunas in the Picos de Europa are discussed.

Introduction and Methods

The type of study undertaken by University Expeditions has been aptly called 'rape and pillage' collecting! Basically, in each of the three years, 1979-81, most of the caves that were being explored by OUCC were collected in. Sometimes, mere searching by eye revealed animals; in others, baits were placed. Several types of bait were used, ranging from illegally poached crayfish from Lago Ercina to the local delicacy of strong blue cheese, scrounged from one of Amador's superb meals in the local 'refugio'. All worked quite well! The methods and apparatus are covered in more detail in OUCC Proc 9.

The preserved specimens were passed to Phil Chapman, who sent them to various authorities on the separate groups. Most of the specimens have now been identified or classified, and a list is shown below. This is unavoidably full of biological jargon and I apologise! The discussion is written to interest the hypothetical intelligent layman, so read on!

Results

Cave details:

Pozo de Fresno, El Mazuco, Sierra de Cueva. Alt 335m
Cave temperature 12°C

Hoyo la Madre, Rio Casaño gorge, nr Belbin. Alt 880m

Cueva del Osu, Los Lagos. Alt 1230m
Cave temperature (50m from entrance) 4.5±0.5°C over 2 weeks in July

Pozu del Xitu, Ario. Alt 1680m
Cave temperature (bottom of entrance series, -180m) 5±0.5°C, July 1980 to July 1981! At camp (-790m) 7°C

More details are given in OUCC Proc 9. All the caves are in the catchment area of the Rio Cares, so are connected by ridges of limestone.

Species List

Abbreviations used:

TB - Troglobite - restricted to caves
TP - Troglophile - lives and breeds in or out of caves
TX - Trogloxene - spends only part of life cycle in caves (eg bats)
PH - Phreatobite - lives primarily in cracks, gravels etc. below water table
ED - Edaphobite - primarily a soil living species.

These distinctions are typical arbitrary biological classifications, but do have some limited uses.

Phylum MOLLUSCA
Class Gastropoda
Order Ctenobranchiata
Family Hydrobiidae
Bythinella saxatilis Reynies

Empty white shells (less than 1mm diameter), washed onto sandbanks. Very common in Xitu. Lives in cracks in phreatic zone and therefore is seldom seen alive. Common in other parts of the Cantabrians. PH.

Phylum ARTHROPODA
Class Crustacean
Order Isopoda
Family Asellidae
Bragasellus comasi (Henry and Magniez 1976)
Small (5mm), white, Asellus-like animal. Found in small inlet trickle to Cueva del Osu. Endemic to Picos de Cornion. TB/PH.
Stenasellus virei subsp. buchneri Stammer
Larger and more cave adapted than above, found in pools on soft mud in Pozo de Fresno. TB.
Family Trichoniscidae
Trichoniscoides chapmani
A new species, found commonly by LUSS. Attracted to fresh chicken baits in Fresno. TB.

Class Arachnida
Order Phalangida (Opiliones)
Family Sabaconidae
Sabacon vizcayanus Simon
Found relatively close to the entrance of Osu. TX.
Family Ischyropsalidae
Ischyropsalis nodifera Simon
Close to entrances of Osu, Madre and Xitu. TP.
These two species of harvestman are not very interesting biospeleologically

Order Araneae
Family Tetragnathidae
Meta sp
Near entrance to Osu. A commonly found genus of spider in caves. TP.

Class Diplopoda
Order Craspedosomida
Family Vandeleumidae
Psychrosoma chapmani (Mauriès, in press)
New species. Single male on wet rock nr. small inlet stream in Madre. TB.
Family Anthogonidae
Asturasoma osuenis (Mauriès, in press)
New genus and species. Found on mud banks just above stream level in Osu. 1 male and 2 juveniles. TB.
Asturasoma fowleri (Mauriès, in press)
Second new species in the new genus. 1 adult only, found on mud bank in oxbow about 20m above first stream in Xitu. TB.
These three new species are all small (equal to or less than 15mm) white millipedes, and apparently very interesting! More specimens are needed.

Class Insecta
Order Collembola
Probably various families collected. Tiny (less than 1mm) white springtails. Attracted to chicken baits in Fresno and Xitu. Often primarily soil living. ED/TB.

Order Diplura
Family Campodeidae
Plusiocampa espanoli Condé
On mudbanks, attracted to chicken, crayfish or cheese baits in Osu, Fresno and Xitu. Possibly a new subspecies. Small (less than 5mm) white, 2-tailed insects. TB/ED.

Order Coleoptera
Family Carabidae
Carabus lineatus L
A large (30mm), very beautiful, surface living ground beetle. Found close to entrance of Osu. Not really a cave animal. It bites!
Ceutosphodrus peleus Schauf
Brown carabid beetle found in rift in Xitu, and in main chamber of Fresno. Attracted to chicken bait in latter. TP.
Lianie drescoi Negre
Attracted to chicken bait in Fresno. TP.
Trechus escalerai
Attracted to chicken bait in Fresno. TP.
Apoduvalius new species
Attracted to chicken bait in Fresno. TB?
Family Ceiodidae
Brevilia triangulum
Attracted to chicken bait in Fresno. TP.

Order Lepidoptera
Family Noctuidae
Scoliopteryx libatrix
TX.
Family Geometridae
Triphosa dubitata
TX.
These two moths are common in some UK caves, sheltering during the day in them.

Discussion

With the single exception of the empty snail shells of Bythinella saxatilis, animals are rather rare in the caves of the Picos. In Pozo de Fresno, however, even limited sampling revealed a substantial fauna, especially notable for the large number of predatory beetles, indicating that a sizeable herbivore community must be present. The Sierra de Cuera, where Fresno is situated, is close to the Picos. Why then is there such a major difference between the faunas?

I believe there are two main reasons for this. Firstly, the number of available niches is low in the Picos, and secondly, the fauna would have been wiped out in the Pleistocene glaciations (about 10,000 years ago), and may not yet have recovered to its maximum potential level, so

not all the available niches will be filled. These ideas are discussed below.

The 'available niches' will be dependent on the number of ways animals can 'make a living' in the cave environment. In caves, the basis of the food chains is organic matter from the surface. This can be washed through from the soil cover, be deposited as faeces or dead bodies of trogloxenes and so on. In the Picos the organic matter entering the caves is likely to have the following features:

a) Small in quantity: Much of the area is covered in scree and Lapiaz, what vegetation there is is overgrazed. The soil layer is thin and probably gets rapidly oxised by the heat of the summer sun.

b) Have low variety: If organic matter is swept into the caves in large quantities it is often all beech leaves. Alpine Choughs supply faeces etc., but only near entrances. There are very few trogloxenes using the deeper regions of the caves. The low temperatures and low numbers of external insects are probably the reasons for this.

c) Be poorly spread in the cave systems: The limestones are, in general, massively bedded. So most of the organic input to caves is by streams in flood. Most passages lack the inflow of seepage water, probably vital for the maintenance of cave populations.

All these reasons will result in a poor cave fauna in the Picos, even if there has been enough time since the last glaciation for animals to colonise the caves of the region. Data on the amount and nature of organic inputs to the caves are needed, especially with regard to comparisons between caves of the high Picos and those such as Fresno.

The second major reason for the rarity of Picos fauna is the limited invasion of the caves by species since the probable mass local extinctions caused by the severe glaciations in the Pleistocene. An individual species colonisation is a random event, but the overall number of species in caves is likely to be influenced by the following factors:

a) The degree of physical isolation of the 'vacant' area. For example, whether deep gorges, non-cavernous rocks etc. form physical barriers to colonisation. This depends to a great extent on the type of organism considered. A cavernous millipede will find colonisation much more difficult than a winged insect. Interestingly, phreatobites may find dispersal, at least within limestone, relatively simple. Quite a number of the Picos species could have been dispersed this way.

b) Something one could call 'ecological isolation', for want of a better term. If the vacant area forms an unusual type of biological habitat, then even if species arrive, they cannot immediately colonise it: They have to evolve. Stenasellus may be able to disperse into the Picos, but is highly cave-adapted to the low altitude, warm, organic rich caves such as Fresno.

c) Size of available pool of colonisers. If the surrounding areas, which will form the arbitrarily defined 'available pool', have only a few species, then the probability of species colonising the caves is clearly reduced. Contrast the likelihood of a Picos cave being colonised, with a locally depauperate fauna, with the probability of a tropical cave being colonised with a tremendously diverse local fauna.

These factors will have combined effects, and are not mutually exclusive. To illustrate two possible extremes:

1) The troglobite fauna of the surrounding hills may be very isolated from the Picos, already cave-adapted (no 'ecological isolation') and be low in species number (small 'available pool').

2) The above-ground beetle fauna in the surrounding hills may not be physically isolated (able to fly), ecologically quite isolated (need to adapt to caves) and have a reasonably large pool of available species.

In general, it appears that the Picos fauna is derived from the cave-adapted species of the surrounding hills: Some species such as Trichoniscoides chapmani and Plusiocampa espanoli are common in the surrounding hills and have evolved only very slightly, if at all, in their Picos populations. Species probably need to change less to exploit relatively low altitude Picos caves such as Madre and Agua, than to exploit high level caves such as Xitu. It would be nice to know the evolutionary ancestry of some of the other troglobites, such as the two species of millipede in the new genus of Asturasoma. Until more is known, the relative importance of factors such as 'ecological isolation' (Stenasellus?), physical isolation or the saturation of available riches will remain a subject for speculation.

The abundance of the empty hydrobiid snail shells in Pozu del Xitu (and probably other Picos caves) is rather surprising in the light of what has been discussed above. They are present on rock and mud surfaces at widely varying heights above the stream, from -180m (bottom of the entrance series) to at least -800m. Their distribution is patchy, maximum abundances being about 10 per $100cm^2$ on deposits of mud, which have a 'grazed' appearance. If this is a result of 'grazing' by animals, then the snails seem the likely culprits, as nothing else is present in the necessary levels of abundance. In life, the snails live in cracks in the phreas, but get washed out in periods of flood. I would suggest that the snail populations on mud banks in Xitu are probably a remnant of the last flood, at that level, and that they lived long enough to heavily graze the mud surface, but rapidly overexploited the limited organic matter present in the mud. Since the cave does not flood to any great height (1st stream, less than ½m, 1979 to 1980), the old snail population, at the highest levels, may be remnants of very ancient floods indeed; presumably when that part of the cave was last active. Micro-radiocarbon dating has been considered, and could give an accurate age for the last period of activity of the passage, but the process is in its infancy. Mollusc shells are also notoriously subject to dating errors, so whether this project is feasible is not really known. However, samples of the snails in Xitu were taken, in anticipation of this, in 1981.

Acknowledgements

To the many members of OUCC whom I dragged along to collect bugs or keep me company.

Particular thanks to Phil Chapman for seeing to all the identifications, and for thought-provoking discussions. Phil is producing a paper for BCRA transactions, which will cover both the OUCC and the extensive LUSS collecting in the Picos, which he kindly let me read before writing this! All details of identifying authorities and references will be given in his paper.

"There were all these Snails spaced out on the walls!"

GEOLOGY OF THE ARIO REGION

When we visited the Cornion area in 1979 there was little time to consider the geology of the region we were caving in. The geological notes of OUCC Proc. 9 were based on observations made when tramping to or from the caves. The expeditions in 1980 and 1981 consisted of full time caving broken by periods of exhausted rest so a proper study of the geology has yet to be carried out.

These are just some further observations which hopefully will be useful as a background to the thoughts on cave development which follow.

The Picos de Cornion consist almost entirely of limestones which outcrop over a vertical range of some 2000m. This thickness is achieved by the repeated overfolding and thrusting of a less thick sequence.

The bulk of the Picos de Europa limestone is grey-white, massively bedded, and has very few fossils. The individual beds are generally impossible to distinguish because of the many faults and joints. The beds are certainly very thick although it is possible that many were originally a series of thinner beds which have slumped and been redeposited as thicker ones. Sedimentary structures to support this theory have not yet been seen. Coarse conglomerates (calci-rudites) occur occasionally within this unit but they are not of great extent.

The other main limestone is a generally darker, finely laminated rock which can be seen SW of Ario. This is probably equivalent to the Mountain Limestone. The laminae vary in colour from black right through to pure white. Small folds disrupt the laminae and these are probably slump structures formed when the sediment was still soft. These rocks are also seen in the Valle Extremero at a much lower altitude.

Laying uncomfortably on the limestones is a sequence of highly fractured shales with a few limestones. The limestones have been redeposited and show features characteristic of turbidites. See fig.1.

Nothing much can be said about the general structure except that it is complicated. The turbidites show that the shale sequence is the right way up but much work would be necessary to make the same statement about the main limestone units.

The rocks at Ario in which Pozu del Xitu is developed are different from most of the surrounding limestones. The Ario limestones have been subjected to a mild metamorphism with some associated hydrothermal activity. Indeed small scale open-cast mining of copper ore (probably malachite) was carried on in the Jou de Ario in the early 60s. Only traces of this activity can be found today. The degree of metamorphism varies considerably over small distances and can be described as patchy. The limestones have been changed into a poor marble and there is evidence that some fault planes have been 'welded' by the heat and sealed in some parts. The fault which is clearly seen in the entrance depression of Xitu can be seen to disappear over 5-10 metres into a mass of quartz and calcite veins.

Another important effect of the metamorphism is that the limestones are crowded with perfect anthigenic quartz crystals. The crystals reach 10mm. in length and what soil there is around Ario glistens with them. In the cave, quartz crystals stand out in veins and clusters on the walls so that equipment is quickly worn our. The sand in the Teresa Series is composed almost entirely of quartz crystals so clothing gets coated. The stitching in the seams of oversuits quickly wears out, and where material comes in contact with skin painful sores develop. I leave the location of the sores to your imagination.

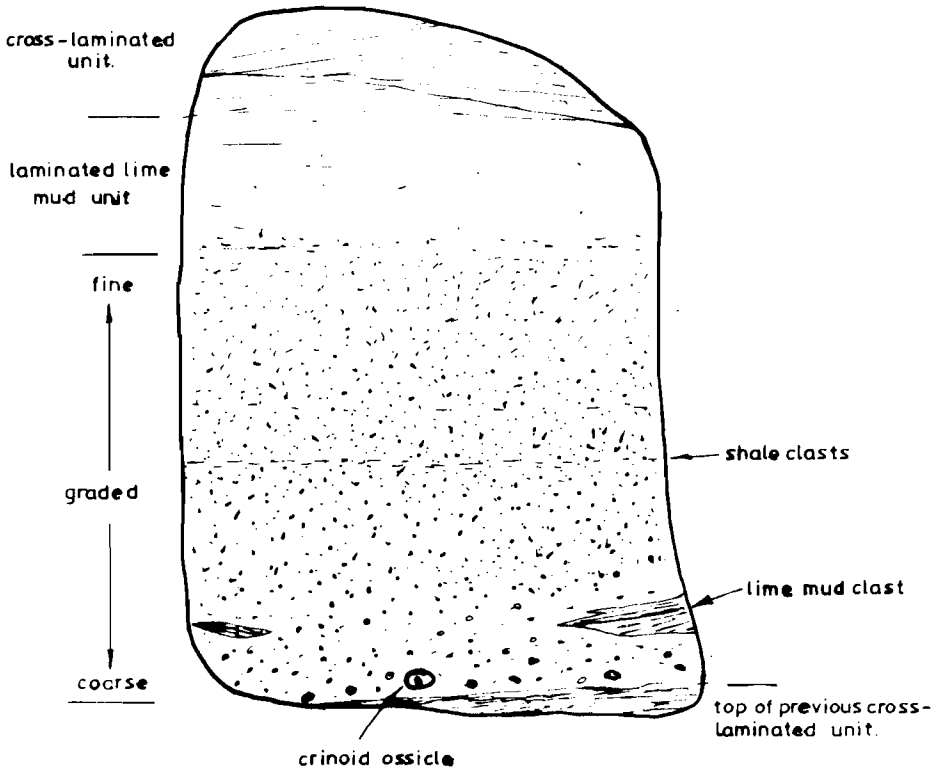


Fig.1 Drawing of limestone turbidite x1

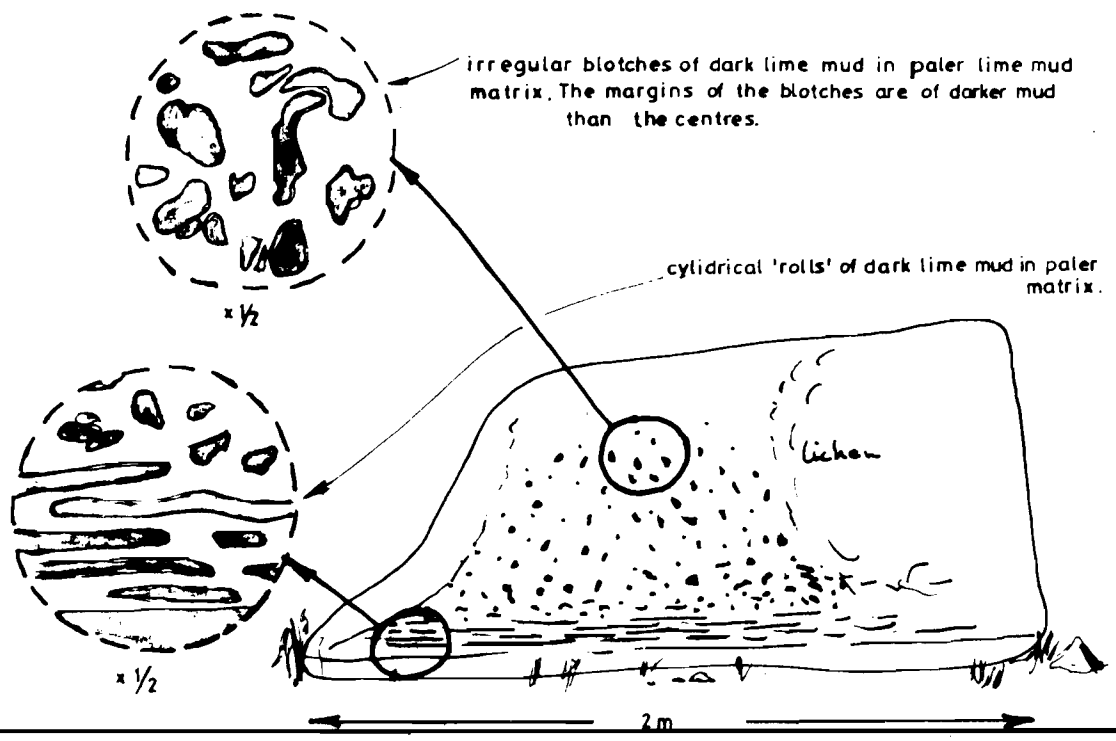


Fig.2 Outcrop and detail of spotted limestone.

The quartz occurs as fine 'stringers' which pervade the rock but also as discrete crystals within the limestone. These are not 'fed' by veins so are presumably formed from silica grains present in the limestone. This implies that the heat of the metamorphism was suffcient to melt the silica in the limestone and 'soften' the limestone to allow the quartz crystals to grow unimpeded within it. There must also have been water present as much of the quartz has been mobilised and forms the abundant veins. There are many phases of calcite veining which indicates that at depth the heat was sufficient to melt the limestone in the presence of water. Nearer the lakes, one of the fine Iceland Spar type veins of calcite has been partially analysed and found to contain over 1000ppm. of Fe (0.1%) and also of Mn - doubtless related to the manganese mineralisation at Bufferera.

It is probable that the Ario 'marbles' represent a deeper level than the surrounding rocks so that some kind of graben structure exists.

On the old Trea path, just past the shepherds' huts, there is a curious spotted limestone of uncertain origin. It is unaffected by the metamorphism and appears to be faulted against the Ario marbles. The best outcrop is shown in fig.2. The rock would seem to have been formed by some kind of sedimentary/tectonic process rather than an organic one. The rock lies close to others which are more clearly limestone breccias and it acts as a reasonable marker horizon. It strikes 090 with a dip of between 40 and 70 degrees to the north.

Cave Development in Pozu del Xitu

The most important fact about Ario as far as cavers are concerned is that the Rio Cares flows 1300m. lower, and between the Ario plateau and the bottom of the gorge there is nothing but limestone! One of the first things that is apparent when you arrive at Ario is the abundance of promising looking shafts and depressions. These are the remnants of some past large cave systems which are possibly waiting to be discovered. Most of the holes are choked with boulders and cavers searching in vain for a way down. Clearly, large shafts are prone to collapsing and being filled with debris but there are some well sheltered shafts (e.g. Pozu Tras la Jayada - 367m.) which are blocked quite deep below the surface. Xitu has quite a large entrance but the narrow rift which leaves the entrance depression still has 2m. or so above boulders. The rift takes you away from the surface shaft so the main entrance pitches are not so susceptible to infill from surface debris. This is why you can get undergorund in Xitu when everywhere else eventually chokes. Even in Xitu the entrance pitches choke eventually but we had another piece of geological good fortune which enabled us to carry on.

Another reason why Xitu has not been filled with debris is that it is on a col and there are only gentle concave slopes above it. Thus rock loosened from the mountains cannot roll as far as the cave.

As previously mentioned the entrance depression of Xitu is formed on a prominent fault which strikes about 075. This fault is 'sealed' by metamorphism to the SW but continues some way to the NE. At the base of the entrance depression the rift follows the fault to the head of the entrance pitches. The rift appears to be mainly vadose with a phreatic roof. It is a trench between 3 and 5m. deep, deepening towards the pitches and having an inaccessible upstream section whence floods emerge.

The first five entrance pitches after Climax Rift descend the

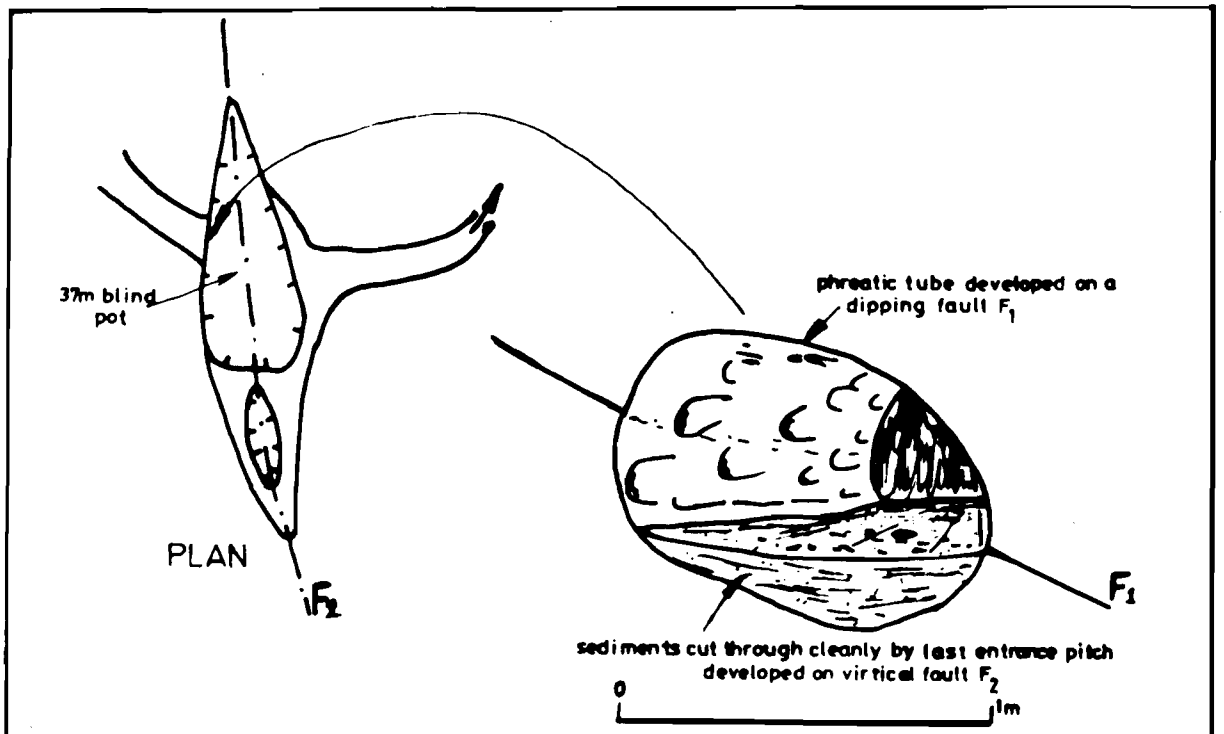


Fig. 3 Where the last entrance pitch cuts through an old phreatic passage.

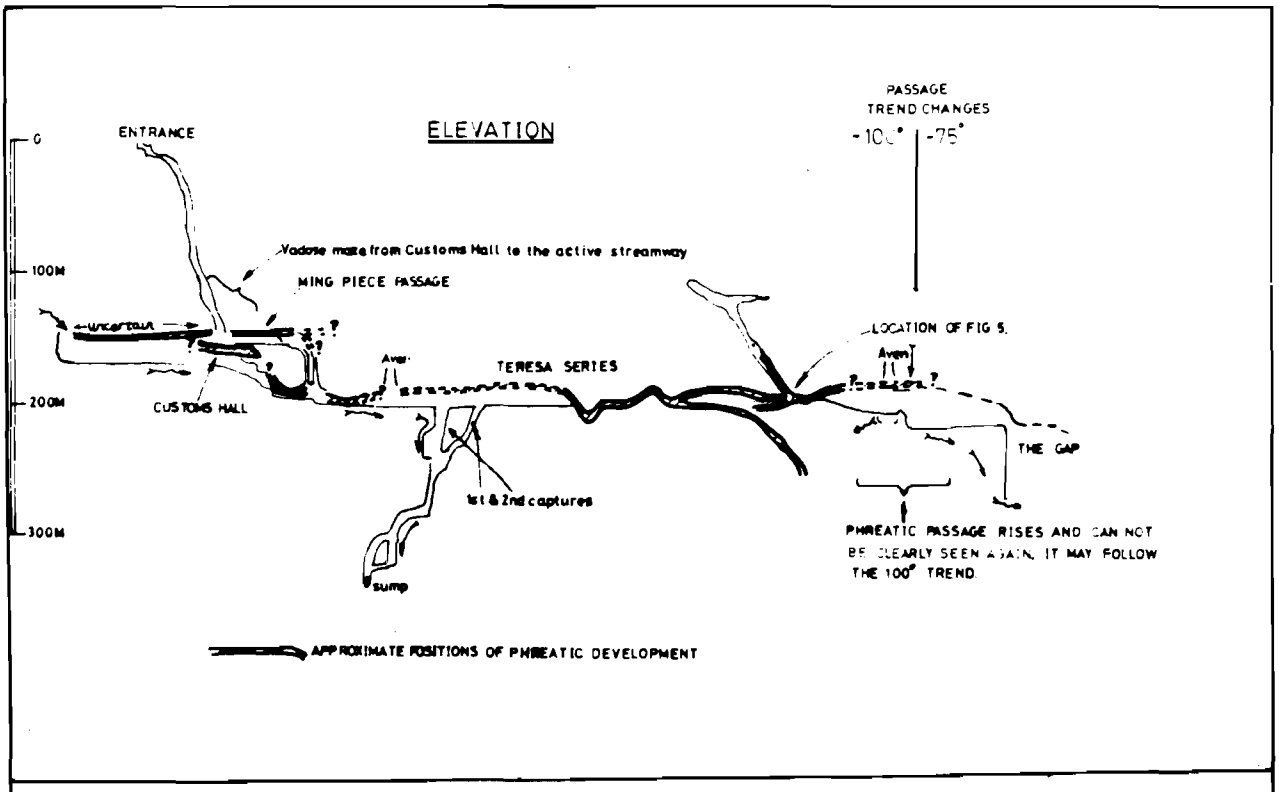


Fig. 4 Sketch survey showing phreatic development.

sloping lower wall of the fault plane. There are no signs of water action on the hanging wall which is a perfectly flat surface. The trenching and potholing on the lower wall is not extensive and can be explained by the relatively small amounts of water that flow down the entrance at present. The size of the cavity that the entrance pitches descend is larger than can be explained by present water flow. What then formed the initial cavity? The rift is not big enough to have carried the volume of water necessary to create the large entrance pitch cavity. We think that the entrance pitches are a modification of a tectonic cavity under flow conditions not too dissimilar to the present day.

After the last 9m. pitch the route drops away from the entrance fault and descends other minor faults. Our route from the bottom of the 19m. pitch is in fact the original passage and the blind pot is the first of many examples of stream capture in Xitu, although it is now largely blocked - yet John appears to have proved a connection by dropping his ropewalker and finding it again on the rubble filling the smaller depression by the 37m. blind pot at the bottom of the entrance series. One of the pictures in Caving International No.11 does, in fact, reveal an appropriate opening in the roof at this point. An interesting site is where the last entrance pitch cuts through an old phreatic passage. This is the stroke of luck which enabled us to get away from the Entrance Series and into the larger, more ancient passages.

The phreatic passage is developed on a gently dipping fault - fig.3. There is about 0.5m. of layered sediment in the passage. There is no 'V' notch cut so the passage must have been dry when the entrance pitch 'cut through' it. How did this actually occur? The vertical fault along which the last entrance pitch is developed must have been present when the phreatic passage was active yet there is no sign that water ever leaked into this fault. The passage must have carried water right across the vertical fault 'ignoring' any potential it had for stealing water. The inference must be that some renewed movement opened the fault sufficiently to capture drainage from the surface or, more likely, that a new surface water source opened it. This source was presumably glacial melt water, possibly concentrated at the col by the crevassing of the ice sheet cover at such a position of probable difluence - towards the Cares and towards Los Lagos. Possibly concentration within the calcite vein or to one side of it insulated the upstream phreatic tunnel from invasion at any stage, but overflow did take place down its continuation to Customs Hall, which is trenched to more than a metre deep at its upper end. However, it is not trenched below here, so maybe this marks the phreas level at the time of opening the entrance series. It is also intriguing to note that the blind pot does not seem to connect to the present cave streamway from its choke, even though its base is only about 10m. from it. The survey also indicates that its choke could be below the level of the present stream at its nearest point, so maybe there is another set of passages below waiting to capture the Traversity Streamway and fossilise the Trench/Sump Series.

The phreatic passage continues into the larger, phreatic Customs Hall. This passage is some 4m. wide and 2-3m. high and must have carried a very large amount of water at one time. Strangely, when followed upstream, the passage disperses into a series of small vadose passages. The downstream extension must be under a boulder collapse. A deep vadose canyon cuts down into Customs Hall from a phreatic passage some 10-20m. above. This is the top of Ming Piece Passage and presumably continues in the roof upstream (Traversity Streamway).

Between Customs Hall and the active stream passage there are many abandoned vadose oxbows. The total amount of vadose down-cutting must be in the order of 60-70m. The present vadose conditions have therefore been operating for a considerable time or are unusually vigorous. This latter possibility is in fact very likely due to the quartz sediment derived fropm the limestone insoluble residue.

There seems to have been more than one phreatic passage in the early development of the cave. The main one is the one seen in Customs Hall, and perhaps in Snowcastle, with others in the active streamway, Teresa Series and William's Bit. There are other smaller phreatic passages at higher levels but these are probably just loops from the main drain.

From the survey the cave clearly follows a trend on 100 degrees then changes its trend. What causes the cave to follow this course is not certain. It certainly cuts across many prominent fault/joint planes which might have caused a change of trend. The general trend of the cave must have been 'decided' by the phreatic passages with the vadose development modifying this trend. In detail, sections of vadose passage follow the line of least resistance among the many fractures. The old phreatic passages do not seem to be influenced by these planes of weakness but follow some other influence. You can only see what this is from the nearest mountain. Looking down from Jultayu an indistinct pale band follows the trend of the cave. It is difficult to see exactly what this 'pale band' is. It is not a bed of paler limestone. Rather it seems to be an ill-defined fault zone now re-cemented by calcite and quartz. The fault zone is cut by another fault at the start of the CBW Series where the trend changes. This new fault continues towards the Cares Gorge and is a very clear feature from Jultayu. The new fault is probably more recent than most and offers an easy route for water to the gorge. It is really a fault zone bounded by two major faults and filled with a well cemented fault breccia. Much of the cave passage is formed within this fault breccia. Passage enlargement by solution in a phreatic system would have occurred at a greater rate on these faults because none of the others provide such an easy, continuous course to the local base level.

The phreatic passage must have carried a large amount of water, the source presumably being melting ice from various glaciations. Any remaining morainic material at Ario should be studied to test this theory. The vadose passages show at least three stages of rejuvenation which would usually be linked to the various glaciations so the phreatic passage must have carried water from the earlier thaws.

It is worth considering what a phreatic passage is doing 1100m. above the present base level. The Cares Gorge appears to have been cut by the Rio Cares as the mountains were rising with some later modification by ice. The phreatic passage is either about as old as the gorge or is the lower part of a big phreatic loop whose higher levels could have been eroded by the later glaciations. In a vertical plane the phreatic passage rises and falls over a range of some 50-60m (fig.4.) The lower parts of loops would have been sumps for some time before being drained by continuous down-cutting. About 20m. downstream from the point where you drop into the active streamway a climb into the phreatic tube leads to a prominent line marking the position of a standing water level. This can be seen in other places and implies that water flow ceased for some time, maybe during a very cold phase with no water input and an ice-blocked resurgence. The very definite 'level' of development achieved by Teresa Series and the Traversity and active Streamways would certainly appear to be significant in itself, especially as there seem to be other cave

fragments exposed in the cliff faces around the Canal de Trea at a roughly comparable level. It seems not unlikely that this could be related to a pre-glacial landscape before the cutting of the gorge.

Afterwards, vadose development gradually took over starting at the highest points of the phreatic passages and working its way down. This is very well seen at the bottom of the climb up to Snowcastle (fig.5). The vadose activity was accompanied by a series of captures, the latest of which is to be seen just before Flat Iron where the present small stream disappears down a fist-sized plughole, presumably to emerge from the mud and rubble at the shaft's base. The great amount of vadose downcutting evident in the lower half of the cave and in the numerous captures could well be related to the abrasive action of the insoluble quartz residue of the limestone - an additional erosive agent of what one would imagine to be considerable import which does not seem to be available elsewhere. (For instance, the inability of vadose action to compete effectively with phreatic solution in the opening of new passages has been remarked on by Pete Smart in his study of the Andara massif where LUSS have worked so successfully.) It is thanks to these that the Teresa Series has been drained; the survey indicates that if the active streamway did not flow down the Trench Pitches the Teresa Series would be sumped at its lowest point. The first capture occurred at the Bold Step and water drained into Chopper Pitch. Later there was another capture at the Trench Pitch route and this eventually joined with the first capture at Enetrprise Series. The immaturity of this passage is demonstrated by the sharp, narrow trenches and the minor extra down-cutting of the upstream trench compared with that in the Teresa Series.

Once the phreatic passages drained stalagmite growth was possible. Most of those in the roof of the active stream passage are 'dead' whereas the upstream section has some active stalagmite along with some amazing moonmilk curtains which are as soft as cream cheese. Moonmilk also occurs on the walls of parts of the entrance series, chiefly the section beyond the first blind pot (below 19m. pitch) capture. Association of moonmilk with alpine karst is well known. What appears to be hardened, laminated moonmilk is also found as remnants of a much more complete fill throughout New Orleans passage. This is somewhat similar to the moonmilk floor deposits in West Kingsdale's Valley Entrance Milky Way, but was several metres in thickness before most of it was reeroded. It appears to show current bedding in places also, unexpectely showing flow back towards Teresa Series. Perhaps William's Bit acted as a sink for this water? Unfortunately no indications of flow direction have been reported from there. The best stal development is in the Snowcastle. The passage leading to Snowcastle is phreatic in origin and seems independent of the Teresa Series. Snowcastle itself is in a fault chamber and the block on which the Snowcastle formation has developed has fallen from the roof.

Most of the stalagmite below Flat Iron is long dead and some has been cut right through by the present stream to reveal over ½m. of finely laminated flowstone in one place; however that a little further downstream is 'alive' and very fine. The absence of any significant vegetation cover means that one would only expect extensive stalagmite formation at depth.

There are remains of at least three phases of sedimentation in the active stream passage and these are reflected in the Teresa Series. The deposits consist of well rounded limestone pebbles in a matrix of quartz sand. They are extremely well cemented and form thick, imbricuted ledges from the Cover Picture Aven well into Teresa Series, after which

laminated sands are predominant, the significance of which was totally missed in 1979; fortunately enthusiasm took us back anyway!

The phreatic cave is lost where the cave changes trend (below Servicio) and it is not clear where it goes. Possibly it continues on the old trend and would be worth looking for. Certainly from the point where the trend changes to the bottom of the cave vadose development is entirely dominant. Water falls from an aven upstream on the new trend. There is definitely more passage to find, possibly an extensive cave system leading to a higher entrance? (or, more likely, to 2/5 and 3/5.) It will be quite a climb however. The water that enters after here (the water from the large aven just below Servicio flows back towards Teresa Series; see Xitu: the Cave) is now followed to the bottom of the cave though it swells and wanes in amount as small cascades join and small sinks rob water. At the Gap a massive collapse has occurred between two faults (filling an old phreatic passage?) and in the roof of the chambers below you can just divine the outlines of a phreatic passage. The depth of the vadose down-cutting is so great that access to any roof tube would require a great climb. Once below the big pitch we have to admit that we didn't feel too much like admiring the cave development and just concerned ourselves with handling the caving. The general impression is that the pitch chambers are far too big. The passages linking the pitches do not seem big enough to have carried the amounts of water necessary to form the pitches. Possibly the pitch chambers are old shafts which developed on the same line of weakness that the present stream passage follows.

There are some very sharp narrow trenches and a series of steeply sloping rifts which emphasize the increasing immaturity of the passage. There are also some extremely attractrive vadose trenches cut through calcite-cemented breccias and the walls are often covered with helictites. One can't help thinking that somewhere in the roof is a big old phreatic passage leading into the upper reaches of an Agua type resurgence cave. We can only dream about this but maybe someone will go back to look for it one day. The cave eventually sumps some 200m. above the bottom of the Cares Gorge and I think we are unlucky to have been stopped so soon. There is a good chance that the present sump is quite short and represents a change of trend for the cave. It probably emerges only some 100m. away in another cascade passage dropping the ca. 50m. to the upstream sump of Grotte de Culiembro, whence the water flows to another sump to drop the last 100m. down a small passage much like the turbine pipes of an HEP station; obviously this is an immature passage formed since the last major incision of the Cares from the level of Culiembro. The good stal to be found in caves at this level could well date this event. That there was a stable valley floor at about this (path) level is shown further towards Cain where the old stream sediments are preserved in the wall of the gorge.

To conclude, Xitu has shown that big deep systems are present in this region despite past scepticism. The trouble is that finding the right entrance is difficult. All the most promising shafts, some around 250m. deep, seem to choke and you are lucky to break into a horizontal stream passage. Steady, careful inspection of all possibilities would yield results. A good way to start might be to climb a mountain and look for long persistent faults which trend towards the Cares Gorge. Then look at every entrance on the fault. Concentrate on the ones farthest from slopes which could supply debris to fill the entrance. Good hunting, and remember the only certain law of cave location is that 'Caves are where you find them'! It took OUCC 18 years to find the right hole - and we were lucky.

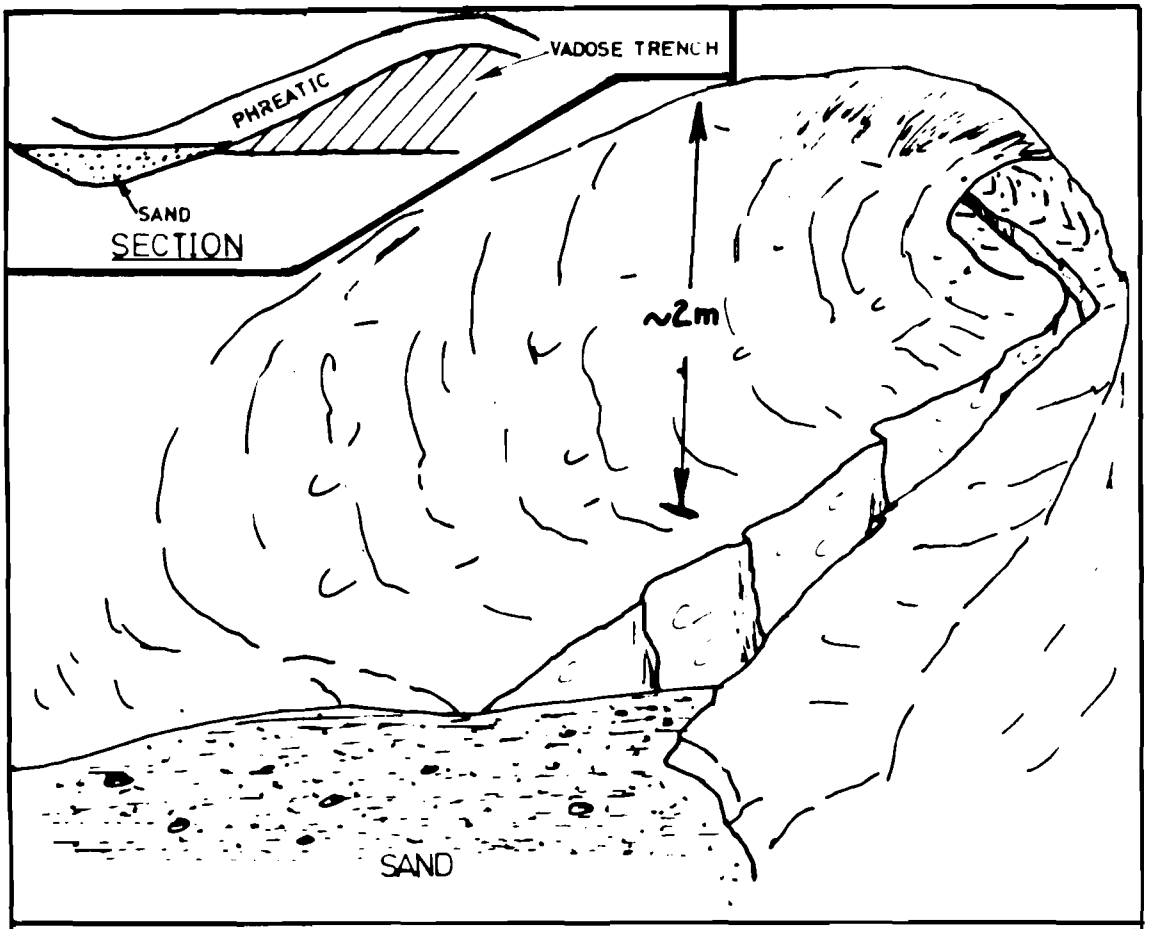


Fig. 5 Relationship of vadose down-cutting to the looping phreatic passage in the Teresa Series.

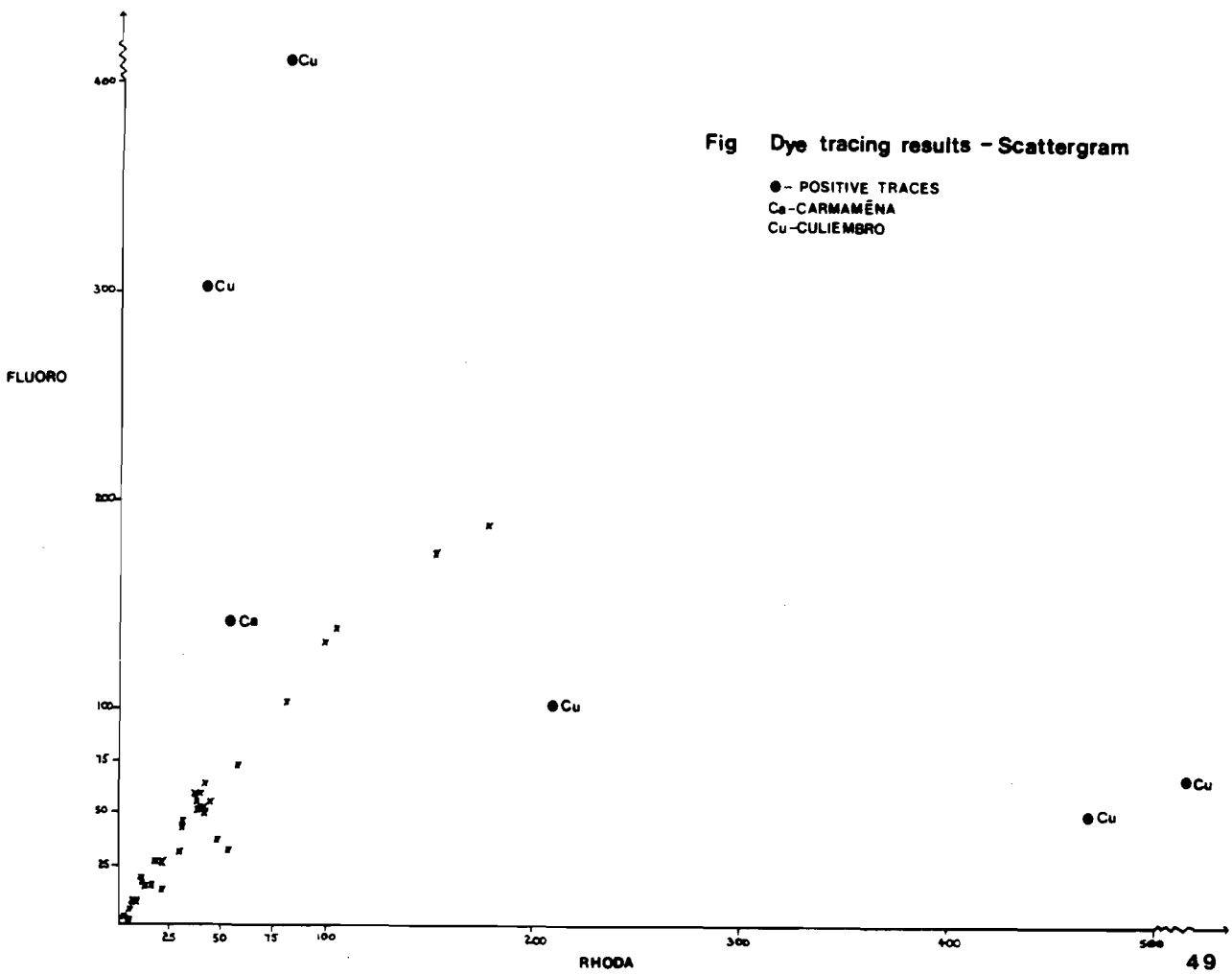


Fig Dye tracing results – Scattergram

● – POSITIVE TRACES
Ca–CARMAMÉNA
Cu–CULIEMBRO

Pozu del Xitu - 1981 Dye Tests

The 1980 Expedition produced an inconclusive dye trace from the small stream at the head of the Flat Iron Shaft to the resurgence in the Canal de Trea, below Ario. Since Xitu was certainly going to go much deeper than the altitude of this resurgence it was obvious that additional work would be necessary to establish the major resurgence for the cave.

The first group to arrive at Ario in 1981 walked up the Cares Gorge placing charcoal detectors in all the known resurgences, including Trea, in order to obtain measurements of the background fluorescence in the waters. These detectors were changed before the introduction of the dye into the cave and were subsequently changed three more times at approximately weekly intervals. As a further control detectors were placed up and downstream of the likely resurgence area in both the hydroelectric canal and the river in case the cave resurged directly into the canal in one of its many tunnels or into the river at a previously unknown site.

0.5kg of Rhodamine B was placed in the terminal sump on 5.8.81 followed by 0.5kg of Fluoroscein into the pool at the head of the Flat Iron (the site tested in 1980) on 7.8.81. No visual positives were obtained but later analysis of the detectors shows that Rhodamine had appeared at the Culiembro resurgence by 9.8.81 and that Fluoroscein appeared at this site (and in the river downstream at Caramamena) between 16.8.81 and 30.8.81. All other resurgences were negative for both dyes.

Analysis of the detectors was carried out by Pete Smart and Hans Friedrich at the University of Bristol Geography Department. Following Smart & Laidlaw (1977) the values obtained for each dye were plotted onto a scattergram (Fig.). Positive results were indicated by any points more than two standard deviations from the line of best fit drawn through the known negative (ie. background) values.

Acknowledgements

Thanks to Cathay Pacific Mulu '80 for the dye, O.U.C.C. for the invitation and hospitality, Pete and Hans for the analysis and Anni for the statistics.

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Dick Willis

SPELEOPSYCHOGENETICS II

How to Recognize some OUCC Cavers (if you should want to)

There have been so many interesting and unusual personalities involved in exploring Xitu over the years that lack of space forbids a character assassination of them all. Those that could afford the price do not appear below. If you see one of the below in the street do the sensible thing and cross to the other side.

The John Singleton

Almost unique amongst OUCC cavers and possibly the strangest, this one STILL uses rope-walking in Xitu after three years! This has been attributed by various writers to it falling on its head in 1980. To tell the Singleton from other varieties you place it in a maze. The Singleton is the one that finds its way out by demolishing the maze with wild, uncoordinated movements of its large body.

The Graham Naylor

Pretty small as OUCC cavers go, it can still be seen without the aid of a hand lens. Appears to buy its caving clothes from a rag and bone merchant and has not yet given up rope-walking. It was this caver that was responsible for the rigging of Graham's Balls-Up, the pitch which is known to Graham as Graham's Sporting Pitch.

The David Thwaites

Extremely rare nowadays is this polite OUCC caver that does its share of washing up. Tends to fall off things underground though.

The Stephan Green

Rarely seen in a cave and happier on a Welsh railway, this bearded beast is none the less useful for its ability to speak Spanish and hence order drink. Essential to any expedition. Also useful is that this beast's parents have a large house in Nottingham.

The Richard Gregson (M.D.)

Something nasty about this one. It spends a lot of time dreaming of operating on cavers underground without using anaesthetic. Recognisable by the unusual behaviour of writing postcards continuously to its loved one, this animal should be avoided when it has a knife in its hand. It tends to throw other people's gear down holes.

The David Rose

You can tell a rose underground by the wailing from the harmonica it uses to call for a mate. Never seen washing up but nearly always eating, this beast has a curious dislike of surveying and a fondness for Rioja. Sane nevertheless as it uses sit-stand.

The Colin Nicholls

Even more strange than the Singleton, this one also STILL uses rope-walkers in Xitu after three years but to our knowledge it has never fallen on its head yet. A curious aspect of its madness is its manufacture of rope-walkers to improve its prusiking when it could more easily change to sit-stand like everyone else has. Another curious feature is that when it runs the kitty you always owe it money!?

The Mike Clarke

Known as 'Skunk' to its friends, this nickname must be taken as a warning rather than a term of affection. Rarely saying much as it contemplates the state of its bowels, this is a creature to be pitied (from a distance). Lives in symbiosis with the Ankcorn.

The Chris Ankcorn

Recently spotted at medical school despite its age, this beast lives in symbiosis with Skunk, trying to discover a cure for its bowel problem. Has a curious behaviour in that it designs unworkable rope-walking systems with cloggers and then returns to using knots as a better alternative. Probably mad.

The William Stead

Suffering always from a genetic speech impediment known as the 'Eton accent syndrome' this caver spends most of its time eating out an existence in the kitchen. Dangerous when hungry, this starving creature continuously asks questions when underground even though he never gets any answers! Affectionately known as bed-stead.

The Mike Busheri

Probably wrongly classified as a caver, the Busheri emits two kinds of call. On the surface it snores and if you manage to frighten it underground it emits piercing squeals like a pig dying. It has yet to discover a prusiking system that suits its unique style of prusiking, which includes an upside down Gibbs.

The Martin Laverty

Affectionately known as 'lavatory' though never seen anywhere near clean water let alone a bathroom, this extremely hairy creature had a hair cut recently so that even we don't recognise it in the street. When in Mulu it was rumoured to look more like a head-hunter than the head-hunters! Never eats anything (which is useful) but insists on trying to prusik with bits of string. Carries luggage for a six week expedition in a shoe box.

The Trevor Menthenway

Its correct name is Neatherway but it is nice to see it get upset when you spell its name wrong. Holds the record for avoiding any prusiking in Spain in 1981 and loves to be in photographs. Claims to be studying an MSc at Southampton Univ. but to our knowledge has never been observed to do any work. Recently asked for a two month extension on a three month project after 'working' on it for four months.

The George Hostford

Most famous for its prusiking The Gap on one leg and more quickly than the Nicolls with both legs and rope-walking system. Identified underground by the blur surrounding it because it moves so quickly and the large blue box it carries full of photographic gear to slow it down to our speed. It invented the "Hostford Chock".

The Jan Huning

Has sordid dreams at underground camp and tells people about them.

The Jim Sheppard

Instantly recognised by the intense aura of age which surrounds it. Rumoured to be old enough to have been around when Xitu was first forming, this ancient creature has a wife and child. It is solidly sane, however, being a sit-stander from its earliest days. Possibly due to lack of use its clothing always looks like it just came from the shop.

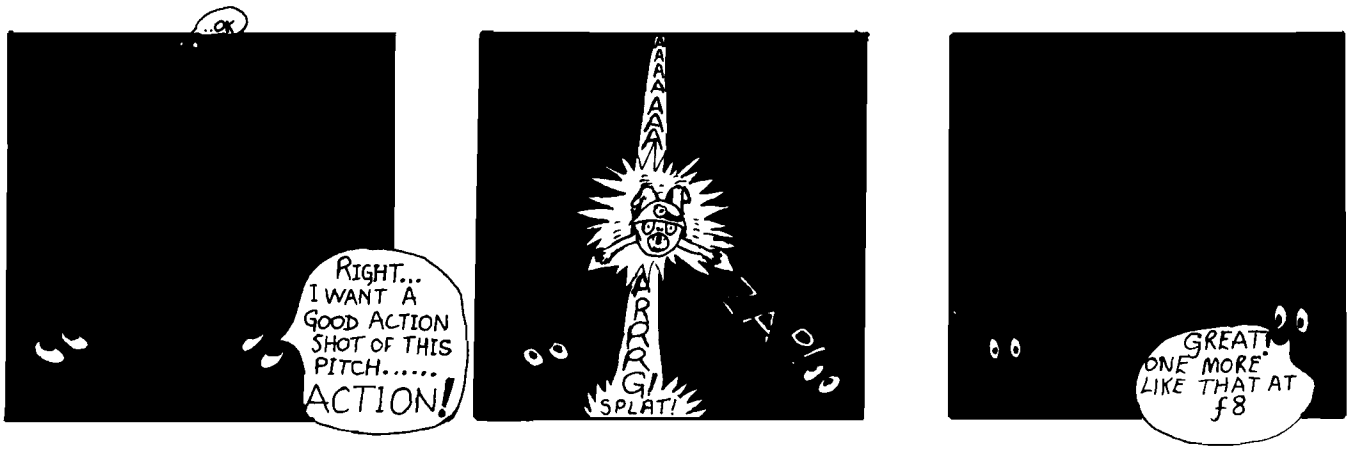
The Hywel

This was the one roped to the ledge above the big 90m. pitch as part of an OUCC experiment to see if an eagle would eat his liver out every day. Hence the worried expression in the photo. Hywel has to be admired as about the only caver capable of caving with Jerry without losing his marbles in the process.

The Jerry Williams

Last and probably least we come to the Jerry. The caver that, with its prusik system, gave a new meaning to the expression 'Jerry built'. In 1981 the Jerry took over from the Busheri as the main user of Refugio bunks and the main recipient of stick from the other expedition members. Despite all this it still managed to do a lot of useful caving which must say something about its mental state.

EXPEDITION PHOTOGRAPHY - SOME COMMENTS



Introduction

"He (John Singleton) described Oxford University's... major photographic/ pushing trip... which reached the final sump" (Caves and Caving No.14, 1981)

Well, we did manage a bit of pushing between the photographic trips! But seriously, in 1981, after 2 years of rapid pushing and hectic surveying, a better photographic record of Xitu was needed: We had hardly any black and white shots and a very, very patchy coverage with slides. Sod's law prevailing as always, it appeared that the cave got more and more photogenic as it got deeper and harder! So to be of most use, photographers had to get a long way down the cave - most unfortunate for lazy so-and-sos like me who would have loved to potter around the Teresa Series ad infinitum.

In the end, at least 1½ underground camping trips were devoted to photography, and a reasonable coverage has been achieved. But this is a lot of man-hours of photography. Unless expeditions are prepared to put this in, I don't think they will get a good photo coverage of the deep bits of their caves: Modern SRT and rapid back-surveying on pushing trips may be the 'in thing', but it certainly won't result in a very wonderful photographic record of the system. Some people may argue that we had a lot of man-trips in Xitu, putting excessive strain on the cave, but much of this time was spent in photography and in producing a grade 5B survey, something few expeditions into deep, hard caves seem to do.

Equipment used

Cameras: Ranged from Olympus SLRs to little Rolleis. The former are much more versatile, but a lot heavier! Both were taken to the bottom. Only 35mm format cameras were used.

Flashes: Varied from small bulb guns to enormous electronic flashes. The former are very lightweight and don't mind rough treatment, such as being swept away at Chunder Pot, to be recovered by the next camping party! Big electronics are the only way of getting bulb-type power without bulbs. I recommend that you take George along to carry them - the weight will probably knacker his legs, but he'll still get out as fast as anyone else, just using his arms! Other comments: Slave units would probably have been useful, enabling tripods to be dispensed with more often.

Films: Ektachrome 200 seems the best cave slide film. Others simply need more light which can be difficult to provide except in white places such as Snowcastle, but they will produce slightly crisper slides. I don't

like Ektachrome 400. For black and white, FP4 (125ASA) was used again, as a standard. It produces nice results, but is a little slow. Most 400ASA films, in my experience, are too grainy. The new Ilford XP1 (400ASA) was also tried and found to be a great success. Developing was done by Clive Westlake (see Caves and Caving No.13 pp.2-6). It really does seem to produce good prints from badly under- or over-exposed negatives. The quality was as good as with FP4.

Exposures: Exposing correctly in new caves is tricky. In Xitu, most of the rock is light, but it's difficult to know this until the results come back over-exposed! Consequently 'bridging' the exposures is a good idea - i.e. take 2 shots per picture, one either side of what you think is the correct 'f' stop. This way you should guarantee to get one right! Using XP1, you can 'get away with murder' on exposure, so that this may not be necessary. Despite all this, we had problems: Nearly all the shots of Snowcastle suffer from over-exposure in places.

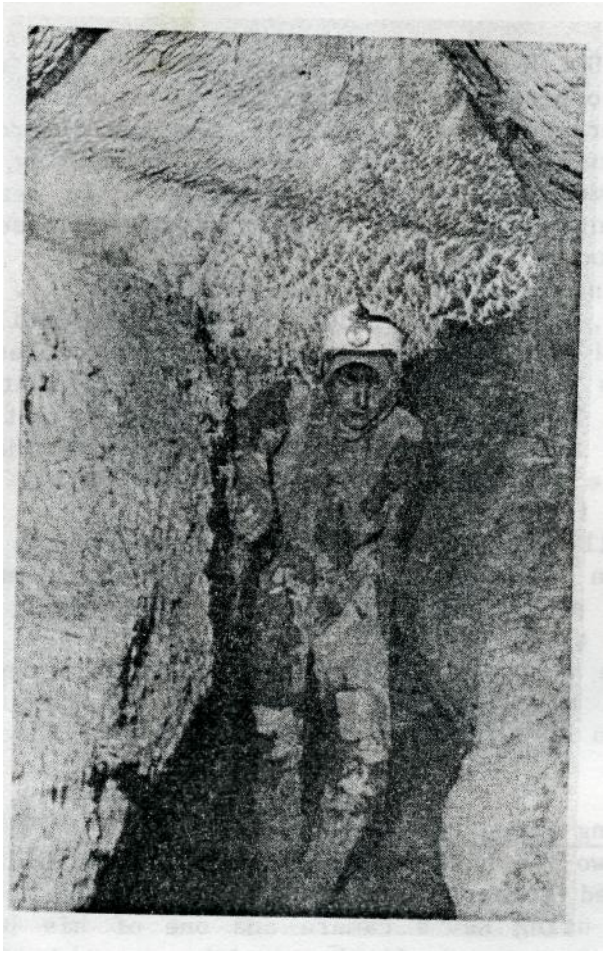
Carrying Gear: All our gear was carried down in ammo cans, or, in the case of George, an enormous fibre glass monstrosity. Contrary to what has been said in the past about ammo cans, I think it's quite feasible to take them on deep trips.

I hope that these notes are helpful to people planning deep expedition photography. Just to prove that even in the simplest of circumstances, lots of things can go wrong I have produced a real-life episode from the expedition log:

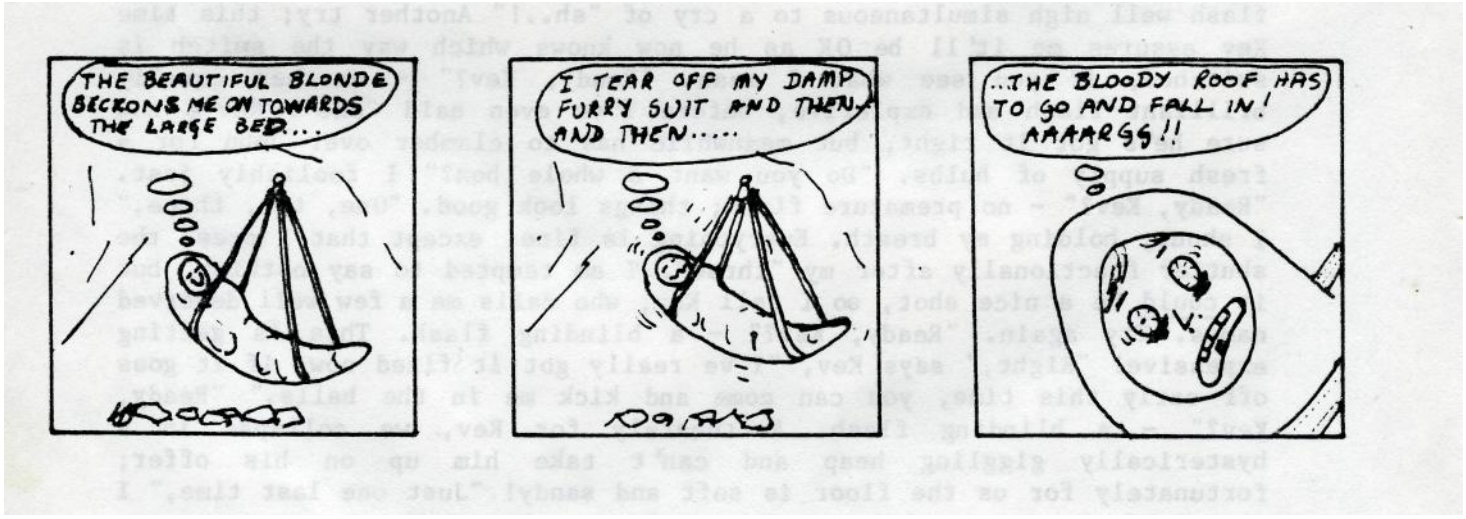
Photography of Ming Piece Passage

I wanted a two flash shot, nothing very fancy, of John coming around a nicely scalloped corner, with backlight to bring out the scallops - easy really. I'm using Kev's camera and one of his bulb flashes. Says Kev, "I'd better operate my flash, as it's got this funny two position switch, and if you don't know which position's which, bulbs can fire as soon as you put them in." "Fine," I says. "Just pop round the corner, and fire it when I count to 3." Off he goes. I position John, and we're ready to roll. I shout "Ready, Kev?" and the only response I get is a bright flash well nigh simultaneous to a cry of "sh..!" Another try; this time Kev assures me it'll be OK as he now knows which way the switch is switched, if you see what I mean. "Ready, Kev?" - another equally brilliant flash and expletive, before I've even said "one"! Kev's now sure he's got it right, but meanwhile has to clamber over John for a fresh supply of bulbs. "Do you want a whole box?" I foolishly jest. "Ready, Kev?" - no premature flash; things look good. "One, two, three," I shout, holding my breath. Everything is fine, except that I press the shutter fractionally after my "three". I am tempted to say nothing, but it could be a nice shot, so I tell Kev, who calls me a few well deserved names. Try again. "Ready, Kev?" - a blinding flash. This is getting expensive! "Right," says Kev, "I've really got it fixed now; if it goes off early this time, you can come and kick me in the balls." "Ready, Kev?" - a blinding flash. Fortunately for Kev, we collapse in a hysterically giggling heap and can't take him up on his offer; fortunately for us the floor is soft and sandy! "Just one last time," I say, in desperation, while Kev is clambering over John to get some more bulbs. It all works a treat; success, we think; well, you can judge for yourself - the photo is below! My mistake was to ask John to pose naturally - "naturally, so you look like other people, John, not like you!" After this, Kev spent ten minutes fishing his lens cap out of a deep crack, but that's another story...

We were a bit sick of photography by this time, so we went upstream in Xitu, and discovered ½km of very fine, sometimes very pretty passage - fate, perhaps?



CAMPING UNDERGROUND



The author of the article at the camp.

Introduction

In caves such as Xitu it is only worth while setting up a camp if trips are taking more than about 20 hours return. With all the gear necessary we could get to the camp in 9 hours (6 or 7 if you're good) without busting a gut, and maybe get out in 10. 15 to 20 hour trips are then possible from the camp downwards. For most camping trips we took one trip to the camp, slept, a trip down and back to the camp, slept, and then went out, i.e. 3 caving trips in all.

Choosing a Camp Site

The ideal place would be a fairly large flat floored chamber with a stream low down one side with pools for washing in and for use as a general water supply. The rest of the chamber would be dry and draught free with a clean rock floor with a few boulders for sitting on. Nearby there would be a small chamber with a narrow blind pot for the inevitable calls of nature.

But, as we all know, these chambers either don't exist, or are in a very unsuitable place - an entrance chamber is no use (except maybe in Mulu).

A water supply close by is essential - it would be a real pain to have to crawl several hundred metres just to fill a pan for a brew, especially as the fewer pans etc. needed the easier it is to get the camping equipment down (a major problem in itself). You'd spill most on the way back anyway.

Finding a draught free place is very worthwhile so that you don't freeze whilst cooking the meals and so that candles burn longer and give a better light.

As long as there is a reasonably dry area it doesn't matter too much whether the floor is smooth or not. The main trouble with a boulder floor is that it's painful trying to walk around without boots, and things tend to get lost very easily. The floor should be very stable so that precariously balanced pans stay on top of their stoves. In most situations it should be possible to arrange boulders to provide an area for cooking and storing things (food etc.).

A sloping roof of decent rock is handy so bolts can be knocked in to support hammocks. Otherwise it is best to arrange things to give a flat space for sleeping.

Somewhere accessible but not too close has to be found, off the main route, for replying to the calls of nature. If a blind pot cannot be found then other arrangements must be made - take plenty of plastic bags down and find a safe place where they can be filled and then left. It is extremely important not to get any human excrement into the stream as it will poison it for the poor Spaniards using it as a water supply on the surface.

Sleeping and clothing

So once we've found the ideal spot to camp at, something is needed for sleeping in. Feather and down duvets are definitely not on. The ideal thing is a good quality fibre pile sleeping bag as they remain warm when they are damp, which they will be within a very short time. (They are also strong, which is necessary when getting in and out of them on sharp boulders - thin cotton would just tear.) The thick pile provides some padding, not important if sleeping in a hammock but an added bonus when sleeping on a karrimat on rough ground. They also wick moisture away so that you wake up reasonably dry. The disadvantage is their bulkiness although they are light (providing they are kept dry on the carry in - wrap them in a couple of polythene bags. More on this later.).

If the camp is flat and dry it is easiest just to sleep on the ground, on a plastic sheet (the bag providing the padding) or a karrimat which is warmer but bulkier for lugging down to the camp. In a boulder floored chamber either arrange boulders to provide a suitably shaped space for sleeping, or use hammocks. These require a sloping wall or low ceiling (so that bolts can be put in to hang them from). Hammocks with single point suspension save time setting the camp up (only one bolt!), but whatever type they should be positioned so that they are about half a metre off the floor to facilitate getting in and out. Don't let them touch the floor though, as they are fragile and may get torn. If a bolt can only be placed high up, a cow's tail will be needed to bring the hammock within easy reach. Everyone should practice getting into a hammock when inside a sleeping bag above ground - it's not easy, and provides a lot of laughs for spectators.

Several people found the hammocks rather constricting as one can only lie flat out, and tends to have one's shoulders pressed in. This would be avoided if hammocks with spreader pieces were used (again, more bulk).

There are a couple of options for what to wear whilst cooking etc. Some people stayed in their furries (minus oversuit) until they were about to get into their sleeping bag, when they either changed into some Damart or just slept in the pink. Others preferred to get out of their caving gear and into something dry straight away. Wearing a furry without the oversuit may help it dry out a little, although most people eventually came to the conclusion that the effect was small. Wearing dry Damart is probably preferable as it will reduce the tendency to contract jock-rot. Footwear can be a problem - keeping the same socks and boots on can lead to cold feet. I took a pair of thick socks down and put my caving boots back on, which kept my feet quite warm even though the socks got slightly damp. For rough bouldery floors caving boots will be better than gym shoes or wet socks, especially if the site chosen for crapping involves a walk downstream followed by a sharp very difficult climb (ours did)! Even so Graham was quite happy wearing only a pair of socks. (I'm glad I didn't camp with Graham: Ed.)

Food

Plenty of food is required on a camping trip, and one definitely shouldn't skimp on this. Volume is required; i.e. the food should be filling, and some variety is a good idea: chilli con carne for every meal doesn't improve most people's morale (except Graham's). At the camp one eats only two meals per 'day', one before going caving and the other before sleeping, so that they need to be large. You can get away with one day's caving on insufficient food, but not several! A main course of stew/meat with vegetables and spud, and something else such as oats and dried apple flakes with milk (powdered) provides variety and is usually enough for breakfast and supper. The food will have to be dried to get it down to the camp, but try not to get types of stew which need to be simmered for ages because it uses too much fuel, and wastes time. It takes long enough as it is between waking and leaving. Some people liked to have biscuits and things to nibble at - they do add variety but remember that they will have to be carried in, and a heap of biscuit crumbs isn't really much use. As an alternative to porridge at supper, thick soups are quite good, although to keep up body sugar levels it is best to eat chocolate as well. If dried meats and stews are unobtainable (or you run out as we did!) take thick soup and preserved meats such as chorizo or some other sausage which doesn't require cooking. Sardines are easy to take down (though fairly heavy). Tea bags are probably more

convenient than coffee, and fruit juice ('Rise and Shine' type of thing) is very refreshing.

Don't forget extra food for taking on caving trips such as chocolate and sardines.

A set of nesting billies is ideal for cooking in as it takes up little room and doesn't weigh much. Make sure that there are enough pans and stoves at the camp so that everything can be cooked at the same time, and so that each meal requires only one lot of washing up.

Small gaz stoves ('Bluets') were found to be very suitable for the cooking. The cylinders are cheap, easily available and reasonably robust - essential for the carry in. Petrol stoves and primuses are rather more delicate and in Spain paraffin seems to be unobtainable. A leaky petrol can could provide some excitement with carbide lights around.

A plastic (unbreakable) plate, bowl, mug and a set of cutlery (or at least a spoon) per person is helpful. Take some washing up liquid (biodegradable!) and a scourer for cleaning the pans, though don't get carried away using the detergent, or else you'll end up fighting through great heaps of bubbles at wet pitches further down!

Cleanliness is important - if there is any doubt about the water stero-tabs should be used to purify it. In this case it would be advisable to have a large collapsible container for the water supply, as the tablets have to be left in for some while before the water can be consumed.

Other Supplies

Adequate supplies of bog roll must always be taken on each trip. Each roll should be put in a waterproof container, such as an empty 'Mornflake' tin. This ensures it arrives in a usable state after the grade V trip from the camp to the bog area, and also keeps it dry (but they're not very effective when dropped from 10m onto a waterfall, Simon!).

Carbide is best carried down in a strong waterproof container. Plastic jars big enough for 15-20 man-trips are easily obtainable in Spain although two smaller containers spread the load better. They can also be used for carrying the spent carbide out again.

Lighting at the camp is best provided by candles as they are easier to carry in than carbide. How long they last depends a lot on how draughty the camp is. Carbides can be left to burn out providing extra light (beware of sooted up jets though). Use a helmet light when traipsing off for a crap - it leaves both hands free. Lamp spares should be left at the camp, along with a torch.

A first aid kit, including anti-diarrhoea pills, pain killers, bandages and antiseptic cream is necessary, as well as a mending kit for shredded oversuits, and spare pairs of gloves (assuming the type of caving demands gloves, as Xitu most definitely did!).

An alarm clock of sorts must be taken down, to prevent anyone from sleeping for 24 hours and thereby getting out of doing any surveying.

Carrying

Gear is carried down in tackle bags, the large two strap variety being the most convenient (in Mulu just pack a rucksack and walk in). Everything should be wrapped in at least two thick polythene bags (bin liners) to keep it clean and dry(ish!). Put unbreakable things such as sleeping bags, clothing and carbide containers in the base and on top, with the more fragile items such as stoves and some of the food well padded with extra clothes in the middle. It may seem obvious but try to ensure that all the bags are of similar weight - having several very

light ones and one weighing over 50kg makes handling them on climbs very awkward, more so if the lightest person has the heavy bag.

General Points

The length of camping trip must be decided in advance. We found two night trips the best. 3 night trips (2 trips beyond the camp) left everyone very knackered so that the exit from the camp could become dangerous. It always seemed to take 3 hours from waking to actually leaving and about 2 hours to get to bed after arriving back in camp. This should be noted in the planning. The most important thing is getting a good 8 hours sleep - even if you get to the camp at 6 or 8 a.m. still try and have a reasonable sleep. One gets ' out of phase' , sleeping during the day and caving at night which is knackering in itself, but not as bad as insufficient sleep. If you do manage to keep to ' normal' times so much the better, you won' t be so tired.

Jan and Keith at the Camp

Excreting (or crapping, to the plebs!)

Don't try to save it up, or take stop pills as you'll only get caught short in a very inconvenient place without any bog roll - like on a ledge between two wet pitches. Try and go in the 'morning' or 'evening' at the camp - this happens quite naturally anyway once you're used to camping. (Ed's note: One of the contributors has scribbled "make sure that you have lots of spare pairs of gloves" at this point in the original.) Once again, it is absolutely essential that no crap gets into the stream if people are to be able to use the water below the camp.

Water Supply

This may sound trivially obvious but you should use the stream at the camp in the following way:

a) The place from which water is taken to drink should be furthest upstream. Better still, use an aven or inlet.

b) Next furthest upstream should be the washing up place.

c) Just downstream from that should be the place where you wash your hands first. You can wash them again at b) if you feel like it.

d) Furthest downstream should be the place where you pee. This is OK to do in the strean but once again you must never get human excrement in the stream. Bury it unobtrusively in sealed bags well out of the way.

If you want to wash gear or lamps out in the stream do it between c) and d).

Conservation

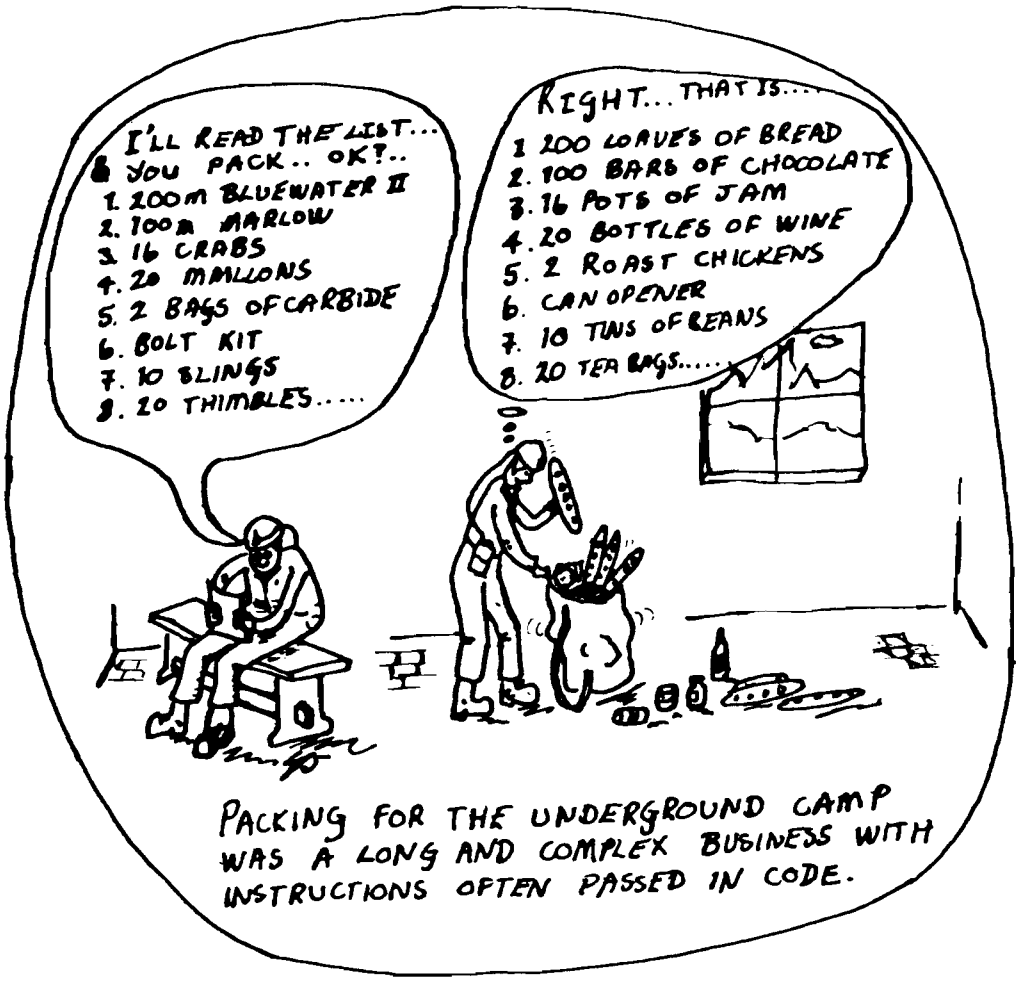
Finally, carry as much of your rubbish and carbide out as possible. If you can't manage to do this with some articles, bury them under boulders as deep as possible.

Typical List of Food etc. Taken down by a Four Man Two Night Camping Trip

Two large "Batchelors" catering packs of stew (or curry etc.)
A tin of mashed potato mix or pasta
Two packets of dried soup
Two tins of "Mornflake" oats
A chorizo sausage to chew
A "Five Pints" container of milk
About 2lb of sugar
A dozen tins of sardines
About ten bars of Spanish cooking chocolate
A packet of biscuits
Eight small Spanish munchy chocolate things
Raisins
About three "Bluet" cylinders*
Small container of salt
Two tinned bog rolls
Six spare petzl batteries
About two dozen pedal bin liner bags (guess what for)
Large container of carbide
Six candles
Spare Damart undies for four
Matches

All of this fits into two "Mulu" bags with the appropriate packing

* - we used about two Bluet cylinders per camp but it's always best to take down too much rather than too little. The same applies to sardines.



EXPEDITION MEDICINE: HOW TO PLAN IT

In the 1981 Expedition, no-one was badly injured or seriously ill. This is how the Club Medical Officer helped to bring this healthy state of affairs about.

Before We Went

Most of the things that prevent people from caving on expeditions (apart from laziness) are not serious - of the serious things that can happen, the most likely is an accident: the most likely sort of accident is a road accident (if you cave safely!). The reason to really worry about road accidents is not only the inconvenience to the expedition, but also because of the expense that may be involved. A lorry driver was recently released after four months in jail because an Arab driver killed himself driving into the back of his stationary truck. He was jailed because he was not insured. The most important part of expedition medicine is ADEQUATE INSURANCE for the members: imagine the cost of helicoptering a casualty from the advance camp to an N.H.S. hospital - you might not want to take advantage of local hospitals, especially if you're outside Europe.

The next most important thing is immunity from infectious diseases. By far the most important of these is malaria, because you are so likely to get it if you do not take anti-malarial tablets, and because it is serious. Other diseases can be prevented e.g. Typhoid, Cholera, Yellow Fever, Hepatitis, Rabies. Smallpox inoculation is now no longer required for any country. Of all these 'jabs' the most important is polio: be certain that every member is immune: the other diseases are either treatable, not serious, or (in the case of rabies) preventable after the event.

Whilst We Were There

Most of the problems encountered are very minor, but nevertheless they can prevent people from caving. The things which did this were knees, elbows, festering cuts, sores and piles. We had few cases of diarrhoea - probably because we cooked nearly all we ate and drank spring water.

1 Festering Cuts - the 'Ario Festers' - are an occupational hazard. They seem to be caused by splinters of quartz and my own cuts healed rapidly if I cleaned them well - on subsequent expeditions I shall take several tweezers!

2 Knees and Elbows - get cut, swell up, hurt etc. Part of this is the 'way you cave'. The caving was much tougher and there was more of it, so knees and elbows needed more care and better protection. One of the great successes of the medicine box was to pad and dress a gaping hole on someone's knee - about the size of a cup - with the result that it healed over whilst the person in question continued to kneel on it when caving. This wound was clean - another one became an abscess: it wes helped along by a Shepherd's remedy of a boiling hot salt and vinegar compress, application of which caused a great deal of amusement! This abscess was lanced and drained, and the sufferer went caving the next day, having been unable to walk before! Another problem was 'bursitis' - a fluid-filled bag which develops over a joint which has been subjected to too much pressure. In the knee, this is 'housemaid's knee' - in the elbow 'olecranon bursitis'. This can only really be cured by rest, but aspiration of the fluid and possibly also injection of steroid (in which case you have to be sure it isn't an abscess).

Lastly, cartilages in the knee may 'go', resulting in inability to straighten the leg. These never heal, but sometimes the broken bit of cartilage can flop out of the way. The knee should never be forcibly straightened as this can wreck the knee. Only an operation to remove the broken bit of cartilage sorts this out, and this is best done in England.

3 Piles - apparently the majority of people suffer from piles. Maybe they were common on OUCC expeditions because of straining whilst caving plus constipation (due to diet and dehydration). Steroid cream, local anaesthetics and a high fibre diet (or a laxative) are the best expedition treatments.

4 'Jock Rot' - a condition maybe unique to caving, where a tight sit harness, worn for over twelve hours at a go, plus sweat and sand, erodes away the skin. It is unclear if this condition is confined to males, as we had no women underground that long (you can't win them all). This was effectively cured by talk (on the surface) and by not wearing underpants beneath the furry (underground). Make sure that you buy an easily adjustable sit harness!

In summary, we suffered from only simple ailments in Spain. We had quite an ample medicine chest, and also a reasonable rescue kit (I.V. fluid and antibiotics, powerful analgesics, splints, superb sleeping bags, stretcher, Paul's tubing, soup etc.). We used the medicine chest for very minor ailments, and never used the rescue kit at all. Safe caving is worth a thousand rescue kits, and was the most important feature of our remaining well in Spain. We were also well because we were Insured and because we were Inoculated.

R. Gregson

HYPOTHERMIA FOR CAVERS

Introduction

The normal body temperature is about 37°C. Accidental hypothermia may be defined as a spontaneous decrease in the core temperature of the body, usually in a cold environment and without any malfunction of the temperature regulation centre of the brain.

Stages of Hypothermia

At core temperatures of 33-34°C the victim is usually alert, well orientated and co-operative, but as his temperature decreases, drowsiness, difficulty in understanding, slow responses etc. begin to become apparent.

32-34°C	his speech becomes slow and slurred
30-31°C	he is rousable and will speak
28-29°C	he can still answer questions correctly but often only after a long delay
27°C	he will usually only grunt when questioned
26°C	he is comatose

At this point the victim's blood pressure may be unmeasurable, his pulse very slow or undetectable (not necessarily absent), his breathing very shallow and infrequent. Below about 32°C he will cease shivering and may go very stiff as in rigor mortis. His pupils may be fixed and dilated, and he may appear to all intents and purposes dead.

Note carefully that people have been revived from core temperatures as low as 17°C and so the dictum must be applied that no-one is dead until they are warm and dead. Many hypothermic patients have only been diagnosed as such on their way to, or at, the mortuary.

In any situation, early recognition is important. The initial signs are fatigue, weakness, stumbling and general slowing down, and lack of co-ordination. There may also be apathy, confusion or aggression. Shivering may not occur, especially in heavy physical activity. As the victim's temperature drops, judgement and reasoning are impaired. These symptoms are almost always associated with exhaustion in a mountain or caving situation.

Physiological Consequences

There is a decrease in the victim's basal metabolic rate; this may be 50% of normal at 28°C. The heart rate and cardiac output decline. The blood pressure intially rises and then falls gradually. This is because as a consequence of hypothermia, fluid is lost from the blood to the tissues, and so in effect the blood volume is lowered. The body can counteract this by closing down the blood supply (vasoconstriction) to the less vital areas of the body, particularly the skin, which of course also minimises heat loss from the same. The peripheral vasoconstriction may cause a temporary rise in blood pressure, but this mechanism becomes less effective as blood volume is steadily lowered in continuing hypothermia.

The blood supply to the brain drops by 6-7% for every 1°C drop in core temperature, which accounts for the decrease in mental ability.

Initially, the muscles can provide a large amount of heat by shivering when the core temperature is in danger of falling.

What to Do

As soon as the first symptoms are recognised in a member of the party, it is time to turn round in a cave. First, stop, let the victim

have a rest and something to eat, and if he is in wet, inadequate clothing, if possible exchange it for something better from another member of the party. However, it is worth remembering that if one member of the party is affected, there may be others.

Then, if the victim is able, begin to make for the surface. Lighten the victim's load by carrying his ammo. box, tackle bag etc. Do not make the victim travel faster than he wants to but try and keep on the move. Exhaustion exacerbates the hypothermia.

If it becomes apparent that the victim is not going to be able to get out under his own steam, or you are worried about his ability to climb a large wet pitch, then lose no time in summoning the Cave Rescue Organisation, as an exhausted hypothermia victim is ripe for a catastrophe on a pitch.

Whilst waiting for aid, try and insulate the victim as much as possible, using whatever is available. The heat loss from an unprotected head is considerable: at 4°C up to half the body's total heat production is lost from the head, so do something about this if you can.

Obviously a Space Blanket is useful if you have one. The victim should lie down, preferably with his head slightly lower than his feet, and he will lose less heat curled up in a ball. Avoid close contact of anything hot with the skin, as this will cause vasodilation of that area, resulting in a drop in blood pressure and a shunting of cold blood from the extremities to the core.

The provision of heat by the buddy technique - where if a sleeping bag or space blanket is available, the victim and another person get in it - is not regarded as being very efficient. Moreover, the buddy technique is theoretically unsound because it constitutes a form of partial external warming, but there is no firm evidence on which to judge its efficiency or dangers.

Do not give alcohol, as this makes the problem worse because it is a vasodilator and a central nervous system depressant. This will cause the victim to lose more heat from his skin, and also lower his blood pressure even more. It also lowers the blood sugar and suppresses shivering. If the victim appears to cease respiration, then give mouth to mouth resuscitation at about half the normal rate (about 8 inflations/minute).

The indications for closed cardiac massage, however, are in dispute. Although a victim may appear pulseless, this does not necessarily mean he does not have a pulse.

It is known that mechanical stimulation to a cold heart may cause it to fibrillate. Also, cardiac massage often fractures ribs, which may instigate unnecessary complications.

On the other hand, if the victim's heart has stopped, or he is already in ventricular fibrillation, then cardiac massage may help.

On balance therefore, it would seem to be better not to give cardiac massage, especially in a caving situation where it may be very difficult to do or maintain.

The maintenance of adequate blood pressure, and blood supply to the brain is all important. Therefore, when transporting the victim out of the cave it is important to carry him head down whenever possible, so gravity assists the supply of blood to the brain. The victim should naturally be carefully watched in case he vomits and obstructs his own airway.

Treatment on the Surface

There are two basic ways to warm a victim up - one by passive rewarming, where the patient is put in a warm bed in a warm room and hopefully does the job himself, or secondly by active rewarming where the patient is physically warmed up quickly. Hospitals have various sophisticated methods of doing the latter, but the only way available outside of a hospital is to put the victim in a hot bath.

Some rescue organisations do have a portable inhalation rewarming apparatus and this is the only practical out-of-hospital core rewarming technique yet developed.

Mortality rates in accidental hypothermia during rewarming methods range from 30-80%. Different rewarming methods remain a controversial area in hypothermia management. Concern has been raised about the efficacy of actively rewarming the body surface because of the inherent physiological changes which may aggravate the effect of hypothermia on core tissues. There is a well described 'afterdrop' of core temperature after the removal of the subject from his cold environment. This afterdrop may be exaggerated by the peripheral vasodilation which is associated with vigorous external rewarming and causes paradoxical central cooling. This occurs because of shunting of cold stagnant blood from the periphery to the core, thus further chilling the heart and increasing its liability to failure, which is the ultimate cause of death in hypothermia.

However it is generally agreed that for young healthy adults subjected to relatively short periods of cold, without having suffered cardiac or respiratory arrest, active rewarming is probably best. For long term hypothermia victims, slow, passive rewarming may be better.

Active Rewarming

Rapidly rewarm in a bath of hot water at the following temperature:

41°C if conscious or naked

45°C if unconscious or clothed

If no thermometer is available, 41°C is about as hot a bath as you would like to get into. Remember that when the victim is put into the bath, the water immediately cools down and needs warming up again. Only the torso should be immersed to minimise the afterdrop. If the patient suddenly deteriorates after being put in the bath, i.e. starts having a fit or convulsions, take him out of the bath, lay him on the floor and raise his legs to help re-establish an adequate blood supply to the brain.

After about twenty minutes in the bath, the patient will hopefully have improved, his core temperature will have been raised and sweat may start to appear on his brow. At this time lift him carefully out of the bath with the body horizontal and head lower than the feet, and put him in a warm bed under blankets, still with the head lowered.

There is a serious danger of cardiac arrest if the patient is moved awkwardly, or also the risk of the patient having convulsions caused by lack of blood to the brain if the patient is kept in the head up posture necessary in the bath.

In prolonged hypothermia the plasma volume is so low that rapid dilation of the peripheral vascular bed can cause an increased return to the heart of cold venous blood, which may further cool the heart and aggravate cardiac failure.

Passive Rewarming

This may be the only choice open to you in a remote situation. Experience with induced hypothermia has shown that even at core temperatures of 27°C the body can still produce enough heat to rewarm spontaneously, so long as adequate insulation is provided. A good sleeping bag in a warm room should be sufficient. The use of hot water bottles, electric blankets etc. should be avoided.

Prevention

1 Have a good large meal before going caving. A fry-up is ideal from a calorific point of view.

2 Carry enough high carbohydrate food (i.e. chocolate, sweets) and eat regularly underground.

3 For a wet cave, wear a decent wet-suit.

4 Keep the unfit, inexperienced and ill-clad away from severe, wet caves.

5 If in doubt, turn back.

Food for Thought

Pugh reviewed 23 incidents of accidental hypothermia in walkers, campers and climbers in Scotland, Wales and the Lake District. He noted that the casualties in four incidents were unusually thin, skinny individuals with little insulative subcutaneous fat. He also noted that in four other incidents women survived whilst their male companions died.

Reference Material

Reuler J.B. (1978)	Ann.Int.Med.89:519-525 "Hypothermia: Pathophysiology, Clinical settings and Management"
Leblanc J. (1975)	In "Man in the cold"
Keatinge W.R. (1969)	In "Survival in Cold Water"
Maclean D. (1977)	In "Accidental Hypothermia"
Haught and Keatinge (1973)	J.of Phs.229:87-97 "Failure of thermoregulation in the cold due to hypoglycaemia induced by exercise and ethanol"
Pugh L.G.C. (1966)	B.M.J.1:123-129 "Accidental hypothermia in walkers, climbers and campers: Report to Medical Commission on Accident Prevention"
Lancet (1972)	Severe accidental hypothermia (leading article) Lancet 1:237

A NOVEL ROPEWALKING DEVICE - THE WARSAW WALKER

As those that have read OUCC Proc. 9 may suspect, there have been interminable arguments in the club about rope walkers and rope walking versus sit-standers and petzl jammers. To summarise for those lucky enough to have missed out on this prolonged infighting, I have drawn up this table:

Item	Pro	Con
Rope walking	Quicker on big pitches. Less tiring.	Intricate system required. Slow on short pitch since putting on gear requires long time. Starting off causes some people problems.
Sit Stand	Simple. Quick on short pitches. Easy to rest.	Slow on big pitches. Overhangs difficult.
Gibbs type ropewalker	Strong. Grips on muddy and icy rope.	Needs to be dissembled to put on rope. Bits are separate and can be lost.
Jumar type spring can jammer	All one piece. Easy to put on/take off rope.	Can slip on muddy etc. rope. Some types subject to spring failure.

I emphasise that I do not state these to be true, merely that this summarises the arguments that I have heard. However I do agree that Gibbs type devices usually grip better on a muddy rope and for this reason would be preferable, were it not for the compensating disadvantage that the seperate pieces of a Gibbs need to be chained together.

It was with some interest, therefore, that amongst a pile of mangled Krabs Dave Brooks was showing us in his lecture at the 1980 BCRA conference in Nottingham I saw a novel rope walker developed at the University of Warsaw, which had run off a batch of about 500 of them. This particular one was slightly bent in the testing procedure Dave had put it through, but other than saying that it was 'surprisingly strong' no comment was passed on it. I found that rather puzzling since this highly innovative device was a single piece. There were no strings to snag, bog chains to break, wires to bend, holes to clog with mud or parachute pins whose balls could drop off. Fired by enthusiasm and with mental images of me shooting up Flat Iron, overtaking the sit standers and pouring scorn on the rope walkers who were pouring scorn on the sit standers, I borrowed this thing, took it to pieces (the essence of scientific technique is to take something apart to understand how it works and then why it won't when you've reassembled it), sketched it and took the drawing back to Oxford.

On getting back to Oxford I showed the blue print (actually a grey print since they only let me use pencils in here) to an engineering friend of mine, to ask his advice on constructional details. When he'd got back onto his chair (I can only assume he had swooned at the excellence of my T.D. and that he was holding his sides and shaking merely to improve his breathing) I showed him which way up it should be and which of the grubby doodlings he was supposed to be considering. We then got down to a discussion of the how, what and whys.

Since the device has effectively only got one side (see figure 1 for overall view) I was worried about its bursting strength. I therefore wanted to use a thickish (about 3/32") piece of stainless for the

sheath. Being a practical chap, however, Phil pointed out to me that I had to bend it and that I would be better off using a thick piece of Dural. The advantage of Dural is that it is less dense than stainless steel and, since the bending moment is proportional to thickness squared, doubling the thickness would increase the bursting strength whilst reducing the weight of the sheath. Since the flexural modulus of Dural is greater than 50% of that of stainless I could make a stronger, lighter sheath by using thick Dural.

This I did and then made the cam, again of Dural (it's light, cheap and there's plenty of chunks of it knocking round our workshop) and bolted the whole lot together with a 3/8" stainless steel bolt, hammering over the threads and then covering the lot in Araldite to fix it and smooth it over at the same time.

With my nice new shiny ascenders in my paw I trotted off to test the things out on one of the trees surrounding Alum Pot. (I chicken out of a 220' freehanging pitch on untried ascenders. It's an allergy I've got called safety.) The system I used them in was a standard ropewalking system - one Warsaw walker on my ankle, one on my knee and a Lewis ascender on my shoulder with a Howie belt.

They ran up surprisingly smoothly - I didn't need any weight on the rope to start off. Then the acid test - how easily would they accidentally come off the rope? I sat down 15' above the ground with all my weight on my top (Lewis) ascender (i.e. no weight at all on the Warsaw walkers) and then I got Martin to vigorously shake the rope. I wasn't sure whether he thought he was skipping or whipping but the rope flew around for about a minute and both Warsaw walkers stayed on the rope - success!

How they work

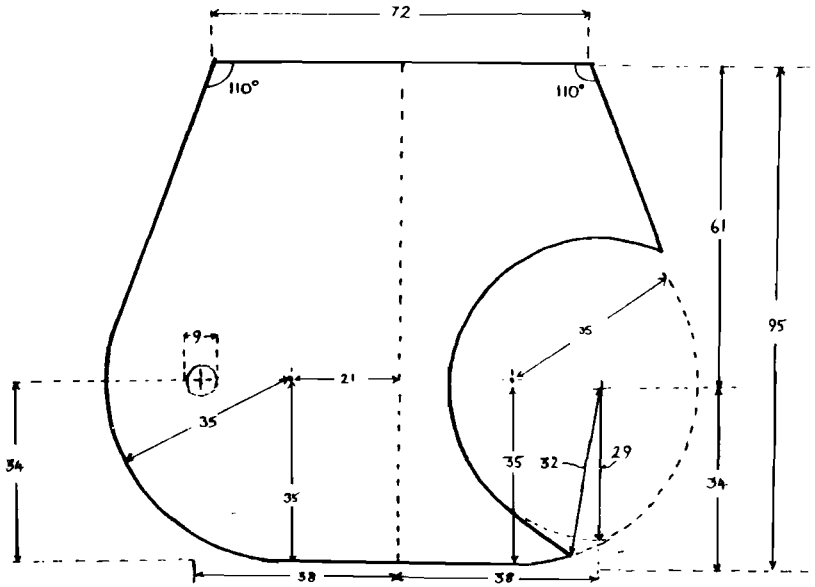
As you can see from figure 1 the sheath looks like a Gibbs sheath from which a circle has been cut, and the cam too is like a Gibbs with a chunk cut out (this in fact could be a way, albeit an expensive one, for someone with limited facilities to make a Warsaw walker). To put the device on the rope:

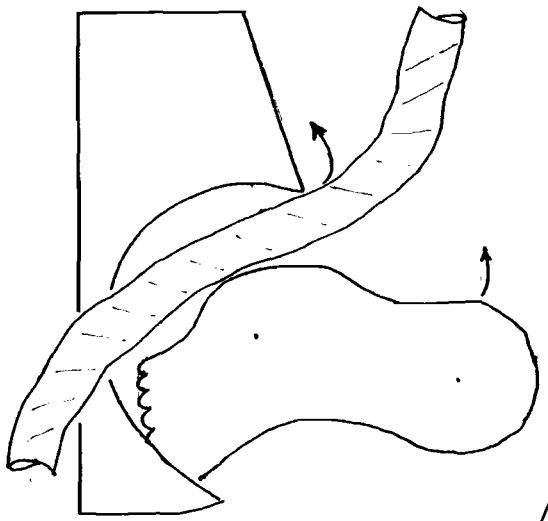
a) pull the crab hole up, lie the upper part of the rope along the top of the cam and thence hook it inside the sheath (figures 2,3).

b) pull the crab hole down, lie the lower part of the rope along the underside of the cam and then hook the rope inside the lower lip of the sheath (figures 4,5).

To take the device off the rope the process must be exactly reversed.

In Spain I found these gizmos to be very good indeed. They did wear a bit so that I had to perform the usual tricks that rope walkers do to start off on a pitch - maybe a more advanced bearing and more attention to the top toothed part of the cam would improve this. At no time did these things come off the rope, except when I took them off - all in all they performed very well. Some people may wish to make a hole or two in the sheath to fix elastics for rope walking - that's easy, but you should remember that if you fix both ends of the elastic to the cam you must fix them both to the same side of the sheath otherwise you need to undo the elastic when removing the walker from the rope - defeating the object. Finally a few points in conclusion, some obvious and some maybe not.





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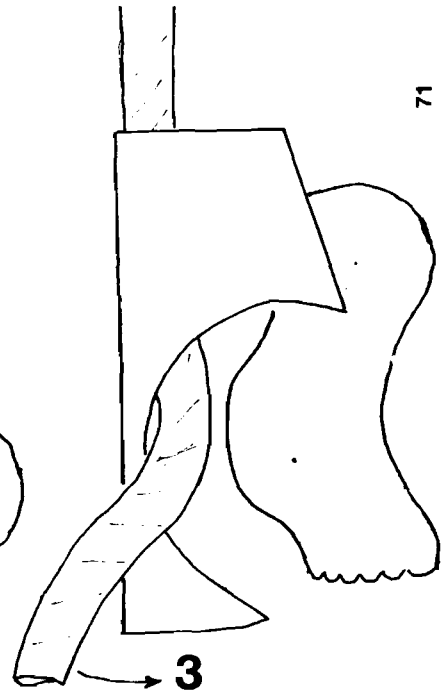

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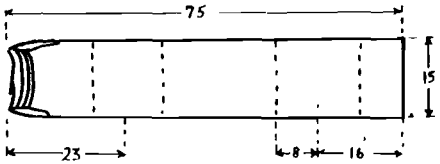
cam



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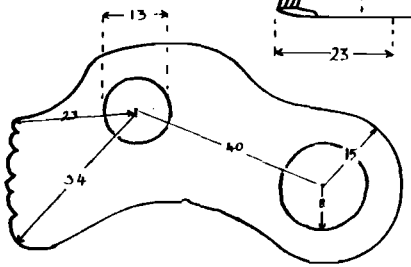

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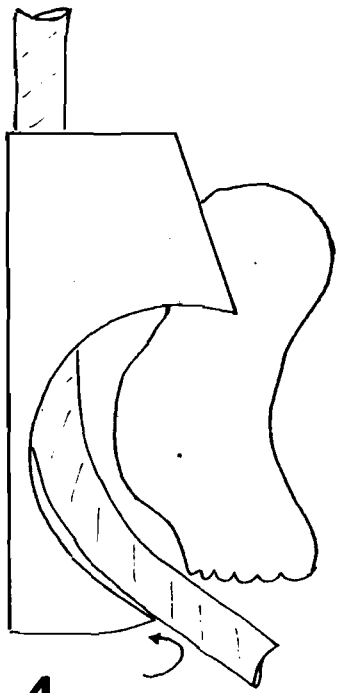

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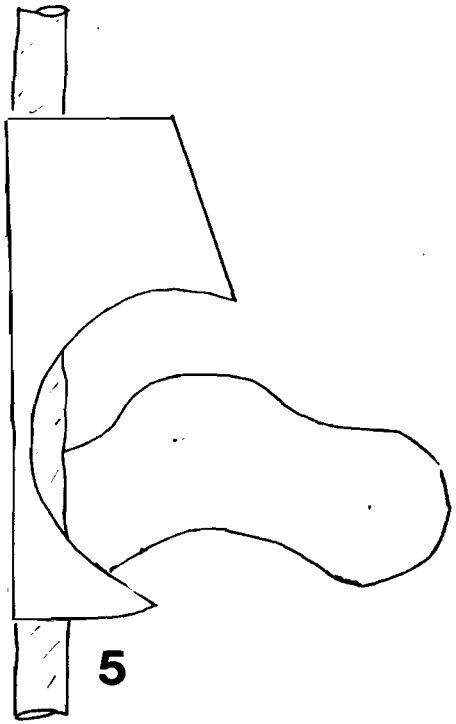

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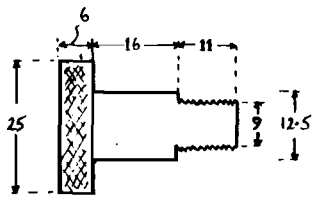
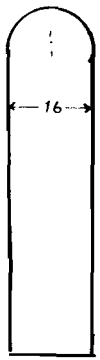


pin

1

All dimensions in mm

former

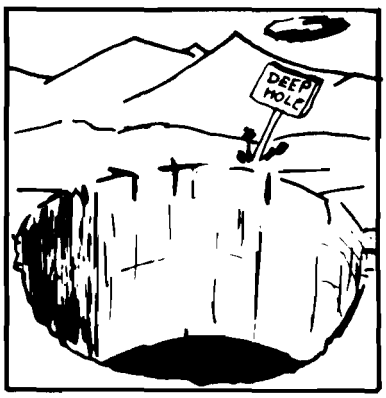


Pro: All one piece - no bits to lose.
Can be put onto rope whilst still attached to you - no dropping them down pitches.
Work like ropewalkers - i.e. on muddy and icy ropes.

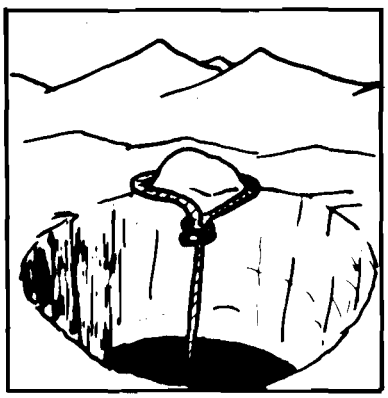
Con: Cannot be used for self lining - I haven't checked the bursting strength but I guess self lining might be pushing it.
Cannot be used on shoulder - you can't get them off the rope if your weight is on the rope below the device (I didn't have any problems on Flat Iron though with the weight of 100m of rope below) - Even though they never come off in use I reckon a petzl or Gibbs on the shoulder makes me feel safer (a petzl made more sense since the whole point is to eliminate Gibbs). (Ed's note: As a successful ropewalking caver, I'd like to comment on this point. 1) I can't think how you'd mount a Petzl on your shoulder so that it would run up the rope easily and hold you close in to the rope. 2) Neither the Petzl nor the Gibbs are as efficient a device for the shoulder as an ascender containing rollers, e.g. the Lewis (Caves and Caving 13 p.26). It's philosophically pleasing to consider a system with three one piece ascenders but I think that the loss in efficiency due to the Petzl on the shoulder would outweigh any of the advantages.)

Note: Don't bend your own sheaths unless you either know exactly what you're doing or, like me, can get the things crack tested.

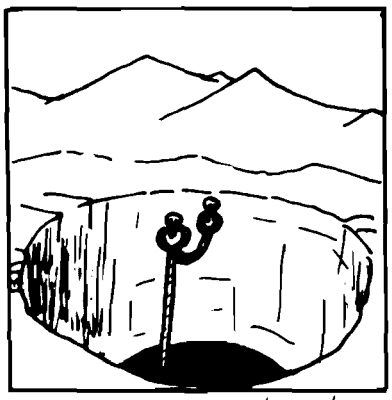
BELAYS ... & HOW TO RECOGNISE THEM.



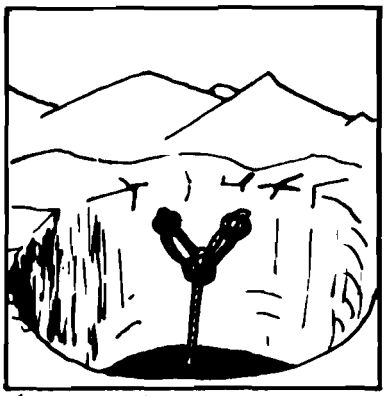
1 No rope or belays.. pretty dangerous.



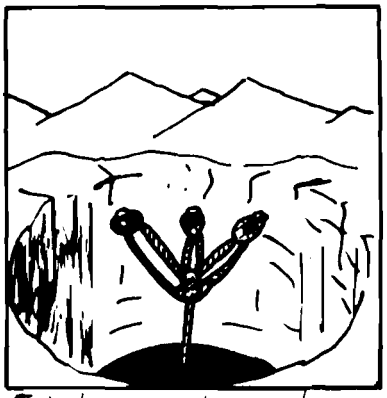
2 The natural belay. Good.



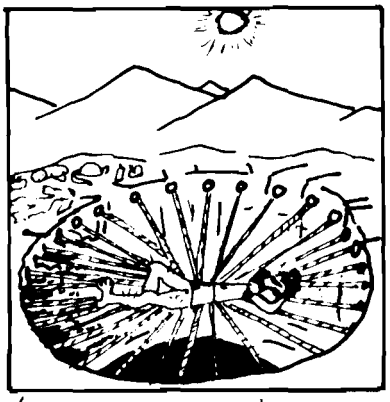
3 The single bolt plus a backup.



4 Load shared between 2 bolts Probably better than 3. but certainly better than 1.



5 Why not share the load between 3 bolts? It takes longer to rig & uses lots of rope.



6 The 'ultimate' in belays — the **OUCC. WEB*** belay!

* PATENTED WORLDWIDE

Full details below....

THE OUCC WEB BELAY. (LIFETIME GUARANTEE!)

Advantages:- 1. Uses all the rope so no chance of any caving today.
2. Uses all the expedition bolts so no chance of caving any where else.
3. Belay completely blocks all access to the cave.
4. Takes all morning to rig — leaving rest of expedition for serious sunbathing. (As illustrated). Features cave draught cooling.
5. A miniscule load on each bolt means that you can dispense with a strong SRT rope and bolts. Use BLUTACK and cotton.

Disadvantages:- 1. In tropical regions large spiders have been known to get jealous.
2. Sunburn is a hazard.

A SURVEY OF ABYSMAL ETYMOLOGY

Fundamental Principles

Names are useful things. They are usually more than mere identifiers and the study of the history of individual words is etymology. Here, it is not intended to analyse the etymology of 'etymology' or anything as mentally deep as that but to give the light of day to some pretty darkly obscure meaning behind the names of some caves and the passages in them. The bestowing of such names is one of the lesser sung joys of exploring new passages, or sometimes of just being landed with completing the associated reporting and surveying. Many approaches have been adopted; a few are illustrated in this article and many in caving literature as a whole. To start with, let's look at some rules of nomenclature.

Rule 1

Some persons perpetuate puns upon passages, possibly perplexing people.

Rule 2

In view of Rule 1, rules would be unworkable. Therefore, there are no rules.

Rule 3

As there are no rules, this might sound silly; but the Union Internationale de Speleologie thought of it, so Rule 3 is: 'The names of each cave or system should be stated in the language or dialect of its area. Synonyms should be indicated, to avoid confusion, as should the names of different entrances. Whimsical names, such as those of discoverers or explorers, should be avoided insofar as possible.'

Back to Boring Basics

One can be totally objective if one wants to. This can be very boring (The Streamway), or not so boring (The Big Chamber Near the Entrance), or not as boring as it might seem (The Borehole). Boring bits might in fact have rather good names as there wasn't a lot else to keep the explorers' minds busy except thinking of names. This doesn't always work though - no one could think of a suitable anagram during the exploration of Anagram Passage.

Dedication

To become immortal it helps to die. Adamson, Boireau, Frakes and Ogden were all unfortunate enough not to live to see this in action. Also Loubens and Plumley. You might manage this status less tragically, however, as did Hardy after his Horror, Colin for his Climax or Calamity. You might even just be able to grab lots of glory through publicity - especially if you're French (Casteret with his Grotte, Martel with his Gouffre...) or an explorer's girlfriend (Puits Josyanne in PSM). It is to be hoped that no one wants to call a cave in Ireland after an Ox (or even the Ox which is OUCC's alma mater) because, despite classical allusions to Castor's twin the Poll so dedicated could produce misunderstandings after a good night's drinking... More poetic is Lady Blue's Underwater Fantasy. Another type of dedication is revealed by names such as Stemple Rift, Blasted Hole and Fat Man's Agony.

Some More Ploys - Show Biz

Can anything top Salle Today Night's Fever?!

The Classics

Pluto's Bath, Vulcan Pot and River Styx and names of that ilk recall one age of literature; the 39 Steps another; and Shelob's Lair, Rivendell, Gandalf's Gallery etc. perhaps the most popular of late.

The Truth

Various ploys can be adopted here using:

a) The Date

Whitsun Passage, Easter Grotto, Christmas Hole.

b) The Obvious

La Cueva, Cueva del Rio, the Dark Cave belong here.

c) The Passage's Way of Impressing Itself on You

Razor Passage, Sore Knees Creep, Kneewrecker, Sahara Passage all typefy this ploy.

Lies

are an alternative, but usually come under "Rhetoric".

Figures of Speech

are very popular. Alliteration, hyperbole, litotes, onomatopoeia (Tinkle Crawl) are among the most used.

Rhetoric

Was it wet? or Estaba Frondosa? typefy this. (Ref: Caving International No.3 (1979), p.33.)

After seeing this minute selection from the rich hoards of cave and passage names already adopted, what did we come up with in Xitu? Read on!

Xitu by Name...

That the 1979 expedition didn't have much time for talk is shown by the lack of names bestowed in that year, although, as good followers of Rule 3, OUCC 1/5 became Pozu del Xitu after its position near the col known locally as El Xitu. Down the Entrance Series you go through Climax Rift towards the 19m via the Marlow, and then the Blue Water Pitches lead to Customs Hall (lots of barriers?), the Inlet and the Active Streamway. The Trench Pitches were only named when it emerged as necessary for the report, as was Cover Picture Aven. Only Chopper and Pearl Pitches were named beyond here.

In 1980, the previous year's bottom was passed on trips giving rise to the naming of Somme Climbs - partly due to them being in the Trench Series and partly to the near demise of certain climbers - and Happy Pitch, where Marvin decidedly wasn't. Boring people want to call it Grey Pitch. Dave entered Teresa Series for the first time - how this reflects on his girlfriend's past, posterity may speculate - and carried on past the sandy White Nile (no hovercraft or camels required) and New Orleans ('they call the rising sump...') to Servicio which was a relief before Constipated Blue Whale. The Gap in William's education was immortalised at the pitch which was so named while Graham has been immortalised for the trouble he had - and gave - at GBU. The Pilling potholer took a tumble at Pilling Slip and Kev's dream came true at an insignificant little puddle called Dream Lake. The Road to Rack Ruin - one for every

two trips - leads to Flat Iron which is F...ing Enormous (Fe, see?) and even more obscure in its complete etymology. The Eton School song is not often sung down deep holes so Eton Palais was named in honour of such a rare event. After the Boulder Chambers in which Combined Tactics is an interesting climb you feel pretty committed by the time you reach Lemmings Leap, leading by Samaritan Streamway to the Samaritan Pitches. The commitment shows in the way the Road to Damascus was not thought of. Veined rock and drops lead down the Marble Steps to the 'splashy' Dampturation Pitch followed by the right angle buttressed Pythagoras Pitch. PAFS pot is where Piles Arose From Suspension and leads to Cheesegrater - a narrow jagged rift - Choss-chock Pitch which was rather dubiously rigged and the final pitch of 1980 which was first ravaged by rope and tape - hence (?) Rape B'rape. Other 1980 explorations were the awkward upstream Traversity Streamway - a travesty of a streamway requiring much traversing - with its greasy Easy Slider section and Ming Series - something to do with vases although it certainly didn't lead to any monumental pots.

1981 saw the pushing of the main route down the Flier, named after an 18 hour BSC shift (it was found 18 hours in) and Ferdies Delight - another caving suit shredder to the Classic Numbers climbs before and after Campers Pot - the first fruits of the expedition from the camp at almost exactly a kilometre down. Cobblers pot was the "last" pitch in the cave, and Xitu's Last Stand was the final nasty section before the final easing up on the way to Stag Sump, where a Royal Wedding flag was left in celebration of the following day's events back home. Elsewhere, El Puritan was pronounced disgusting and a hazard to healthy living - but it did try to make men hard. Snowcastle was almost fairy-tale in its purity and beauty and William's Bits proved quite extensive, even including GOETHE Passage - the Greatest Oxbow Ever To Have Existed - an insignifcant grovel.

Exercise for the Reader

Identify the caves in which above passages are found.

Prizes for the Reader

The chance to completely resurvey Xitu or publish a second edition of this report.

AFTER THE BALL (OR RATHER THE EXPEDITION DINNER) WAS OVER

The Junior Dean stands in the middle, his heavies round about, Andy negotiates. I note a singular absence of other cavers, so contemplate the floor where all I see is a singular excess of the port I spilled some time ago. The negotiations reach a paroxysm of gesture and incomprehensibility whilst I consider my woeful inadequacy in coping with celebrating Oxford cavers. Little more than a year ago the same Andy led me out of Vézelay, past the Gendarmerie garden and the ritual urination, then all was crumpling flysheet and earnestly repeated gasps of "Riley's buggered the tent, Riley's buggered the tent!" whilst I made resolute attempts to enter the foot end of my sleeping bag...

...But, lo, we have a keg - have these negotiations succeeded? No, the keg is empty, but the ever-resourceful Andy decants from another one, while I try to focus my brain on some recent news story about a gang stealing aluminium kegs then melting them down. Of course, Andy is a metallurgist. The Junior Dean indicates we should leave. Andy takes one end of the keg, I the other and we leave.

"Let's go to John's"

"Yes," I reply, encouraged by this convincing evidence that he knows where he is, where he is going and the route in between.

This journey may have been within the powers of able-bodied men, but we are not able-bodied and after some hundred metres of erratic progress Andy decrees, "Let's throw it over this wall!"

"Yes," I reply, again impressed with the ambition of youth, though rather less impressed with 'this wall' which is about the height of the Pilling Slip and much solider.

"Heave!"

The keg performs a somewhat inebriate parabola, hits the mid-height of the wall, bounces off, bounces on my head and rolls off down the street. We roll dutifully after it. My brain begins to hurt very badly indeed but Andy is negotiating again. As usual tonight I cannot understand but lean against the wall which conveniently is still standing. Then all is simple: we have no keg and we are going to John's, Andy leading in a determined zig-zag. Where is the keg? Where is John's? Where am I? Why is my head larger on one side than the other? Why did I ever join this Xitu trip???

Keith Potter

Keith Potter, 22, died on November 14th 1981, whilst diving in Wookey Hole.

To us in the Oxford University Cave Club and others who knew him, his death remains almost incomprehensible. Not even his funeral, held near his parents' home at Wedmore, really brought home the fact that we would never again see him bounding into the bar during a midweek club meeting, or share his limitless enthusiasm for future trips, be they to Mendip, Yorkshire or Spain.

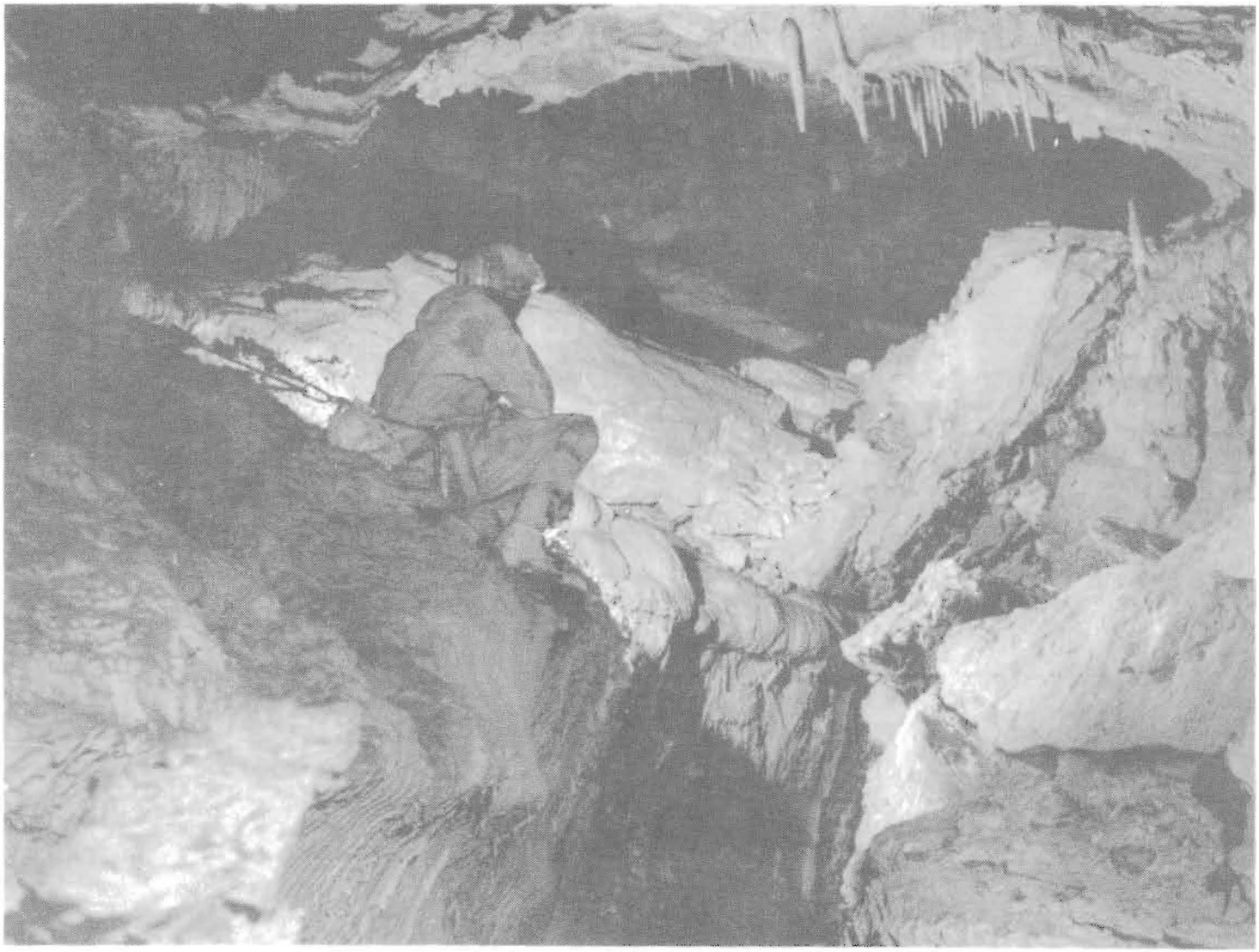
Keith's contribution to caving, especially in OUCC, was enormous. During the 1980 expedition to Pozu Del Xitu, he took part in many vital pushing trips, offering his companions encouragement and showing determination to continue where others were prepared to turn back. In even the most difficult circumstances, he retained his humour whilst remaining absolutely reliable: witness his amusing write-up of a trip in 1981, including in the tackle list his recommendation for spare crotches and limbs - this written after emerging from a 35 hour pushing trip into severe passages in which he sustained a knee injury and suffered agonising friction sores in his groin. Fittingly Keith was the first to reach Xitu's terminal sump and even here despite being tired and thoroughly wet, he showed his character typically, by spending hours searching for a by-pass.

Yet whilst without Keith OUCC might still be trying to bottom Xitu, he never took unnecessary risks: indeed his thoroughness and caution in unexplored passages could frustrate those less experienced team members, carried away with exploration fever.

No amount of fatalistic philosophising can begin to compensate for Keith's death. He was also a man of many talents outside caving: his Scholarship in medicine at Exeter College, Oxford was surely the first step towards realising his ambition to become a consultant physician.

Above all he was a tremendous colleague, a companion who will be mourned and missed by his many friends: left only with memories, they can only continue to extend their condolences to his family, and bid Keith 'Hail and Farewell'.

Dave Rose



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