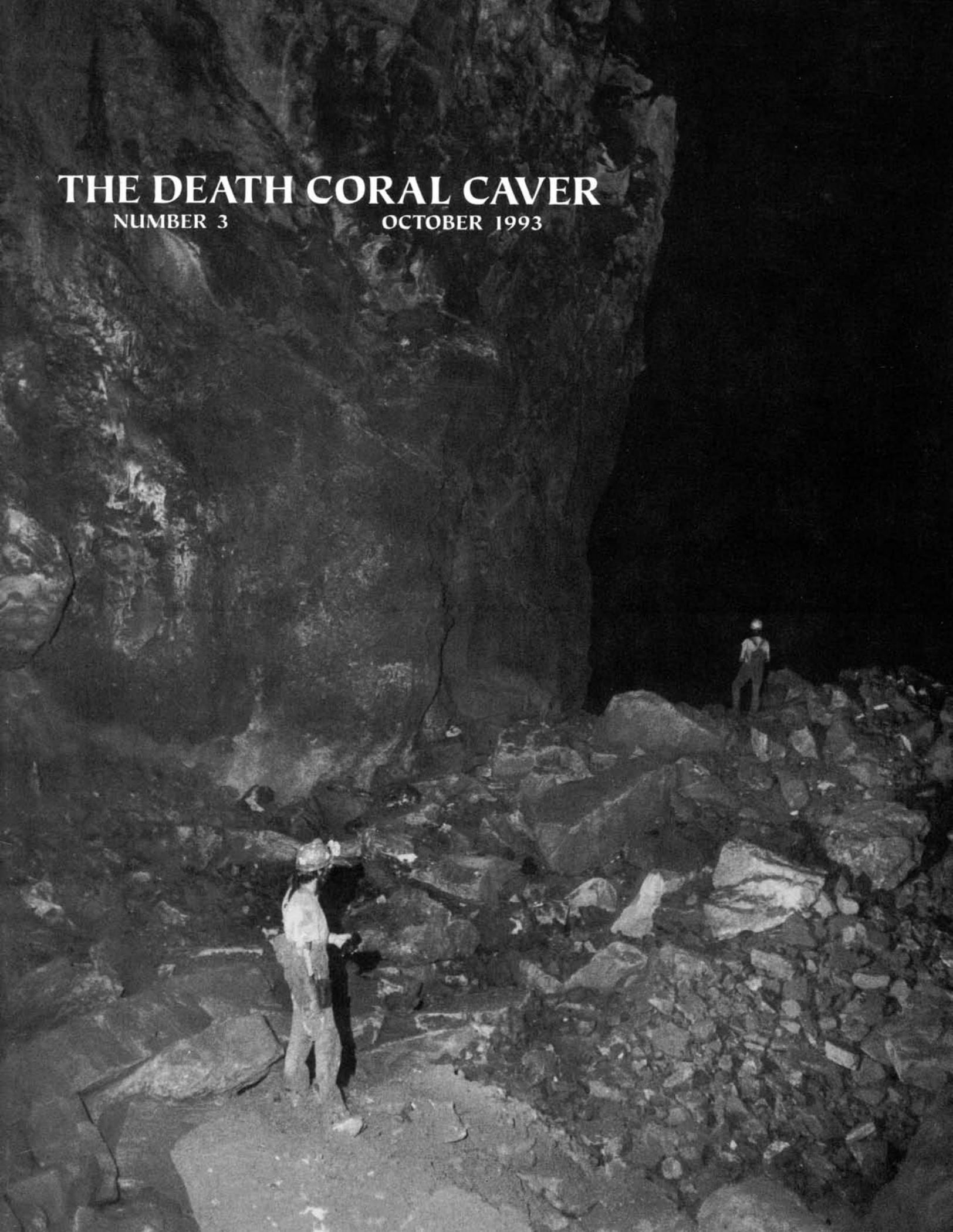


THE DEATH CORAL CAVER

NUMBER 3

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THE DEATH CORAL CAVER

No. 3 October 1993

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PHOTO CREDITS

Front Cover - *Charley Savvas and Bill Stephens light up part of the immense Cardassian Borehole. 1993 photo by Peter Sprouse.*

Inside Front - *Noel Sloan gives the MK4 rebreather a final check before Jim Brown's dive in the Left-Hand Sump. 1993 Photo by Bill Stone.*

Back Cover - *John Stembel does a socks-only rappel into the Road to Nowhere, flashed by Greg McNamara. 1993 Photo by Peter Sprouse.*

Inside Back Cover - *Joe Oliphant on Farpoint climb. 1993 Photo by Peter Sprouse.*

EDITORIAL

Speleology: the study of caves. That is how it is usually defined. Yet it is not just another "ology". The speleologist, or caver, has a peculiar passion, some would say obsession, you likely wouldn't see in say, a radiologist. It is, for the most part, not a profession, but an avocation: you don't graduate from a university with a degree in speleology. Certainly a biology or geology degree may be cave-related, but speleology is really a grass-roots science generated by cavers going caving. Cave research isn't so confined by the needs of commerce, it develops in an individualistic, yet orderly manner, not unlike caves themselves.

The PEP is frolicking in a grand adventure in speleology. We have in our laps a wonderful karst area with 20 years of caving tradition behind it. Piece by piece, we are building a detailed model of a huge mountain range and the labyrinth of tunnels which pierce it.

Peter Sprouse

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1993 TECOLOTE EXPEDITION

by Peter Sprouse



Bill Stephens flashes John Fogarty on traverse in Tecolote entrance series, before Fifth Drop. 1993 photo by Peter Sprouse

Tecolote - 28 kilometers long and going strong. After years of huge boreholes, and especially after the great discoveries of the 1991 expedition, this cave was nearing mythic proportions. How far could we push it? After some debate, we decided to go on and try to establish a Camp III closer to the frontier, rather than keep pushing from Camp II, a mere 5 kilometers from the entrance. The site picked for the new camp was at the You-Us Junction, another 2000 meters in at the base of the Mother of all Boreholes. The two years of planning were the most elaborate we'd ever done for a PEP expedition, and as the date approached we had a crew of 13 able cavers lined up. A month beforehand, David McKenzie, Charley Savvas, Cathy Winfrey, and I went up to rig the drops of the entrance series and to confirm low water levels.

The team members for the 1993 expedition were Tony Akers, John Fogarty, Andrea Futrell, Mike Futrell, Jack Kehoe, Susie Lasko, Chris Lloyd, Greg McNamara, Joe Oliphant, Charley Savvas, John "Rocco" Stembel, Bill Stephens, and me. After a day of dividing up group gear and packing camp duffles, we were set to head in for our 9-day camp. There was some uncertainty as to whether all would want to make the trip to Camp III in one day, so the option was held out to bivouac at Camp II if need be. After all, there was considerable time spent just changing clothes: wetsuits on for the Entrance Series, off at Ides March for the dry boreholes, on again for the the wet Chihuahua Freeway, then back to dry clothes at Megaland for the final leg to camp. Things went well, and after about 18 hours we reached the You-Us Junction. I was

relieved to find that it indeed was a suitable campsite. We were in a moderate-size borehole with enough flat gravel bars for sleeping, and with scattered pools for drinking and bathing water.

After a long rest, we were ready to start working a myriad of leads available from our centrally-located camp. Given that we had a day of travel on each end of the trip, and that not all of our daily cycles were 24 hours, we ended up with 6 work days in the cave for exploring and surveying new leads. I'll discuss this work area-by-area.

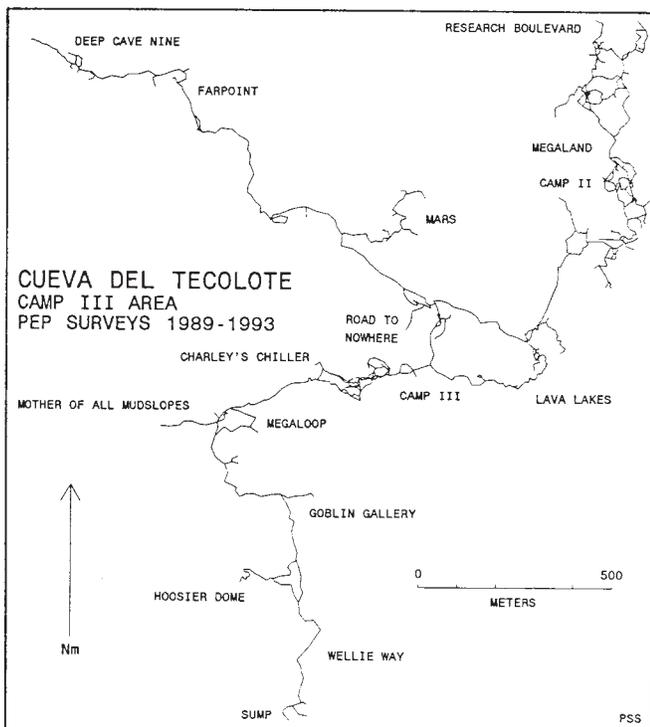
THE WELLIE WAY

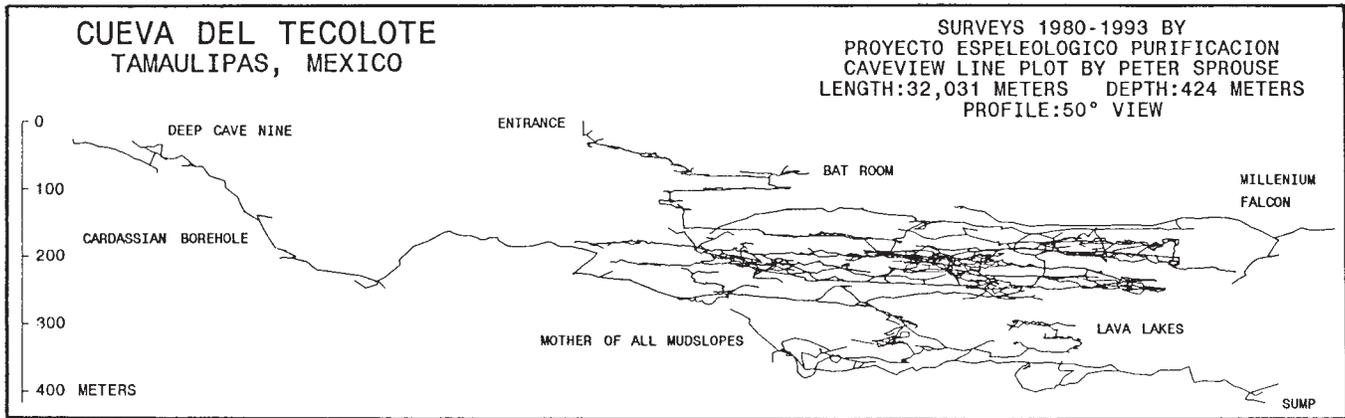
The Wellie Way had been the climax of the 1991 trip. It was the biggest passage in the cave, filled with huge mudbanks, and taking the cave's drainage down to the deepest point explored thus far. Clearly this was the most likely route to the presumed resurgence, still nearly 9 kilometers away. With numerous side leads to push, we decided to put the whole team out there on Survey Day 2. We set off from camp through the clean-washed Drutherhall to the tight and complicated breakdown maze. Since none of us had been there before, it took quite a bit of checking to find the way through, but eventually a way was found up into the huge beginning of the Wellie Way. Once the survey stations were sorted out, we split into four teams. At the beginning of the Wellie Way were three side passages. One had been mapped up a steep slope to the west for a ways by the '91 team. Jack, Susie, and

Andrea pursued this lead, naming it the Mother of all Mudslopes. Unfortunately it ended in an unpromising dome after only another 50 meters of survey. They returned to the Wellie Way to join John, Charley, and Greg in the pursuit of the other two large leads.

John's team had found that these two leads connected into a large Megaloop, with two pits noticed along the way. After Jack's team helped to finish the closure of the Megaloop, returning cavers Tony and Rocco were keen to check the new pits. First I rigged the one partway down the slope for Tony. Unfortunately the rope was not long enough, but Tony was able to see down into what was likely the breakdown maze we'd come up through. The pit at the top of the Megaloop slope seemed promising to bypass the whole mess of the breakdown, so Rocco set about rigging it. He felt like the rope wouldn't reach, but Charley said "so?" and went down anyway. Reaching the bottom, he at first didn't realize that he had indeed bypassed the breakdown, and proceeded to explore back down the Drutherhall. Eventually he came back to greet us as we emerged from the maze. We sent Charley back up the "Do Drop" rope to leave a note for the other team, informing them of the new drop which could be used for an easier route back to camp.

Meanwhile the other two teams had continued on down the Wellie Way. About a third of the way down the Wellie, Rocco, Tony and I split off at a lead on the left. This sloped up as the Goblin Gallery, but unfortunately pinched off in mud fill after 100 meters. We retreated to another side lead which did the same, afterwards joining the two teams at the Megaloop. On down at the end of the Wellie Way, Mike, Chris, Joe, and Bill had two leads to check: the steeply descending continuation and a lead-climb inlet coming in from the east. They headed down over a huge mud mountain, only to be stopped by a large sump. Then they attacked the inlet climb, with Chris setting two bolts. Mike finished it off, only to find that it didn't go either. They were discouraged at having finished off such a major lead, but did have a look at a side lead heading west on the way back. This led to a T-junction, with the right-hand lead looping back to the Wellie. The left way went to a sand pinch, then up to a lead-climb dubbed the Hoosier Dome. They left a rope for a later effort here, which was resumed on Day 5 by Peter, Joe, Charley, and Greg. Joe managed to toss the grappling hook onto something Charley was bravely willing to climb on. He was distressed upon topping out to see that the hook was caught only on a 1-centimeter gour! He continued up a steep flowstone slope, putting in two bolts to allow the rest of the team





to survey up. At the top, they found a complex bone-yard maze which eventually pinched with no way on.

Backtracking up the Drutherhall on Day 2, a large side lead was checked not too far below camp. This soon split, with the left way ending in a large room. The right way soon became wet, and the survey stopped at an overhung climb out of a lake. This "Charley's Chiller" was the object of a return trip on Day 5, but Charley was unable to get enough height with the grappling hook.

CAMP AREA LEADS

Charley and Mike had better luck with the hook in the Grandmother Borehole above camp on Day 1. They accessed a high ledge to a large room, and followed a slope up to a hands-and-knees crawl. This swung left to an area of nice aragonite bushes, Grandma's Cookies. A lead on the left went to a pit which presumably led down to another known pit lead off the Grandmother Borehole. They went to look at that lead but could not find a rig point on the mudslope. So they retreated to another side lead which resulted in a loop back into the Grandmother.

Another lead quite close to camp was the east passage from the You-Us Junction, Paul's Plunge. With Rocco declaring "we don't need no stinking wetsuits", he, Mike, Susie, and John set off to map 762 meters in 117 stations on Day 3. They were in and out of the water in dark, eroded flowstone, which earned it the name Lava Lakes. They were heading upstream toward a possible connection with the Throne Room area near Camp II, but skinny Mike found the water a bit cold without his wetsuit. Towards the end of the survey, it was splitting up and getting complicated, but kept on going.

Not far from camp were several leads in the Death Coral Borehole, which goes west off of the

Mother of all Boreholes. The second left-hand passage of the DCB was a great-looking lead-climb. Chris started work on it on Day 1, placing several runners and a bolt. Rocco then took his place and topped out on a muddy slope. Greg and I followed with the survey up to a short formation gallery. Here was a drop down into what I suspected would be the first left-hand passage off of the DCB called Road to Nowhere. I backtracked around to the Road to Nowhere and, sure enough, I could hear the others through a hole visible at the top of a spectacular striped flowstone cascade (*back cover*). Rocco and Greg completed the loop by rappelling barefoot, so as not to muddy up the stal. Farther along the Death Coral Borehole was another lead-climb which Greg had a go at on Day 4, essentially a steep mud slope. As he cut steps in the mud, he slipped and started an uncontrolled slide. When he tried to self-arrest with his plastic trowel, it broke in two, but it did slow him down, keeping his injuries to a scraped arm. This became known as the Trowel and Error. The next day John managed to finish this climb, but it merely dropped right back down to the DCB.

A more promising lead was the water hole. We had found this in 1991, a small tube off the right side of the DCB containing the only water in the whole area, where we were filling our canteens. I had squeezed past the pool for about 30 meters, and it continued with airflow. So on Day 3, Jack, Joe, Tony, and Greg ended up pushing it as an alternate lead. Naming the crawlway "Pay Your Dues", they kept at it until it opened up. This new section was reasonably large and rather complex, a series of flowstone rooms. After several hundred meters it seemed worth coming back to the next day. Now named Mars, the area resulted in another 200 meters of survey before running dry.

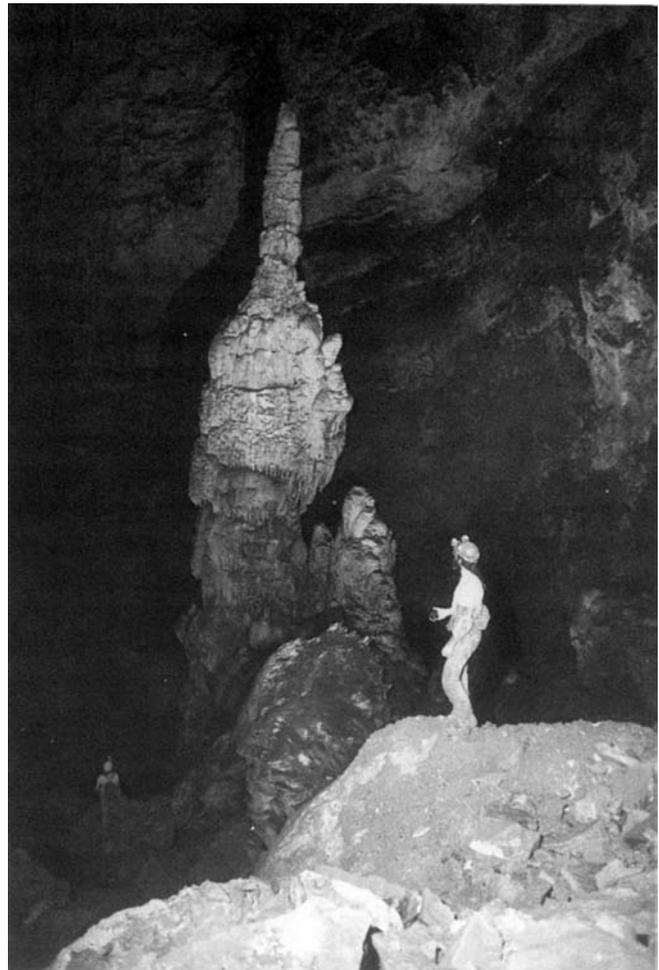
FARPOINT

The 1991 limit of exploration reached in the Death Coral Borehole area was Farpoint, a short overhung climb which only needed an easy lasso of a stalagmite. Two teams headed out to Farpoint on Day 3, with Jack, Joe, Tony, and Greg taking off into a steeply descending lead just before the end. They quickly found two dead-ends, and retreated to discover the aforementioned Mars section. Meanwhile Chris, Charley, Bill, and I went on to the Farpoint climb. Lassoing the 'mite was easy, and I climbed on up the short drop. Just ahead was another, so Charley came up with the Maxim dynamic rope to belay me. A couple of iffy pro's and a scramble, and I was up. I walked ahead around a corner to make sure that it went, then anchored the rope to a big totem for the others to survey up. Chris reconned ahead, leading us through a few short passages to a big sloping breakdown room, which we named Tinagra.

From there, the only way on was up the steep breakdown slope, angle of repose and 20 meters wide. This was a bit difficult for me to sketch, as all I could see when I looked ahead were looming boulders. But it was to get worse, meaning better. The walls drifted away nearly out of sight until the passage was a full 50 meters wide, and still climbing like a mother (*front cover*). The ceiling soared, and stalagmites up to 20 meters tall reached for it. We noticed as we climbed above the muddy flood-level mark of the Tecolote entrance water. We called this the Cardassian Borehole, a continuation of our "Next Generation" theme. Finally it levelled out at the bottom of a climb, with pure white aragonite everywhere. At the base of the climb two crawls led into wonderfully decorated alcoves. The climb itself was difficult to do, not



Joe Oliphant inspects helictites in Deep Cave Nine. 1993 photo by Chris Lloyd



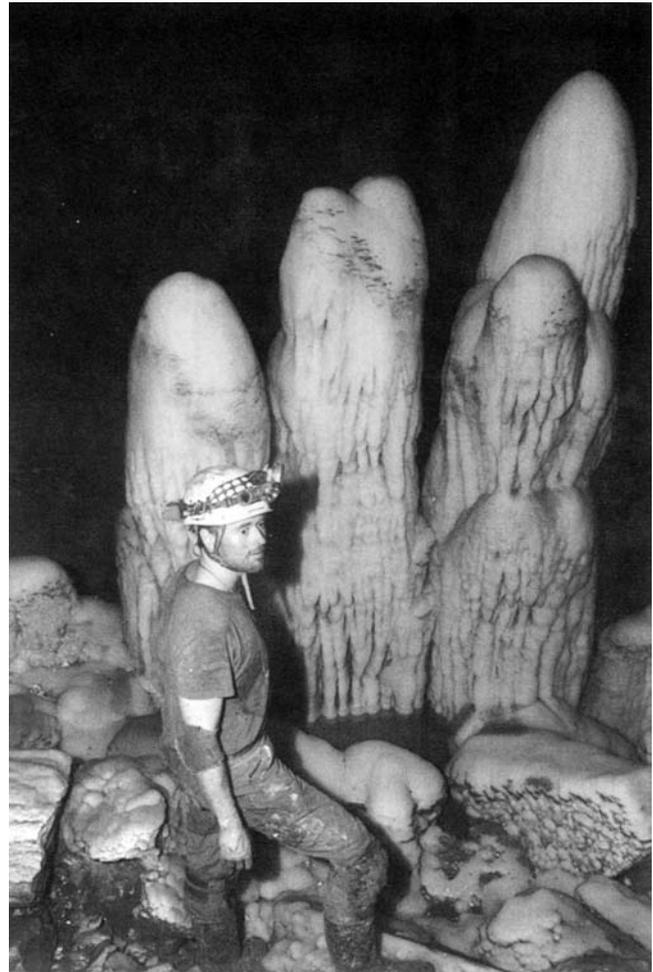
The huge Capitol formation in the Cardassian Borehole. 1993 photo by Peter Sprouse

technically, but emotionally, as it was covered with brilliant white crystals. Over the top the borehole dropped into a breakdown room with several side leads. None seemed to go, but one contained unusual displays of yellow sulphur and blue celestite.

Scrambling on up the breakdown slope in the main passage, we soon came to a drop into a large rift for which we had no rope. Bill did a level traverse along the right wall to access a side passage. He reported a complex boneyard area with spectacular helictites. Indeed, they were the best any of us had ever seen. Large wide pasta spikes intertwined with orange ramen clusters, which Bill said couldn't even be matched in Lechuguilla. Just beyond, we intersected a sloping rift, and mapped up to the left in this. It soon ended, and despite some airflow we could not find a way on. But we were astonished to find deposits of bat bones at the top of this rift. They seemed quite old, covered at times in flowstone, and no guano was seen. The skulls were unusually long-nosed, and

though filled with clay tended to crumble when touched. This discovery, over 8 kilometers from the Tecolote entrance, naturally set off speculation regarding a second, perhaps paleo entrance. Later plotting of the data showed that we had climbed almost up to the level of the Tecolote entrance, and that the Cardassian Borehole was ascending under the east slope of the Mesas Juárez with 180 meters of overburden. But now it was time to leave, with some team members getting a bit dehydrated from the long climb, having left the last water some 1500 meters back. Fortunately we found a nice pool below the aragonite climb, guarded by a cluster of distinctive stalagmites which we named the Cardassians.

On Day 4, Mike, Charley, and Rocco returned to the Cardassian with rope to drop into the rift, which being a bit loose earned the name Rift Van Tinkle. It continued up to an apparent end after about 100 meters. Charley attempted a freeclimb at the back, but a foothold gave way, sending him to the floor with a few scrapes. Next he used the grappling hook, which got him up, only to find that his lead pinched. Although this ended our exploration of the Cardassian Borehole, it stands as the largest and most well-decorated section of Tecolote. And the mysterious bat bones will likely inspire a new search on the surface for a possible second entrance. One final trip on Day 6 was made by Chris and Joe to photograph the helictite area, now named Deep Cave Nine.



Chris Lloyd collects water from the Cardassians. 1993 photo by Peter Sprouse



Bat skull found in Deep Cave Nine. (to scale)

CAMP II AREA

As the expedition wound to a close, it was decided to move back to Camp II for the last day to push a lead at the end of Research Boulevard. This was a promising lead-climb which we had worked on Day 4. John, Joe, Bill, and I had returned to the point at which the last team had run out of rope in 1991 following the ascent of the first pitch. This was a major infeasible to the Megaland area that held promise of being a major extension toward Cueva de la Llorona to the north. At first Joe tried to toss the hook, but

couldn't snag anything on the smooth flowstone slope. So then John began a standard lead-climb and managed to get up to the top. There he was immediately confronted by a steeper and taller climb. We climbed and surveyed up to his position, then I kitted up to climb the next pitch. An hour of climbing and five pieces of pro got me to a smooth bit of flowstone. I threaded a thin jughandle and clipped an etrier into it as a last resort, but it didn't hold. Bill's belay did, however - thanks Bill. He lowered me down and John ascended to have a look, but concluded it needed a bolt to get up the smooth section, and we didn't have the kit with us.

Everyone except the Cardassian photo team packed up duffles and moved the 2 kilometers back to Camp II on Day 6, and Charley, Greg, Rocco, and Tony gave the Research Boulevard climb another try. Charley set a bolt and a runner to reach the top, but unfortunately could find no way on, at least at that point. It is possible that a steep flowstone cascade a bit

farther back is the way to go, but it would require a long bolting effort.

Back at Camp II, we all slept before the final trip out and awaited the return of Joe and Chris. After an extended wait, we began to be concerned for them, and eventually John, Bill, and I set off for Camp III to search. Along the way we debated their possible fate, but were relieved to find them in camp just finishing up packing. They had merely overslept after their photo trip, having slept something like 16 hours. We all made the trip back to Camp II, then packed up to continue the trek toward the entrance. As usual, we all strung out on the drops in the entrance series. When I finally reached the last chamber I looked up to see the Big Dipper perfectly framed by the entrance, a wonderful end to a great trip. Across the field at our camp a warm fire greeted cavers as they trickled in.

Soon it was dawn of 31 March, and though we'd

been awake for 24 hours, sleep was put off while we played an extensive Frisbee game in the surreal sunlight. Tony, Joe, and Greg even went to the extreme of packing up and starting the long drive back to Indiana. The next day some of us went back in to Tecolote to finish de-rigging the entrance series, while Charley, Rocco, and Chris drove farther up the mountain to bounce the drop at El Hundido. In the afternoon, Gabino showed us a short cave near town called Cueva de El Gato.

All told, our 9 days underground had resulted in 3912 meters of new survey, making Tecolote 32,031 meters long, the third longest cave in México. We had deepened the cave slightly to 424 meters. Although we wrapped up a lot of leads in the Camp III area, numerous leads remain throughout the cave and there is still good potential for significant extensions or connections with other caves.

PEP MEMBERSHIP LIST - SEPTEMBER 1993

Akers, Tony
Allen, Doug
Anderson, Bob
Atkinson, Jerry
Balsdon, Sheila
Batsche, Ralph
Bockelman, Wayne
Bowden, Jim
Coke, Jim
Coons, Don
Crawford, Michael
DuChene, Harvey
Feely, Bill
Feely, Jim
Fromen, Charles
Futrell, Mike
Hose, Louise
Jenkins, Julie
Keeler, Ray
Kehoe, Jack
King, Joel
Koerschner, Bill
Kristovich, Ann
Lasko, Susie

Love, George
McMullan, Duke
Oliphant, Joe
Palit, Linda
Pisarowicz, Jim
Pitchford, Mack
Ponebshek, Carl
Reed, Dawn
Russell, William
Savvas, Charley
Sayther, Terry
Scheibner, Scott
Schomer, Barbara
Sevcik, Ed
Sloan, Noel
Sprouse, Peter
Stembel, John "Rocco"
Swann, Tag
Treacy, Terri
Veni, George
Vesely, Carol
Walker, Harry
White, Jack
Winfrey, Cathy

INVERTEBRATE FAUNA OF CUEVA DEL TECOLOTE

by James Reddell and Peter Sprouse

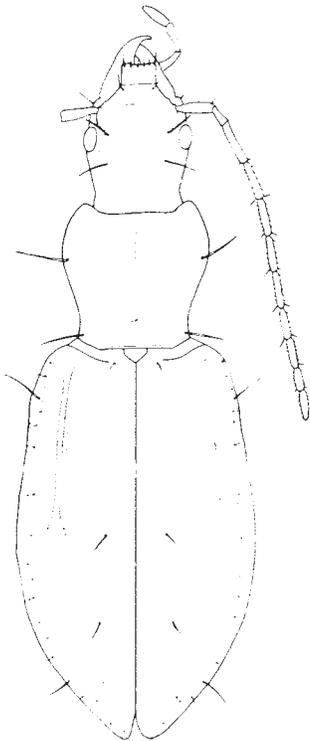
Cueva del Tecolote is the second longest cave in the Purificación Karst Area, and third longest in all of México, with over 32 kilometers of mapped passage. Tecolote is situated on a major bench halfway up the east flank of the Sierra Purificación, and drains about five square kilometers of surface catchment. Most of the area of the village of Los San Pedros drains into the entrance, carrying in sediments during flood events. Large silt mudbanks can be seen throughout the cave which appear to have been deposited relatively recently. In the past, cultivation of corn was more widespread than it is today. This was almost certainly the source of the siltation in the cave, although today's more limited cultivation and herd erosion undoubtedly still contribute. The massive siltation of Cueva del Tecolote has drastically changed the cave from the way it must have been a few hundred years ago, prior to the establishment of the village. An obvious negative effect of the siltation is aesthetic, as the cave is now covered with mud. A probably positive effect for the cave fauna is the great increase in organic matter

in the cave environment. The lowest passage of the cave near the terminal sump, the Wellie Way, has large mudbanks with extensive populations of earthworms and troglobitic schizomids and harvestmen.

Cueva del Tecolote contains at least 17 species of troglobite, a number that will likely increase with determination of recently collected material. This is second only to Sistema Purificación in the Purificación Karst Area. A large troglobitic isopod, *Speocirolana endeca*, can be found in the pools of larger streamways in Tecolote. This species is also known from the wet caves of the Corona drainage 6 kilometers to the northwest and from Sótano de San Marcos 20 kilometers to the south. The fact that this isopod is strictly aquatic suggests a possible hydrologic connection between these caves. Interestingly, *S. endeca* is not found in Sistema Purificación; however, that cave does contain two species of asellid isopod endemic to its lower sump level. That suggests that a connection between Sistema Purificación and the Tecolote/Corona basin is unlikely, at least at active passage levels.

Tecolote hosts two species of troglobitic schizomids, *Agastoschizomus* sp. nr. *patei* and *Protoschizomus sprousei*. The first of these species is the more highly cave-adapted of the two, but is less abundant than the latter. These are two of four species of schizomids known from the Purificación area. The presence of two different species in the same cave is probably indicative of different times of invasion, with the more highly-adapted *Agastoschizomus* having entered the cave earlier. While schizomids typically are not plentiful in caves of the area, Tecolote seems to have a very large population of these carnivores, perhaps due to the beneficial impact of the heavy siltation on the food supply.

A new and undescribed species of troglobitic centipede of the genus *Newportia* is found in Tecolote, as well as in Sistema Purificación. It is spectacular, reaching lengths of up to 10 centimeters. Unfortunately, although first discovered over 15 years ago, it has gone undescribed for lack of specialists in that field. Likewise a very common troglobitic amphibious isopod of the family Trichoniscidae, although found in Tecolote and probably hundreds of other caves, has languished undescribed for a long time. A glance down the faunal list for Tecolote will show that indeed there are a number of new species awaiting descrip



Mexisphodrus purgatus, from Barr, T. C., *The Cavernicolous Anchomenine Beetles of Mexico*, Assoc. Mex. Cave Studies Bull. 8:161-192

FAUNA COLLECTION HISTORY OF CUEVA DEL TECOLOTE

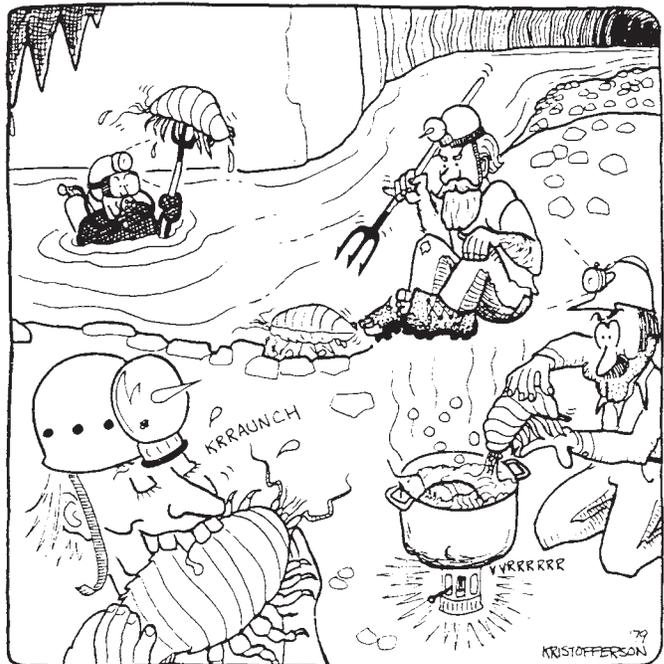
	D HONEA	P KEYS	D PATE	S SCHEIBNER	P SPROUSE	T TREACY	J WILLIAMS
APR 1980	✓	✓			✓	✓	✓
MAY 1980						✓	
APR 1982					✓	✓	
NOV 1984			✓		✓	✓	
NOV 1985					✓		
NOV 1986			✓		✓	✓	
MAR 1989			✓	✓	✓	✓	
MAR 1990					✓		
MAR 1993					✓		

tion. As a result, little can yet be said with respect to the other species of troglobite or their relationships to other troglobites in the region.

Invertebrate Fauna of Cueva del Tecolote

- Flatworms: *Paludicola* undetermined (troglophile)
 Snails: Gastropoda undetermined (troglophile)
 Earthworms: Haplotaxida undetermined (troglophile)
 Pseudoscorpions: *Aphrastochthonius* sp. (troglobite)
 Schizomids: *Agastoszomus* sp. cf. *patei* Reddell and Cokendolpher (troglobite)
Protoschizomus sprousei Cokendolpher and Reddell (troglobite)
 Spiders: *Scotinella* n.sp. (?accidental)
Neoleptoneta n.sp. (?troglobite)
Erigone monterreyensis Gertsch (?troglophile)
Nesticus rainesi Gertsch (troglophile)
Anopsicus sp. (troglobite)
Metagonia sp. (troglophile)
Modisimus reddelli Gertsch (troglophile)
 Mites: Acarina undetermined
 Harvestmen: *Hoplobunus* sp. (troglophile)
Hoplobunus n.sp. nr. *boneti* (Goodnight and Goodnight) (troglobite)
Hoplobunus n.sp. nr. *planus* Goodnight and Goodnight (troglobite)
 Ostracods: *Hobbsiella cirolanae* (Rioja) (troglobite; commensal of *Speocirolana endeca*)
 Aquatic isopods: *Speocirolana endeca* Bowman (troglobite) Terrestrial isopods: Oniscoidea undetermined (troglophile)
 Trichoniscidae genus and species (troglobite)
 Springtails: *Oncopodura* ?n.sp. nr. *dura* Christiansen and Reddell (troglobite)
Pseudosinella reddelli Christiansen (troglophile)
Arrhopalites sp. nr. *benitus* (Folsom) (troglophile)
Arrhopalites whitesidei Jacot (troglophile)
 Slender entotrophs: Campodeidae genus and species (troglobite)
 Insects: Insecta larvae undetermined
 Crickets: Gryllidae genus and species (troglobite)
 Cave crickets: Rhabdophoridae genus and species (trogloxene)
Exochodrilus sp. (trogloxene)

- Beetles: Coleoptera undetermined
 Ground beetles: Carabidae genus and species (?accidental)
 Trechini genus and species (troglobite)
Mexisphodrus purgatus Barr (troglobite)
 Toed-winged beetles: Pilodactylidae genus and species (troglophile)
 Rove beetles: *Eusilicus* n. sp. (troglophile)
Osorius sp. (?troglophile)
 Flies: Diptera undetermined (?troglophile)
 Crane flies: Tipulidae genus and species (trogloxene)
 Centipedes: Lithobiomorpha undetermined (?troglophile)
 Cryptopidae genus and species (?troglophile)
 ?*Newportia* n.sp. (troglobite)
 Millipedes: Diplopoda undetermined
Cleidogona yerbabuena Shear (troglophile)
 Rhachodesmidae genus and species (troglobite)
Rhysodesmus sp. (troglophile)



Paradise Revisited

by Paul Fambro



Jeff Horowitz (l) and Wayne Bockleman haul rope up the Corona Canyon. 1993 photo by Paul Fambro

In 1991, a truly spectacular cave entrance was reached in the vertical recesses of the Corona Canyon. Cueva Paraíso Difícil promised to open up a whole new complex of passages deep under the Yerbabuena Valley. The initial explorations were described in our previous issue. Now Paul Fambro recounts the two most recent trips.

During Thanksgiving, Jerry Atkinson, Jane Gorup, Wayne Bockleman, Mary Thiesse, Paul Fambro, Terry Gregston, Jim Feely, Jeff Horowitz, Mark Minton, Nancy Weaver, Matt Oliphant, Nancy Pistole, and Brian Burton returned to Yerbabuena, Tamaulipas for another camp trip in Cueva Paraíso Difícil. The trip down was fairly uneventful with the exception of frequent fuel system problems on Brian's truck on the steep road sections.

Wayne, Mary, Paul, Jim, Mark, Matt, and Nancy P. camped and worked in the cave for three days while the others camped in the forest and worked on various surface projects. Jeff and Jerry completed a rather difficult overland survey from the Paraíso entrance, up the waterfall and arroyo, to the Corona entrance. Nancy W., Terry and Brian completed the remaining portion of the Corona-to-Calenturas overland survey. These activities accomplished two of our major goals and now all three caves are tied together for a more accurate relationship assessment.

The in-cave goals for the trip were to climb Flowstone Falls to the upper borehole, survey the upper Rfo Sacajawea, re-survey four stations in the big room, and connect Paraíso Abajo to the big room, if not flooded. Well, once again, the big room was flooded, with its survey stations and the lead toward Abajo underwater. To our amazement, we noticed obvious signs that water had flowed from the Paraíso entrance at least thirty centimeters deep. Our camp in the entrance borehole had been about two meters under water. Fortunately, all the stashed gear was left high enough to avoid being swept away, with the exception of Mark's ground cloth, of which we found only tiny, shredded pieces wrapped around rocks near the entrance. Water had to have risen forty meters in the big room to have flowed through the Entrance Borehole. We were impressed.

Since the Flowstone Falls climb was the first priority, Matt and Nancy P., with support from Mark, began that in earnest. The rest of us worked on photos. Matt felt the climb could take a day or more and almost backed off his initial route due to nasty rock with poor protection. With perseverance and climbing skill, he completed the climb and gained access to the higher sloping flowstone issuing from the upper borehole in two and one-half hours. We were all impressed and began scurrying to finish up photos and get our climbing gear on.

All of us climbed up after Matt, waded across a small lake, the Wading Pool, and took off down the

of the Oliphant Walk and joined us for a brief tour of the upper borehole. Jeff and Jerry spent the night in the cave with us so they could start the entrance-to-entrance surface survey the next morning.

All of us had noticed that the water level in the big room had dropped one to two meters during the few days we were in the cave. This is exactly what happened during the Spring '92 trip. Due to the rapid drop observed, we figured the flooding of the big room was just short-term flood pulses, so maybe next time we would have better luck at re-surveying it and checking the downstream pit lead heading for Paraíso Abajo. Wayne and I finally named the big room area Lake Inconstance.

The last day, without any going cave, we decided to have Matt climb to a ceiling lead a short distance from camp. This was our last hope. Again, a grappling hook was used successfully in addition to other aids to gain a high balcony with the meter-diameter lead. It did not go. We de-rigged the cave and began our long ascent up the cliffs and waterfall with camp packs and rock climbing gear. Thankfully, Brian had come down to help carry the "heavy metal." By the time Wayne and I were up, the weather had turned cold and nasty. Matt, Nancy W., and I built a small fire in an alcove amongst the boulders to stay warm as the last ropes were being coiled. We all carried gear up the arroyo and staged it for the pull up the Corona cliff the following morning.

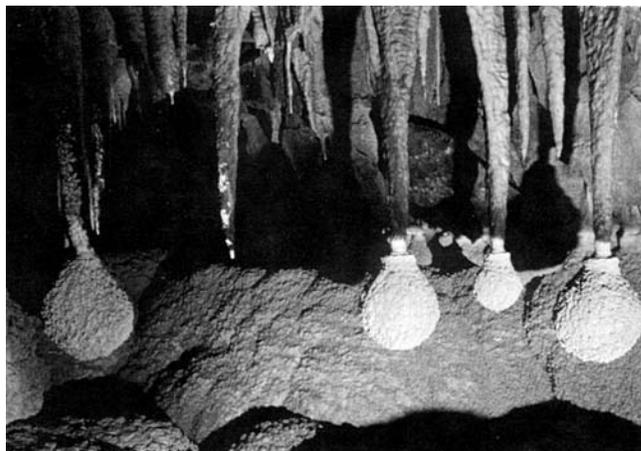
Everyone made it back to their respective homes without incident, except for a little trouble with U.S. Customs. Terry and I in my truck and Jim and Jeff in Jim's truck crossed the border at Brownsville around midnight on a Saturday. The trouble started with a couple of female officers who apparently felt they had to show their machismo (masculine intended) to us, their peers, and their bosses. Well, the lady officials decided to put the dog on our trucks and brought over a poorly-trained puppy that didn't know the difference between contraband and cookies. One official commented that the dog had not yet been to obedience school; say what? Finally after an hour and a half or so, they begrudgingly let us go. Jeff had cookies, we had trail mix, Customs had arrogant, unprofessional attitudes and an untrained dog, we got hassled.

APRIL 1993

In early April a Paraíso team including Jerry Atkinson, Wayne Bockleman, Mary Thiesse, Paul Fambro, Terry Gregston, Jeff Horowitz, Mark Minton, Nancy Weaver, and John Schweyen returned for

perhaps the final trip to the cave. We had no going leads other than possibly the downstream lead towards Abajo if Lake Inconstance was non-existent. And that was heading out of the cave. However, Mark wanted to take one last look at the sump in the Río Sacajawea and had asked John to accompany us with light-duty dive gear. We also wanted to look at the Waiting Pool in the Final Borehole one last time for an underwater lead that we might have missed during Thanksgiving. As it turned out, the winter had been the driest the locals had seen since most could remember.

Wayne, Mary, Paul, Terry, Mark, and John were the cave camp team. We did our now-standard rigging of the cliffs, waterfall, and cave. The water flow from the Corona was noticeably lower and the resurgence pool was kind of scummy. We did not want to haul all the dive gear down to the cave until we had a look at



"Liontail" formations in Paraíso Difícil. 1993 photo by Paul Fambro

the Sacajawea Sump, so it was staged at the bottom of the Corona cliff. This would allow reasonable access to it if needed. Camp was set in the usual place and a quick check of the big room found Lake Inconstance dry. Mark and John did a quick trip to the sump and found open air space in a place they did not expect. Air was roaring through the small air space and creating standing waves on the water surface. The next day, Mark, Wayne, Mary, and John returned to the sump in wet suits to attempt a dive through and survey beyond. They found good passage with several leads. All were surveyed; however, the air flow was not specifically located. They were about to give up when Mark dropped through a small opening in a passage floor. He dropped into stoop-walking and walking passage with good airflow. He and Wayne explored a



Matt Oliphant reaches a blind lead in ceiling of Entrance Borehole. 1992 photo by Paul Fambro

little and turned around in going passage.

Terry and I set about photographing the Lake Inconstance room and the Final Borehole. We spent two and one-half hours on one photo looking from the Entrance Borehole balcony, across the big room and into the Final Borehole. Forty-nine Mhz FM radios were used for communication as Terry manned the cameras and I climbed about the big room and into the Final Borehole firing 5B bulbs. After that endurance photo, Terry joined me in the Final Borehole for multi-flash pictures of its length. Both the Wading Pool and Waiting Pool were dry as were the rest of the smaller pools along the passage. I walked around the muddy floor of the Waiting Pool and found no leads, although I did discover a small colony of isopods in a pocket of remaining water. No collections were made, but the isopods appeared identical to the ones found in many caves of the PEP area. On the way back to camp after eight hours of photographing, I looked at the downstream lead to Abajo and located a rig point.

Nancy had joined the camp group, and the next

day we all decided to rig and drop down to the Emerald Pool, one hundred meters below the Paraíso entrance. This was a first for a few of the group. Everyone was amazed at the awesome beauty and scale of the place. We took a good look at the Black Pool, which is down the next step about thirty meters below the Emerald Pool. Numerous small springs fed into the pool in addition to the water from the Emerald Pool. We all tended to agree with Jerry's previous assumption that the huge, deep pool was formed along the limestone/shale contact. Nancy encouraged Mark, Mary, and John to head back to base camp at the trucks and they began the climbs. We took a lot of photos, including people on three of the rope segments ascending the lower and middle falls, stretching one hundred and eighty meters above us. Unfortunately, only three of us were left to finish up the planned work in the cave and de-rig the cave and all waterfall sections.

Wayne, Terry, and I de-rigged the Emerald Pool drops by late afternoon and returned to camp for something to eat, then on to the work. We re-surveyed the circumference of the entire Lake Inconstance room first. With a tie-in to that survey, we began surveying down the passage to the pit lead. I quickly rigged our only short rope and rappelled the four-odd meters to the top of a huge flowstone mound looking out over another beautiful room with a lake and gravel shore on one end. Below me was a narrow, deep lake in the flowstone with a small outlet going in the direction of Abajo. At this point we were well under the Entrance Borehole. Wayne worked on the sketch of the room while Terry and I photographed. The small outlet of the room was a wet lead. However, since we were going to head back to camp soon, I decided to go for it. Actually I was able to get through with only getting wet to the waist and on the front. I crawled over flowstone for about four or five meters as the chamber opened up, then looked over another four-meter drop into a canyon passage. Still no sign of the Abajo pool level, but we must be extremely close. The nearest unused rope was in camp, it was midnight, and we were tired. When Wayne wrapped up his sketch of our survey, we headed back to camp, de-rigging behind us.

The next morning, we packed our camp duffles and carried the ropes to the entrance. Terry started up the drops while Wayne and I staged and de-rigged the ropes for the lower waterfall sections. We reached the top of the waterfall and met the rest of our team, who pulled the ropes up the upper waterfall section and carried them to the Corona cliff. They also attached

the heavy, unused diving gear to the ropes. It was a hot day, and the vertical hike out was not a lot of fun. As soon as we reached base camp, Jerry and a few of us began rigging a Z-line to haul the ropes and dive gear up the two hundred and twenty-odd meter cliff. Four locals showed up to watch and offered pulling assistance. Somewhere around six hundred meters of strung-out ropes and eighty pounds of dive gear took its toll on us and the locals. After getting the sack of dive gear up, things went a lot easier. The ropes were coiled and carried to the trucks. At least for three of us, it was a first to pack out of camp in the cave, climb and hike all the way to the top, and de-rig all ropes and gear for the entire trip in one day. We were burnt.

Everyone packed their trucks and rolled for Texas the next morning. There were no border cross-

ing hassles, just the normal look-and-see. After thinking that this might have been the last trip to Paraíso, we now have two leads that are going. One, of course, is heading to Abajo with nice passage and the other is heading to the east-southeast with good air flow, which is trending away from the Final Borehole that has a southerly trend. Mark was able to make some gentle modifications that he thinks will keep the Sacajawea Sump open even at non-low water times, so consistent access should not be a problem in the future. The cave passes under Cueva del Río Corona with two hundred vertical meters of separation, and even deeper than the borehole levels of Sótano de las Calenturas. The going passage is heading in a direction of no other known caves. While we scratch our heads trying to figure this all out, we will be planning a return trip for late March 1994.

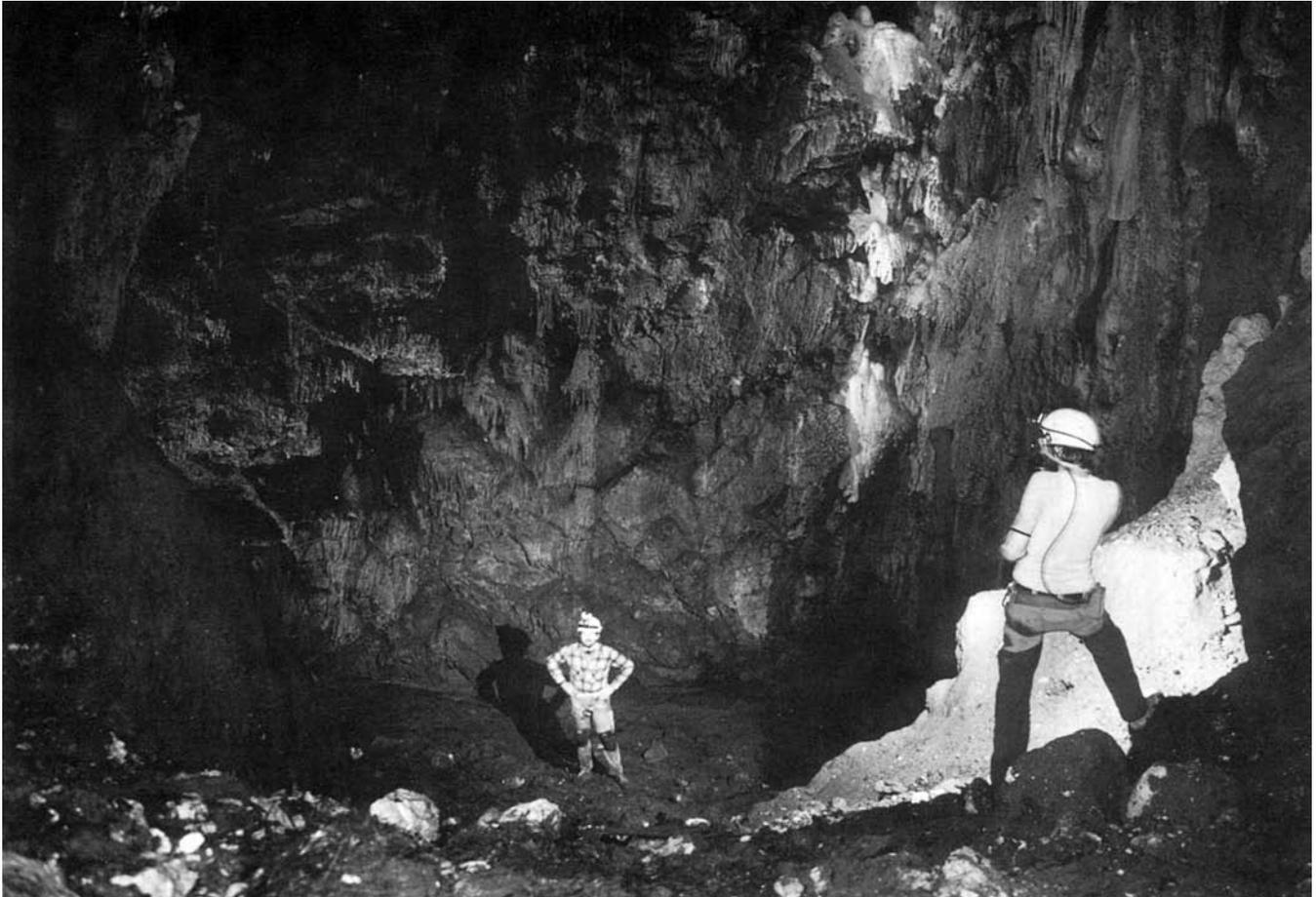
PURIFICACION SPELEOMETRY

(Version September 1993)

		Length	Depth (in meters)
1.	Sistema Purificación	78,961	955
2.	Cueva del Tecolote	32,031	424
3.	Sótano del Las Calenturas	7,730	122
4.	Cueva de La Llorona	3,540	412
5.	Cueva del Borrego	1,354	58
6.	Cueva Paraíso Difícil	1,326	100
7.	Sótano de la Cuchilla	1,306	172
8.	Sótano de Trejo	1,160	80
9.	Cueva del Río Corona	1,151	36
10.	Sótano de San Marcos	1,019	126

PURIFICACION AREA CAVE DESCRIPTIONS

Contributors: Dale Pate and Peter Sprouse
Faunal lists compiled by James R. Reddell



Val Ellis (l) and Peter Sprouse in the bottom chamber of Pozo de Las Chinas. 1989 photo by Susie Lasko

POZO DE LAS CHINAS

Las Chinas, Tamaulipas

Length: 190 meters Depth: 162 meters

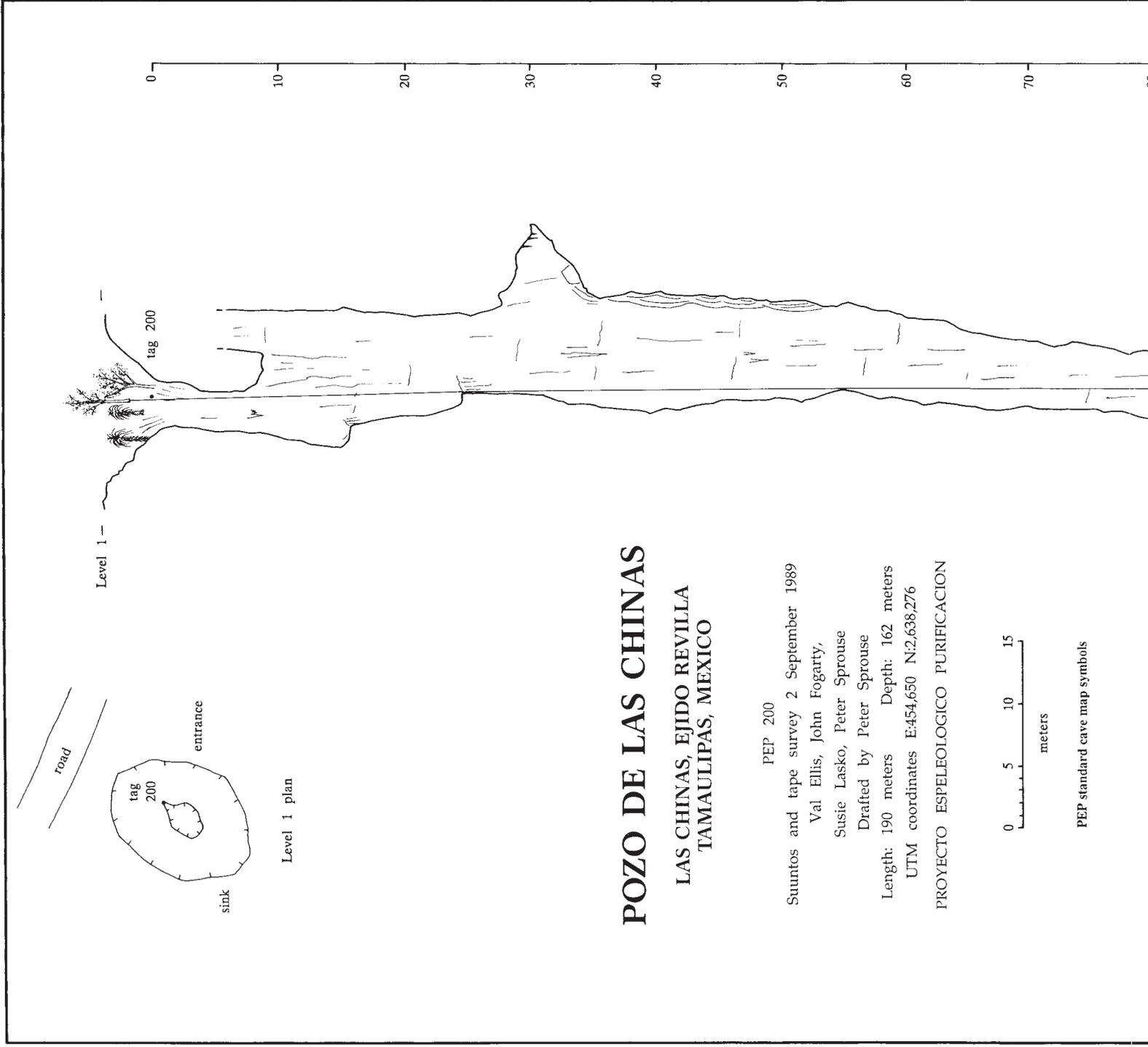
UTM coordinates: E 454,650 N 2,638,276

PEP 200

Pozo de Las Chinas is located 100 meters south-east of Rancho Nuevo at an elevation of 2685 meters. The entrance is situated on the east side of the Rancho Nuevo-Mesas Juárez road, not far south of a small llano which was used as a camp during the exploration of the cave. A 10-meter-diameter sink with several soyate palms funnels down into the 154-meter entrance pitch. A slight offset occurs 25 meters down at a narrow ledge, but the rope barely touches. Another

ledge just deflects the rope at -85 meters, where a standing rebelay could be installed to good advantage. At -154 meters the rope lands at the top of a talus slope. This slope descends to a flat mud floor which is the terminus of the cave.

Pozo de Las Chinas was discovered on 1 September 1989 when a truckload of cavers drove a short stretch of road which had not been previously checked. Exploration and survey was done the next day by Val Ellis, John Fogarty, Susie Lasko, and Peter Sprouse. This was made a bit difficult by communications problems in the deep pit; FM headset radios proved to be of little help, perhaps due to the narrowness of the shaft. (PS)

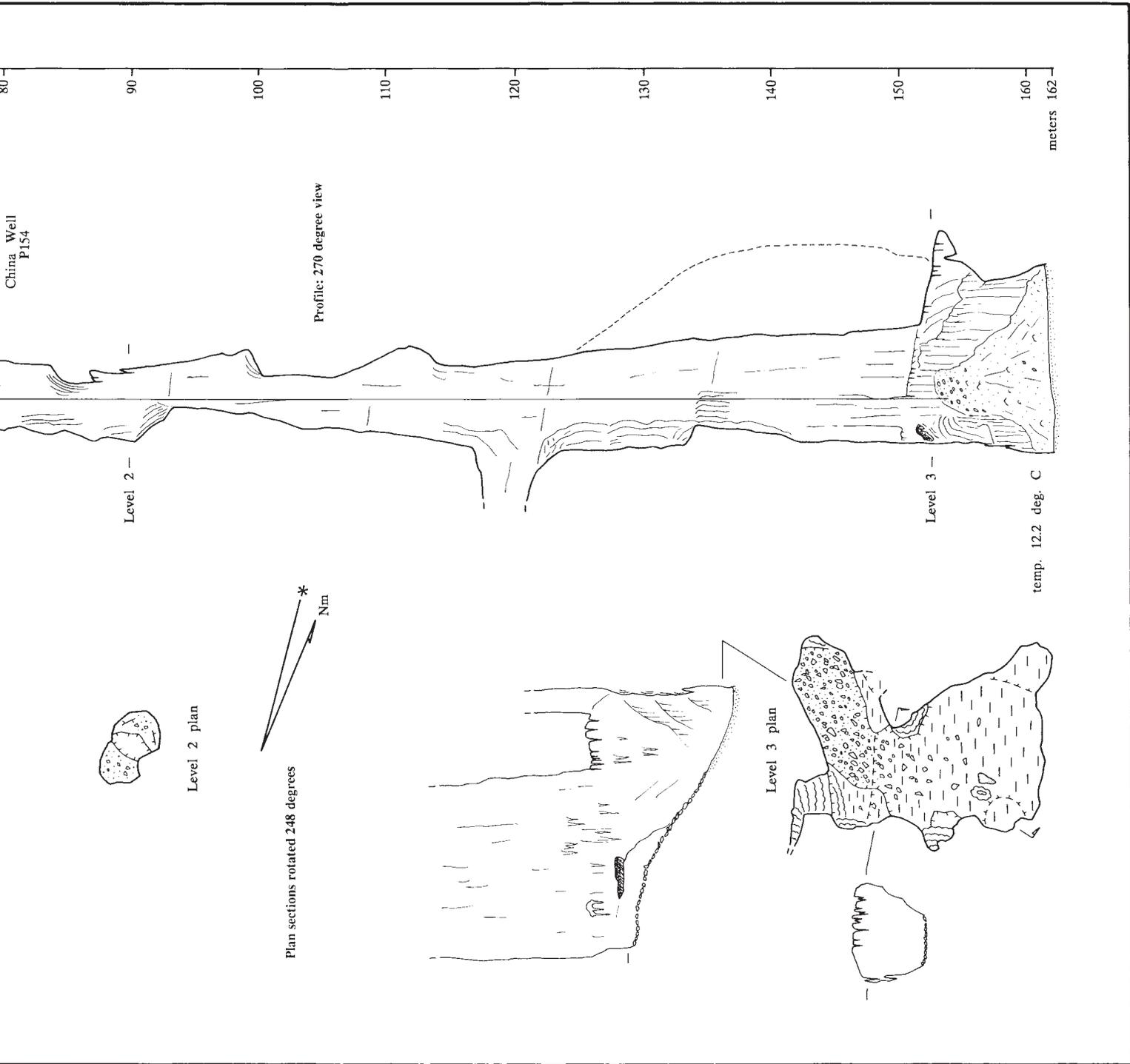


POZO DE LAS CHINAS
LAS CHINAS, EJIDO REVILLA
TAMAULIPAS, MEXICO

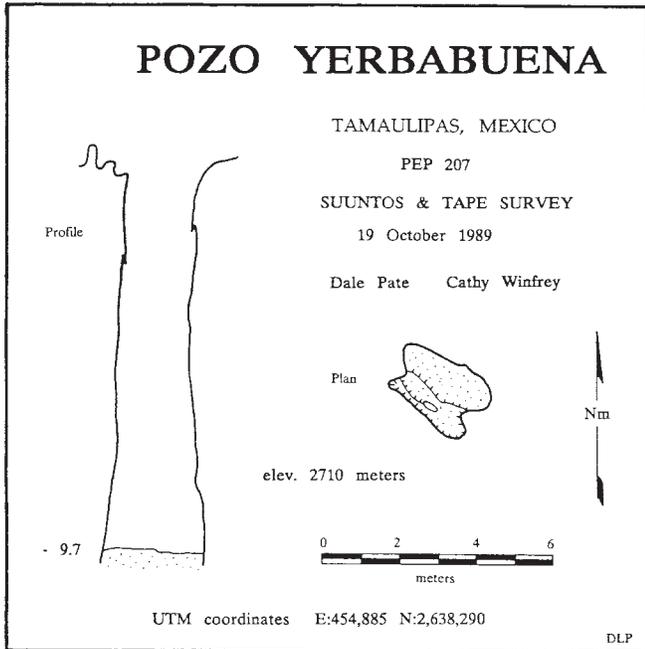
PEP 200
 Suuntos and tape survey 2 September 1989
 Val Ellis, John Fogarty,
 Susie Lasko, Peter Sprouse
 Drafted by Peter Sprouse
 Length: 190 meters Depth: 162 meters
 UTM coordinates E:454,650 N:2,638,276
 PROYECTO ESPELEOLOGICO PURIFICACION



PEP standard cave map symbols



Earthworms: Haplotaxida undetermined
 Terrestrial isopods: Trichoniscidae genus and species (troglomite)
 Spiders: *Cicurina* (*Cicurella*) sp. (troglophile)
 Nesticus rainesi Gertsch (troglophile)
 Mites: Acarina undetermined
 Harvestmen: Phalangodidae genus and species (?troglomite)
 Millipedes: Xystodesmidae genus and species (troglophile)
 Springtails: *Oncopodura susanae* Christiansen and Reddell (troglomite)
 Cave crickets: Rhaphidophoridae genus and species (troglaxene)
 Ground beetles: Trechini genus and species (troglomite)

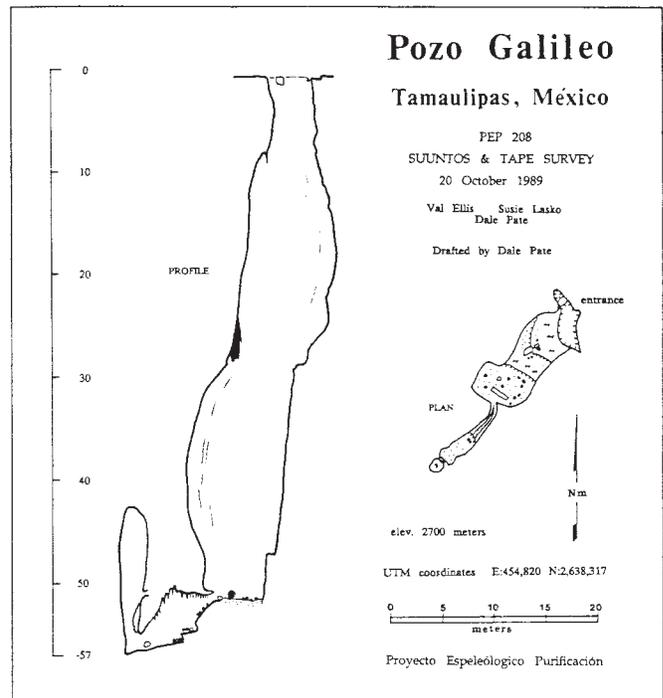


POZO YERBABUENA PEP 207
 Las Chinas, Tamaulipas
 Length: 10 meters Depth: 10 meters
 UTM coordinates: E 454,885 N 2,638,290

This small pit is located 1250 meters southeast of Rancho Nuevo, just uphill from Pozo Galileo at 2710 meters elevation. The entrance measures 1.5 by 2 meters, and it drops 9.7 meters to a dirt fill. Pozo Yerbabuena was located and explored on 19 October 1989 by Dale Pate and Cathy Winfrey. (DP)

POZO GALILEO PEP 208
 Las Chinas, Tamaulipas
 Length: 65 meters Depth: 57 meters
 UTM coordinates: E 454,820 N 2,638,317

This pit is located 1200 meters southeast of Rancho Nuevo at an elevation of 2703 meters. It is on the east edge of the fire tower road. The entrance is 5 meters long by 2 meters wide, with a natural bridge near its northern end. The pit drops mostly free for 30



meters to a small ledge, and then continues against the wall for another 22 meters to a dirt floor with wood debris and small rocks. The entrance pit averages 8 to 10 meters wide and has a stalagmite/curtain hanging about halfway down on its northern side. At the bottom a small squeezeway leads to 10 meters of decorated passage, then ends in a dome that extends upwards for 15 meters.

Pozo Galileo was located on 19 October 1989 by Dale Pate and Cathy Winfrey. It was explored the following day by Dale, Val Ellis, and Susie Lasko. The pit was named in honor of the space probe Galileo which was launched at the same time. A centipede which appeared to be troglitic was seen in the cave but eluded capture. (DP)

Spiders: *Nesticus* sp. (troglophile)
 Modisimus sp. (troglophile)
 Millipedes: Xystodesmidae genus and species (troglophile)
 Ground beetles: Trechini genus and species (troglomite)
 Moths: Lepidoptera undetermined
 Flies: Diptera undetermined

POZO JESUPLASTICO PEP 269
 Las Chinas, Tamaulipas
 Length: 184 meters Depth: 78 meters
 UTM coordinates: E 454,140 N 2,641,540

This pozo is situated 2400 meters north of Rancho Nuevo at an elevation of 2575 meters. It is partway down the slope of a dolina through which a logging spur road passes, a side road which goes left

CUEVA DE LA NIEVE

ALTAS CUMBRES, TAMAULIPAS

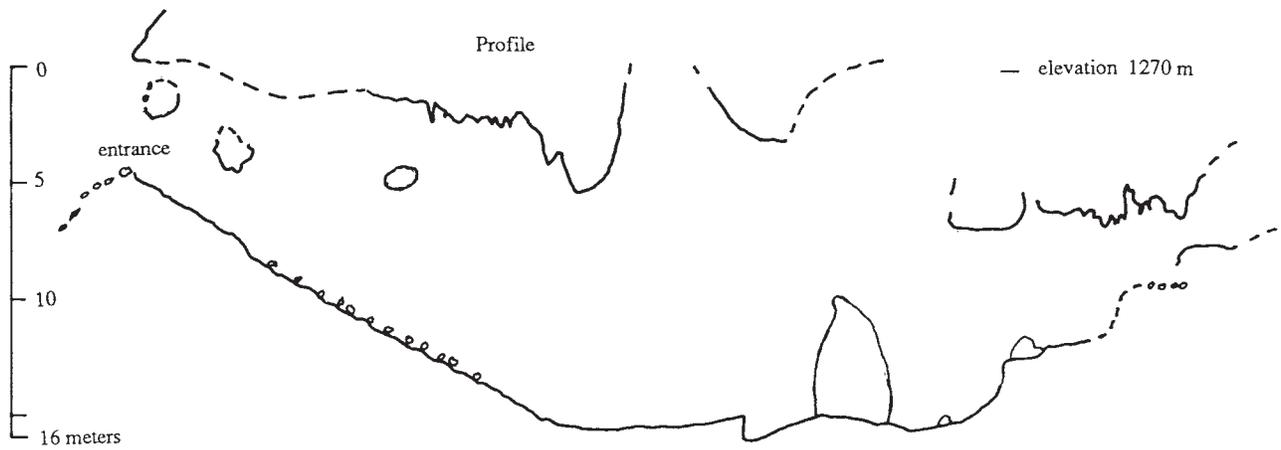
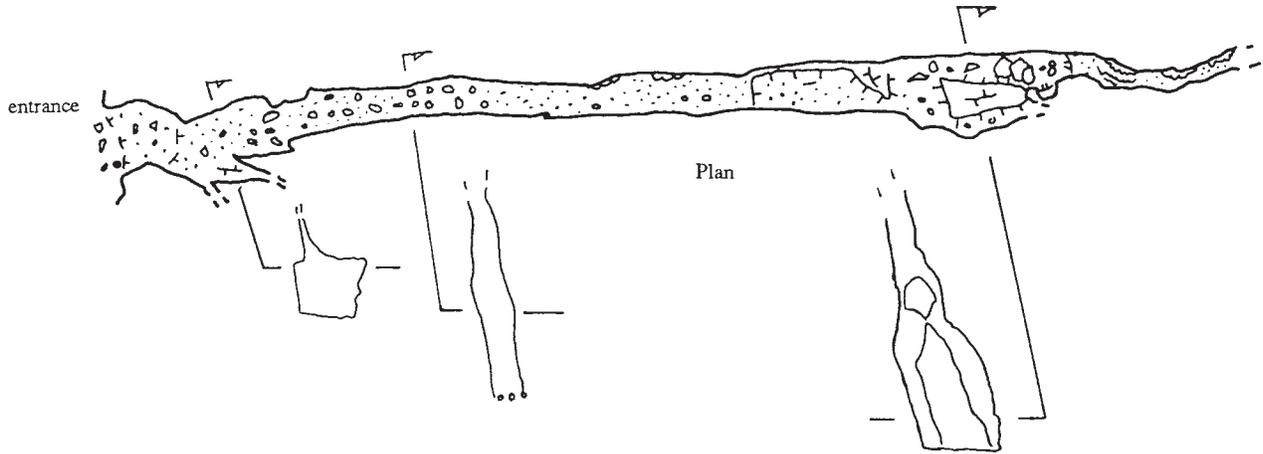
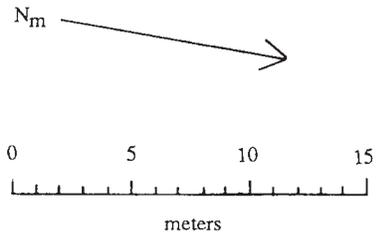
PEP 238

Surveyed 16 January 1992

M. Crawford, S. Lasko, P. Sprouse

Drafted by Troy Lanier

Length: 55 Meters Depth: 16 Meters



logging spur road passes, a side road which goes left off of the Cueva de California road. The entrance measures 1 by 2 meters and drops 5 meters to the top of a rubble slope. This leads down to a second drop situated below a shrine-like niche in the wall. This drop begins in a narrow, corkscrew fashion, then opens up into a wide rift. The bottom is a rubble-strewn ledge 4 meters square which opens out into the third drop. This 13-meter pitch drops through the roof

of a wide formation room. Down a flowstone slope to the south are two muddy and wet alcoves, one of which has a tall dome over it. In the floor just before these alcoves is a 7-meter-deep blind pit.

Upslope from the bottom of the third drop the passage widens into a flowstone landscape punctuated by scattered stalagmites. The north end slopes back down to another drop, a flowstone funnel which becomes too tight to enter, but which appears to bell

out below. At the top of this drop is a spectacular display of thin eccentric totems. A west-trending side passage off the middle of the formation chamber goes to a short downclimb and then a longer upclimb. A mud-and-flowstone ramp leads up to the edge of a 24-meter shaft. At the bottom of this is a small pool and a window into another pit. This one drops 10 meters and has passages going both north and south at the bottom. The south passage goes up a rocky slope to the bottom of a dome. The north passage ducks under a ledge and curves around to the right to another dome. A hole in the floor before this dome pinches at the deepest point in the cave. (see map p 29)

Pozo Jesuplástico was located in February 1993 when a PEP team set up camp next to it for a week of pit-pushing. It was explored and mapped on 17-18 February 1993 by David McKenzie, Charley Savvas, Peter Sprouse, and Cathy Winfrey. (PS)

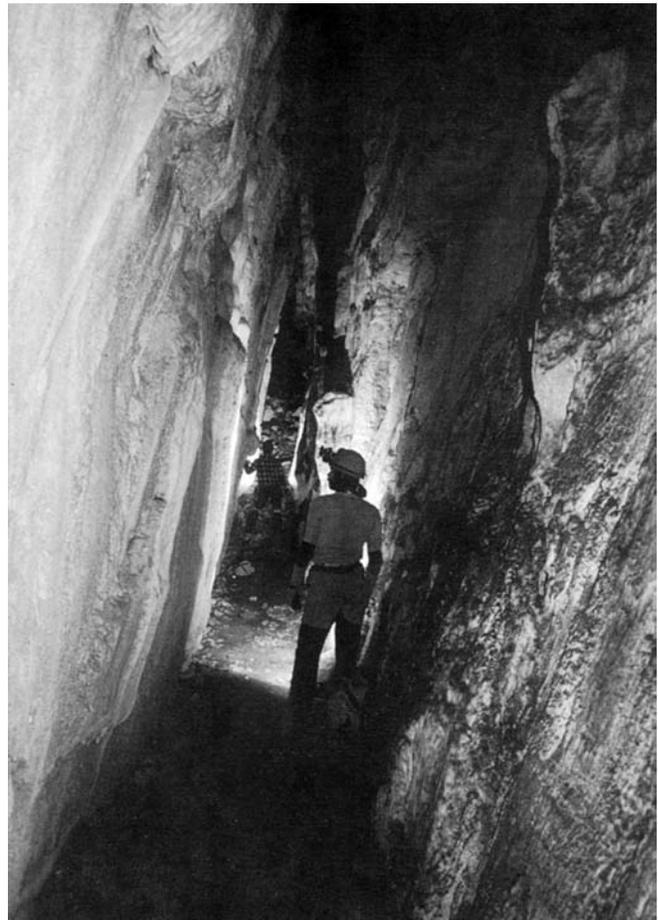
Isopods: *Trichoniscidae* genus and species (troglomite)
 Millipedes: *Diplopoda* undetermined
 Cave crickets: *Rhaphidophoridae* genus and species (troglonexe)

CUEVA DE LA NIEVE PEP 238
 Altas Cumbres, Tamaulipas
 Length: 55 meters Depth: 16 meters
 UTM coordinates: E 478,660 N 2,610,340

Cueva de la Nieve is located 400 meters west of the village of Altas Cumbres at 1270 meters elevation. It is on a steep slope between Highway 101 and the Huisachal road. The entrance is in the base of a cliff, and the whole cave appears to be tectonically formed by a slump block. The cave is a single linear rift. From the entrance a rubble slope leads down to a dirt floor. A large breakdown block is passed, then the cave trends up into a flowstone pinch. This cave was shown to John Fogarty, Leonard Pruitt, Peter Sprouse, and others in September 1989 by local women. It was mapped after a snowstorm on 16 January 1992 by Michael Crawford, Susie Lasko, and Peter Sprouse (see DCC no. 2, page 35). (PS)

SOTANO DE AGUA DE LAS VACAS PEP 152
 Agua de las Vacas, Nuevo León
 Length: 40 meters Depth: 31 meters
 UTM coordinates: E 450,062 N 2,650,015

This pit is along the right (west) side of the road to Agua de las Vacas, 300 meters after it splits off from the main Revilla-Los Caballos road. It is situated on a forested slope at 2050 meters elevation. It has two pit entrances which join in a 3-meter-wide rift.



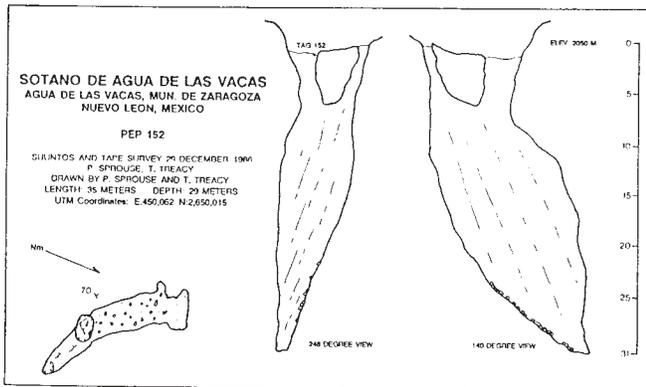
Tectonic rift in Cueva de la Nieve. 1992 photo by Susie Lasko

The small upper pit entrance drops onto steep bedrock ramp formed on beds dipping southwest at 70 degrees. The lower entrance is a 2 by 3 meter pit that drops free for 21 meters, landing on the slope where its gradient lessens and the floor turns to rubble. The cave ends in a small flat silted area at the foot of the rubble slope. This pit was explored and surveyed on 29 December 1986 by Peter Sprouse and Terri Treacy. (PS)

Spiders: *Phonotimpus* sp. (?troglophile)
 Darkling beetles: *Eleodes* (*Caverneleodes*) *sprousei* Triplehorn and Reddell (troglophile)

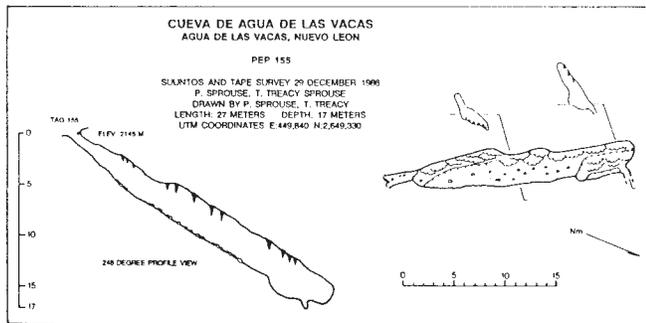
CUEVA DE AGUA DE LAS VACAS PEP 155
 Agua de las Vacas, Nuevo León
 Length: 30 meters Depth: 17 meters
 UTM coordinates: E 449,840 N 2,649,330

This cave is located 100 meters northwest of the village of Agua de las Vacas, at an elevation of 2145 meters. The small entrance opens into a sloping passage which enlarges to 4 by 4 meters. After 25



meters there is a short downclimb leading to a tight pinch. Cueva de Agua de las Vacas was explored and surveyed on 29 December 1986 by Peter Sprouse and Terri Treacy. (PS)

Terrestrial isopods: *Trichoniscidae* genus and species (troglolite)
Spiders: *Phonotimpus* sp. (troglophile)
Modisimus rainesi Gertsch (troglophile)
Millipedes: Diplopoda undetermined
Slender entotrophs: *Campodeidae* genus and species
Insects: Insecta larvae undetermined

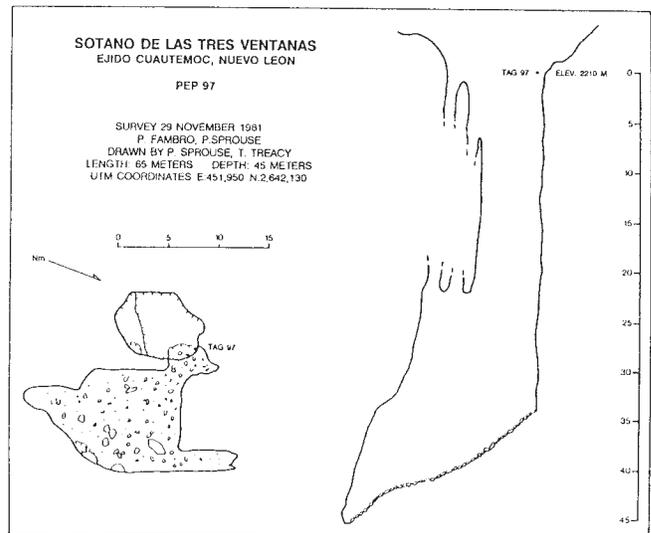


SOTANO DE LAS TRES VENTANAS PEP 97
Cuahtemoc, Nuevo León
Length: 65 meter Depth: 45 meters
UTM coordinates: E 451,950 N 2,642,130

This pit is located 1750 meters south-southwest of Ejido Cuahtemoc at an elevation of 2210 meters. It is in a sink by a road in a wide drainage. The entrance pit drops 35 meters to a rubble pile, which slopes down to fill at -45 meters. Temperature measured at this point was 8.6° Celsius during exploration on 29 November 1981 by Paul Fambro and Peter Sprouse. (PS)

Spiders: *Modisimus reddelli* Gertsch (troglophile)
Harvestmen: *Leiobuninae* n. gen. near *Nelima* and *Paranelima*, n. sp. (troglolite)
Leiobunum viridorsum Goodnight and Goodnight (troglolite)
Centipedes: *Lithobiomorpha* undetermined
Millipedes: *Glomeroides pateri* Shear (troglolite)
Cleidogona yerbabuena Shear (troglophile)

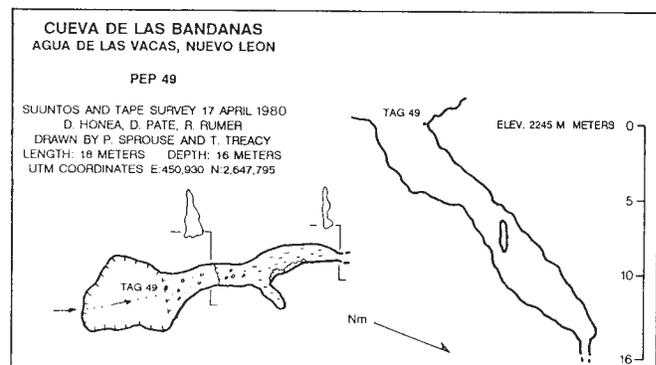
Springtails: *Collembola* undetermined
Slender entotrophs: *Campodeidae* genus and species (?troglolite)
Cave crickets: *Rhaphidophoridae* genus and species (troglolite)
Darkling beetles: *Eleodes (Cavermeleodes) sprousei* Triplehorn and Reddell (troglolite)
Flies: *Chironomidae* genus and species



CUEVA DE LAS BANDANAS PEP 49
Revilla, Nuevo León
Length: 18 meters Depth: 16 meters
UTM coordinates: E 450,930 N 2,647,795

Cueva de las Bandanas is located 500 meters northwest of Revilla at an elevation of 2245 meters. An arroyo which crosses the main road just north of town drains into the entrance. The cave dips down 45° bedding to quickly end in a pinch. David Honea and Jeanne Williams located this entrance in April 1980. It was explored and mapped on 17 April 1980 by David Honea, Dale Pate, and Randy Rumer, who had to cover their mouths with bandanas due to the thick gnats. (PS)

Harvestmen: *Gagrellinae* or *Leiobuninae* genus and species (troglolite)
Centipedes: *Lithobiomorpha* undetermined
Millipedes: *Cleidogona yerbabuena* Shear (troglolite)
Flies: *Diptera* undetermined



Underwater Exploration in Sistema Purificación

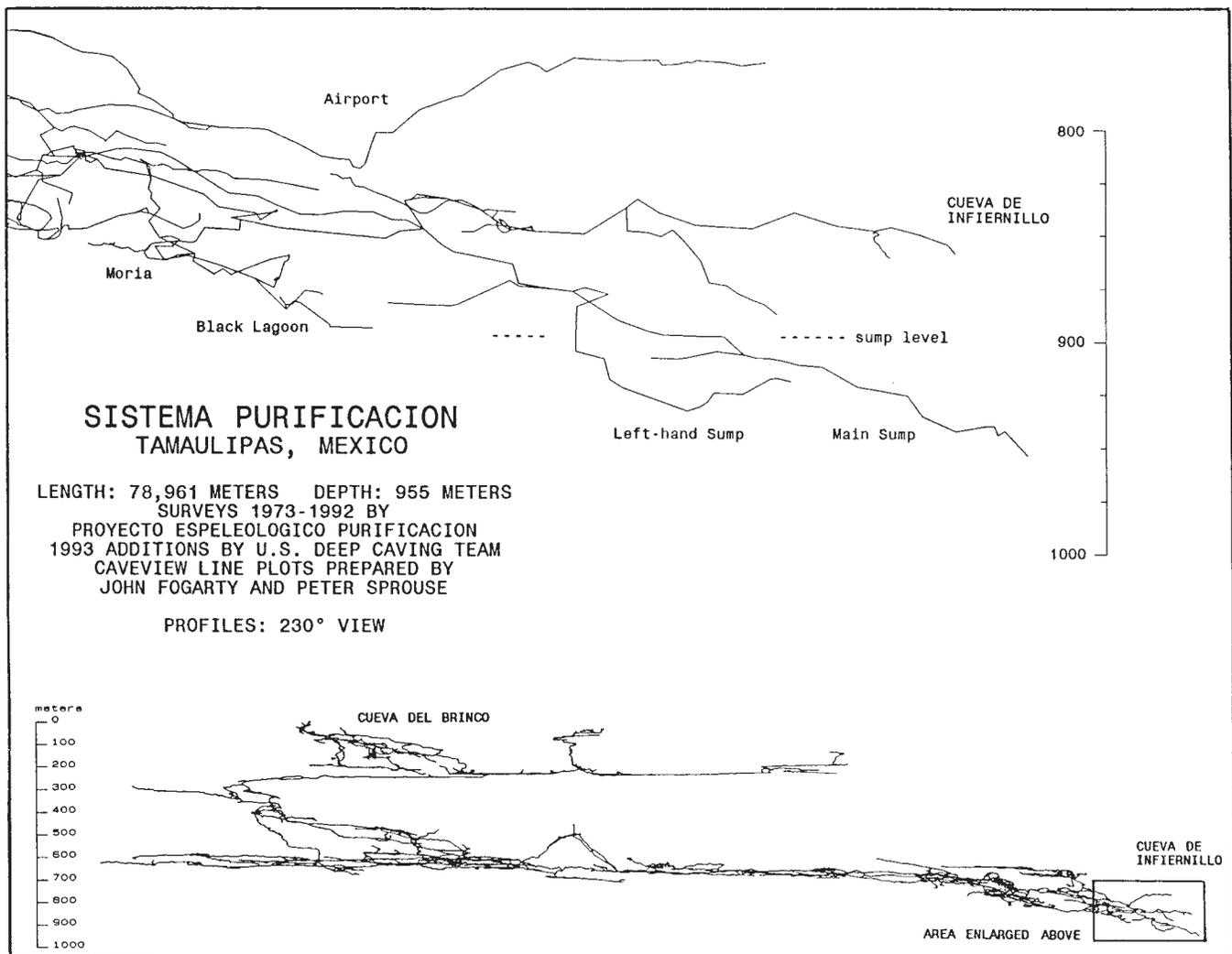
by Noel E. Sloan

As we settled to the bottom of Forty Fathom Grotto, an aura of excitement surrounded us. Now 73 meters deep, we scanned the control panels of our Cis Lunar MK4 rebreathers. All systems were working flawlessly, and unlike our previous open circuit dives, this time we felt no time pressure. We had adequate life support to stay underwater for about 8 hours. With the MK4's ability to automatically maximize our bottom time, conserve gas, and cut decompression to an absolute minimum, most of the limitations we normally feel on cave dives were far from our minds.

Although still an experimental piece of dive gear, the team members were beginning to feel comfortable on the MK4. After almost six weeks of assembly, disassembly, trouble-shooting, modifying and diving

the units in several Florida caves, it was time to put the team and the rebreathers to the true test - remote sump diving. Disassembly, hauling, reassembly, and exploration diving in an unfamiliar cave were the next and final things on our agenda for the US Deep Caving Team this spring. Over the past eight years, both the team and the MK4 had gone through good times, bad times, and many changes. Now our efforts were about to pay off. We had successfully completed 158 dives this spring, logging over 250 hours of underwater time. The team had become close. We were working well together, both underwater and above.

The next step in preparation for the San Agustín Expedition was to take the MK4's to a remote cave



which would involve underground camping, vertical work, unit disassembly and transport and true exploration diving. With the help of Peter Sprouse, the Infiernillo entrance of Sistema Purificación was the perfect choice. The cave more than met our needs. With only ten days left before the group had to return to their respective jobs, we had to be efficient. From a previous dive attempt by Bill Stone, we knew the dives would likely be deep. If we could successfully add another 96 meters through our dive exploration the system would pass the one-kilometer mark.

Out of necessity, the team, consisting of Kenny Broad, Jim Brown, Barbara am Ende, Steve Porter, Peter Sprouse, and myself, left San Antonio about 10pm 12 May, geared for an all night drive. Between the team and our gear, Bill and my Toyota trucks were at maximum load. By the following evening, we were camped at the head of the arroyo leading to the Infiernillo entrance. Planning an early start, Barbara and Kenny went with Peter to rig the entrance and identify survey tie-in points.

The next morning, 14 May, was a stark reminder of how much work sump diving can be as we began countless trips up the arroyo balancing and slipping on the moss-covered boulders. We had brought three rebreathers, but there were no objections to the proposal that we only take two to the cave. By late afternoon, we had all the gear below the entrance. We quickly rigged a highline and began hauling the up equipment. As darkness settled in, it brought a heavy rainstorm which hampered our efforts. We gathered up the necessary sleeping gear and entered the cave to set camp. The gear hauling could wait until morning.

Day 3 began with gathering the remaining gear from the canyon floor, followed by three trips to the entrance to get the essentials carried to the Main Sump. We staged the rest of the gear inside the entrance. By late afternoon, we were prepping the dive site for the first exploratory dive in the morning. The reassembly of the MK4 went much easier than expected until a systems check revealed a nonfunctional oxygen sensor. No problem. We expected repairs, but to our horror we found the replacement sensors lacked proper connectors for any easy repair. With a screw driver and camp stove, Bill had a makeshift soldering iron. Before long we had the unit up and running. The countless hours we had spent assembling and trouble shooting the rebreathers had paid off. Makeshift field repairs were an expected part of using the complex new dive gear.

The morning of May 16 found us ready for the first exploratory dive. The team decided to minimize

the amount of gear we hauled to conduct our explorations; thus we would all be diving solo. Steve would make the first dive and I the second. Our findings would determine the next step. Breakfast went slowly as Steve contemplated the seriousness of his morning ahead.

The sump pool, about 6 meters wide and 20 meters long, appeared both ominous and inviting. We could do our dives on either nitrogen or helium. We had brought high pressure composite cylinders with both air and trimix for our safety bailout. With hopes that the dive would stay shallow, and concerns over diving at altitude on an MK4 that Bill had just repaired, Steve chose air. As Steve disappeared into the water, his 20 watt dive light illuminated a faint milki-ness to the water, producing an eerie glow. We assumed this was from the mineral content in the water. About 30 minutes into the dive we were relieved to see his light return. He took another 30 minutes to surface. Steve emerged from the 16.5°C water, obviously cold. He had laid 104 meters of line, stopping at a depth of 34 meters. The ceiling was continuing to drop, and the floor was questionably visible deep below.

The next morning it was my turn to solemnly contemplate the dive ahead. Even at the end of our diving in Florida, we found that often our attention was on the rig rather than on the dive itself. Unlike the cave diving we were used to doing, a complete confidence in our equipment was still lacking. Buoyancy control with a rebreather is more complex than Scuba. The complications of monitoring the rig while diving, the team's view of the unit as experimental, coupled with exploration of a remote cold water sump at altitude, was definitely task loading. You could see it in our eyes and hear it in our voices as we undertook each dive with the seriousness of our own personal fears.

Knowing that the new exploration was going down from 34 meters, I chose heliox for my dive. After entering the water I felt the excitement build at the thought of making an exploration dive on the rig. I had plenty of gas and minimal time pressure. At about 9 meters depth and about 20 meters back, where the true sump begins, suddenly my composure was shattered as the main LCD control panel went dead.

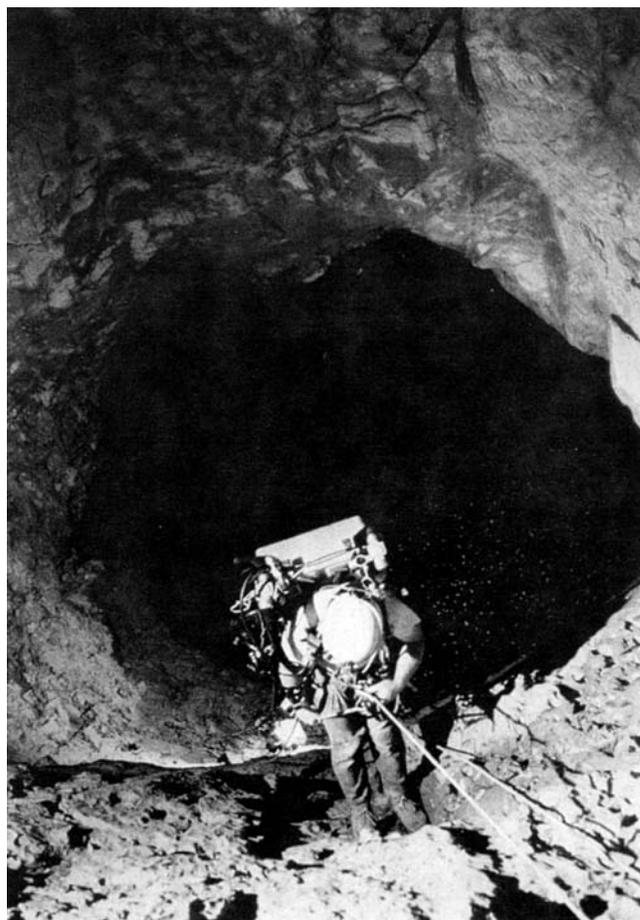
We had seen this before, most likely dead batteries, I thought. With Steve and Barbara's help, Bill changed the main system batteries at the water's edge while I was still wearing the unit. Now, having been graphically reminded of the problems we had encountered during our R&D dives, I set out to finish the

task at hand. The water was not as clear as I had expected. It had a thick milky hue which limited my dive light penetration to less than 10 meters. Steve had laid his dive line along the right wall as shallow as possible. Not far beyond the end of the sump pool the passage widened dramatically. No floor, left wall, or ceiling were visible. The size of the passage was certainly as big as anything we had seen above water. At about 18 meters deep, the wall no longer appeared as solid rock. Instead it was covered with cauliflower-shaped formations of calcite encrusted mud. I finally reached the end of Steve's line at 30 meters. There was no tie-off. Rather, a small loop in the line had been gingerly laid over a small mud formation. At this point, the ceiling was dropping sharply and the only way on was straight down. When I tried to tie to the line loop on the wall a sheet of these mud formations came loose, considerably reducing the visibility. Taking this as an omen, I decided to abort and be content with surveying the existing line out. I finally managed to re-establish a tie-off by poking the line into the mud formations with my finger.

On surfacing, after only a 30 minute dive, Bill convinced me to give it another try. When I again reached the end of the line, a combination of the now-poor visibility and the cold I was feeling after being in the water over an hour easily convinced me to put this off until tomorrow. I was shivering when I ended the second dive. It was becoming apparent that we needed dry suits.

While I was diving, Bill and Barbara had gone to do a lead-climb that looked extremely promising. The lead appeared to be a large shaft in the ceiling of the latrine chamber between camp and the sump. With the help of Peter's Toshiba hammer-drill, and a couple of divelight battery packs, they pursued a very challenging and overhung climb.

I was determined to finish what I had started. So the next day I would make the first dive, followed by Steve. Bill, determined to set a depth record, insisted on our carrying a depth gauge tied to a small line reel for plumbing the bottom. Knowing what was ahead, this dive was much more relaxed. After successfully tying into the end of the line, I dropped down, settling on the floor at 45 meters. I wanted a tie-off at this point. Not seeing one, I used a lead drop weight. I was now in what appeared to be a large tunnel, but the visibility prevented me from estimating its size. I explored another 18 meters before turning the dive due to the cold. Unfortunately, all the deep diving in excess of 60 meters at Forty Fathom Grotto just prior to this trip had crushed our wet suits to about half



Jim Brown rappels into Left-Hand Sump with MK-4 rebreather. 1993 photo by Bill Stone

their original thickness, and their insulating factor had been significantly reduced.

We did a quick turnaround on the MK4 and Steve made the second dive of the day. He extended the line another 55 meters to a large breakdown pile that sloped steeply upward. It appeared that he was now in some sort of intersecting passage. The rebreathers thus far had been working flawlessly, it was the cold and our own psyche that were the limiting factors.

Returning from our dives, we found Bill finishing the climb that he and Barbara had started. Bill was standing on a small ledge, some 10 meters from the nearest wall and 15 meters above the floor. From our perspective, Bill had arrived at a point where we had envisioned major passage. Unfortunately, he was staring up into a progressively narrowing crack which continued upward another 10 meters. It did not look promising, and no airflow was detected, so the climb was aborted.

Bill was surprised by the limits of our underwater exploration, and time was running out. We only had

two days left. Bill still had dreams of a 96 meter-deep dive taking the system depth over 1000 meters. Thus, it was Bill's turn to dive. As the dive approached, it became obvious that Bill, too, shared the apprehensions we had felt. His dive plan was to follow the line to the end and continue exploration in the most promising direction. As he entered the water he said "I'm going to keep it simple, I may not lay any line." I knew what he was thinking. Bill reached the large boulder where Steve had tied his line. Unlike the previous dives, Bill had a much brighter 50 watt light. Bill found a 45° boulder pile angling upward to the north in a passage 18 meters wide by 14 meters tall. Down and to the west, another dark tunnel continued. Bill dropped down from the boulder tie-off to a gravel passage floor at 57 meters. As on the previous dives, the cold became a deciding factor, it was time to leave. On his return, Bill discovered a shaft in the floor of the Main Sump pool. We had all been so focused on the dive line that this rather obvious feature had been overlooked.

Jim, who had been recovering from a cold, was now ready to dive. He had been busy the past day rigging ropes in the 12-meter shaft above the Left-Hand Sump and assembling his dive gear at the bottom. After Bill's dive, we broke down the MK4 and Jim hauled it to the Left-Hand Sump. Bill and I assisted Jim into the water. The water looked good. It seemed to lack the milky white haze we had seen in the Main Sump. We watched with envy as Jim set out on what looked to be the best dive of the trip. During the wait, with Barbara's help, we surveyed tie-in points between the sump and the main survey.

When Jim surfaced after an hour dive, he confirmed my intuitive expectations. It was the best dive of the trip. He explored until running out of dive line. He laid out two full reels in a large tunnel heading west, with only one wall visible through most of the dive. He reached a maximum depth of 36 meters before the passage came back up to a depth of about 20 meters. Jim also discovered a small tunnel with

reduced visibility near the beginning of the sump which trended in the direction of the main sump. We theorized that it might connect with the other lead that Bill had found in the main sump entrance pool.

There was time for one last dive. With only one reel of dive line left, the trip was coming to a close. Kenny had made a special trip back to the vehicles for his dry-suit the day before and was ready. He decided to explore the shaft in the entrance pool of the main sump, with hopes of connecting to the left sump. The visibility was limited, but he managed to empty his reel in what Kenny described as a small tortuous passage with strange formations and very limited visibility. His maximum depth in this passage was 15 meters.

While Kenny was diving, Jim and Barbara had carried a load of gear to the cave entrance. It was now late, but there was still much work to be done. Bill, Barbara, Steve, and I made another entrance run before bed. The last morning began with a significant work load ahead of us. By dark, we had managed to pack all the gear back to the vehicles.

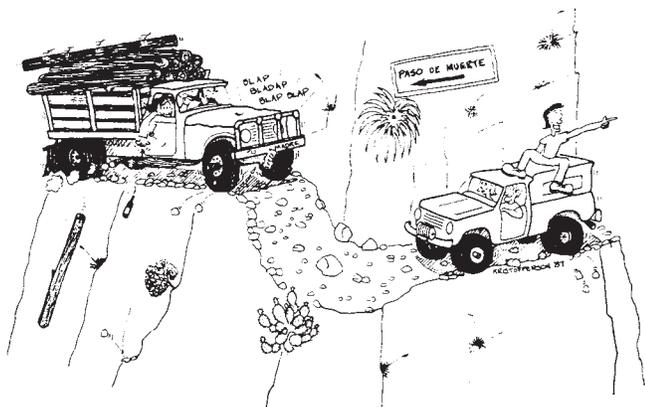
The expedition was a success. The rebreather had performed well. The group had truly become a team. We had been graphically reminded how much work was before us for next year's San Agustín expedition, but we were now much better prepared. During our five day camp we had shed considerable light on the underwater passages of Sistema Purificación. We had explored 473 meters of underwater passage to a maximum depth of 57 meters. The system was now 78,961 kilometers long and 955 meters deep. This cave deserves a full-scale underwater expedition. The underwater passages seemed to follow the same downward stairstep characteristics seen in the dry passages of Infiernillo. The chance of again surfacing into air-filled tunnel seems remote, but the lure of continued exploration, wet or dry, weighed on our minds as we left the canyon. It was clear to us all that we would be back.

THE PEP WOULD LIKE TO THANK THE FOLLOWING INDIVIDUALS
FOR SUPPORT IN 1993:

Allan Cobb
Harvey DuChene
Jack Kehoe
Joel King
David McKenzie

Steve Miller
Dale Pate
Terri Treacy
Jack White

TRIP REPORTS



Destination: Las Chinas area, Tamaulipas

Date: 23-28 November 1992

Personnel: Bill Gassiott, Sandy Henson, Susie Lasko, Charley Savvas, Terry Sayther, Beverly Shade, Peter Sprouse, Cathy Winfrey

Reported by: Charley Savvas

23 Nov.- After some doubt, Cathy Winfrey called and said we were going, so I finished packing and was off. A few hours past the border, Terry's Suburban had a blowout of the front left tire. Everyone helped to fix it and we went on to Barretal.

24 Nov.- We ate breakfast while waiting for the tire repairman. Finally we were off at noon with a new tire and wheel. I rode on the bumper and got a spectacular view of Infiernillo on the way up. I climbed on top of Terry's truck with Bev, ducking branches and soaking in the scenery. A branch nailed Bev in the back and caught my elbow, almost tossing me off the truck. At 7:00 we arrived at our new campsite at Las Chinas.

25 Nov.- Susie, Sandy, and Bev went off looking for caves while the rest of us hiked up to the next road intersection to get oriented. We went into a nice cave called **Cueva del Vandalismo** which was known for its blind scorpions. We hiked around looking for caves and found several new pits. Regrouping on top of some karst pinnacles, we looked down on an awesome sea of clouds. On the way back to camp I ran across a pit, but couldn't find a rock. I tossed in a piece of bark and figured it to be a three second pit. After lunch in camp, Peter, Bill and I headed back to check my pit while the others continued ridgewalking. I had difficulty relocating the pit in the dense karst, finally walking up on it after 90 minutes. Peter rigged it and went down while I started sketching. Peter reached a

ledge and, seeing that the rope wouldn't reach bottom, called up for more rope. I grabbed more rope, jumped in my gear, and joined him on the ledge. Peter anchored to some formations and went on to the bottom, the end. I sketched while Peter collected biology. We found the tangerine that Bill had accidentally dropped in, giving it the name **Pozo de la Mandarina**. Peter headed back up to the ledge, then I joined him there to finish the sketch. We derigged and headed back to camp.

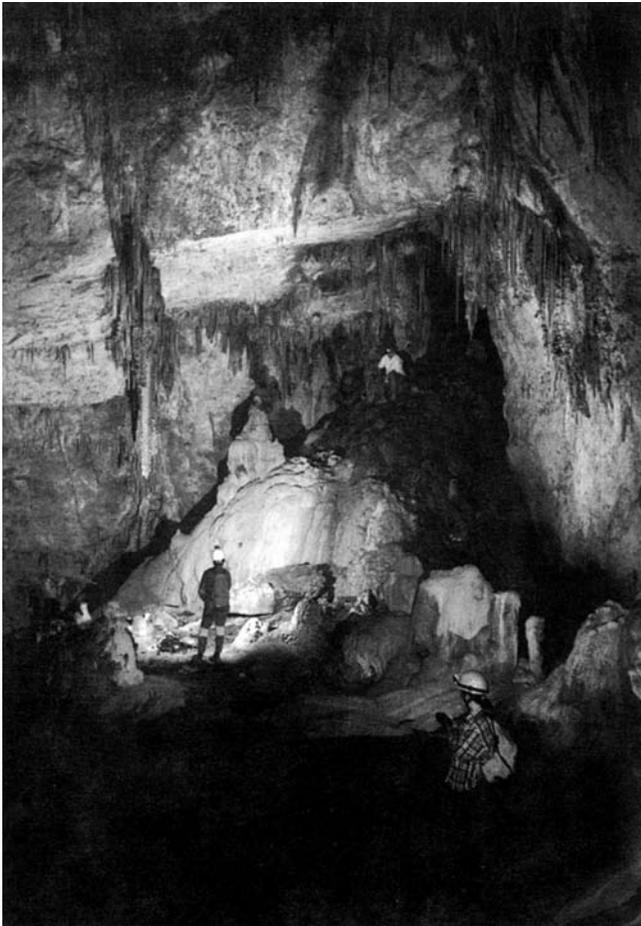
26 Nov.- It was 10:30 when I rolled out of bed. Susie, Bev, and Sandy showed up from checking a pit down the road. **Pozo Sombra** was 12 meters deep. Then we all jumped into the Suburban to go to **Cueva de California**. At the end of the road, we parked and hiked on trails. Along the way, we found a tremendous pit, which we flagged and continued on. We found more pits but couldn't find California. We were heading back when we found a local who showed us the way to the cave.

Peter had brought flashbulbs for shooting pictures. I went on to the bottom of the big room to look at the low crawl. It went about 20 meters to a small drain, with a few dozen bats. We looked at the pool, the only water in the area, and the Lucy-in-the-Sky Room with Lovely Rita's Nipple.

On the way back to the truck we stopped to look at two pits we'd seen along the way. Susie, Cathy, and I checked a 30-meter pit with a bull skeleton on bottom, **Pozo del Toro**. We derigged and went to check on how the others were doing with their pit. At the entrance up the hill, Terry and Bill informed us that Peter, Bev, and Sandy were still under. He pointed to another pit nearby which Susie and I went to check. Susie rigged while I geared up and went on in. At the bottom, I noticed a drain which I enlarged with a rock. Entering head first, I was into a fissure which went straight ahead and also down 3 meters. I dropped down, squeezed through and down another 3 meters. I was in walking passage and could see up the fissure about 20 meters above me. I walked down 6 meters into a good-sized room. Then I returned to the bottom of the entrance drop and called to Susie to come down for the survey. Because I left my glove at the bottom, this pit became known as **Pozo Guante**. When we climbed out Peter told us of the other going cave, **Pozo Tetrico**. Back at camp we feasted on Cathy's Thanksgiving dinner.

27 Nov.- After breakfast, we loaded into the

Suburban for the ride over to Pozo Tetrico. Susie rigged the entrance drop and we went in to the second drop, a flowstone squeeze. I hammered and hammered on it, then took off my vertical gear and squeezed through. I was on a ledge over a drop. Susie snaked down the rope and lowered our gear. I re-directed the rope so it would be totally free. I dropped the pit, finding flowstone and formations everywhere at the bottom, a 3-way junction. One way went around a corner to a nice lake, which Susie named Lake



Bill Gassiott (top), Bev Shade, and Sandy Henson at Strawberry Fields, Cueva de California. 1992 photo by Peter Sprouse

Charles. An upper passage went for 40 meters in a dry fissure to a drop. The lower lead went down two small climbs to another rope drop. Returning to the 3-way junction I called for Susie to bring more rope.

We surveyed down the lower lead to the rope drop. We rigged it, but it had some rub points. We decided that I would go down and see what it did. I dropped down about 30 meters in three stages, then walked a short distance to yet another drop. It looked

to be about 20 meters. Needing stiffer rope or more pads, we decided to leave it for the day. I was the last one out at about 6:30.

28 Nov.- I got up early and started a fire, as it was freezing out. I noticed bodies stirring out of the tents as I was sitting down to breakfast. Although I had my gear ready to go by 7:30, it was 8:30 by the time we left camp for Pozo Tetrico. Susie, Peter, Bev, and I were dropped off at the cave while everyone else went hiking or birding. Peter went down first, and the rest of us followed with 200 meters of PMI. Susie and I went ahead to rerig some of the drops. At the virgin fifth drop, we cleaned the wall, padded, and redirected it for a free hang. I descended, and once on bottom set off to explore. I was disappointed to see the cave end in a narrow joint. I called for the rest of the crew to come down. As they descended, I tried to hammer the joint open, with no success. I collected a rhadine beetle and some harvestmen, then we ate lunch. We then decided that I would go back to the 3-way junction and push the fissure while the others would survey back and join me.

I crawled, squeezed, and hammered; horizontal extent was limited. It went down about 40 meters to a constricted drain in the floor, with some airflow. As I came back up, I ran into Bev, who was getting to be a pretty good caver. We left the cave rigged except for the entrance rope, since we planned to come back in the near future to blast the bottom lead. Our ride was not there yet, so we hiked down the road to look at a blowing pit entrance that Bill and Terry had found the day before. We started hiking back and ran into the others coming to pick us up. I packed up my gear for leaving the next day and called it a night - I was beat.

28 Nov.- The drive back down the mountain was excellent. Terry had to get gas from a truck in one of the villages, since he had done so much driving on top of the mountain. Susie, Bev, and I rode on top of Terry's roof rack all the way down, it was spectacular. When we hit the coastal plain, Cathy noticed a noise near her right front tire. Later, on the highway, we heard it again, so we dismantled the brakes and found a loose nut which we discarded. We ate dinner and drove home trouble-free.

Destination: Las Chinas area, Tamaulipas

Date: 15-20 February 1993

Personnel: David McKenzie, Charley Savvas, Peter Sprouse, Cathy Winfrey

Reported by: Charley Savvas

15 Feb.- After pre-rigging Tecolote for the

upcoming expedition, we drove up the mountain to Las Chinas. We set up a nice camp in a sink by **Pozo Tetrico**. After camp was set, Peter and I decided to go blast the lead in the bottom of Tetrico, while David went off looking for new entrances. Peter and I put on our new clean Wonderalls and Cathy took photos of us.

We said goodbye to Cathy and rigged the Tetrico entrance drop. The next four drops were still rigged from the November trip. The descent was quite swift, a half hour later we were placing our charge. We sat around the bend about 10 meters away. I used my REI headlamp to set off the two 1-lb pouches. The shock wave was awesome. It immediately got smoky and we started coughing. Peter put on his gear and started up the rope pronto. I could hear him coughing on rope as I put on my ascending gear. I couldn't see a meter in front of me. When I heard Peter signal I wasted no



Bev Shade admires flowstone in Cueva de California. 1992 photo by Peter Sprouse

time in getting on rope. When we reached the top of the third drop the air was clear.

Returning to camp, we grabbed some more rope and went off to check the blowing pit entrance located on the last trip. Peter rigged the pit, which he named **Pozo Pozole**, while Cathy and I waited on top. After awhile, I heard Peter yell "Come on down, bring more rope". No hesitation there, I got on rope and went down the nice 20-meter entrance drop, which then offset for another 10 meters. I found Peter gardening the lip of the third drop. He rappelled down and called for me to follow. The walls of this 25-meter drop were almost completely covered with flowstone. When I arrived I could hear Peter in a crawlway. I had a look and found that it was a flowstone pinch. We climbed out of the cave and joined David back at camp around a toasty campfire.

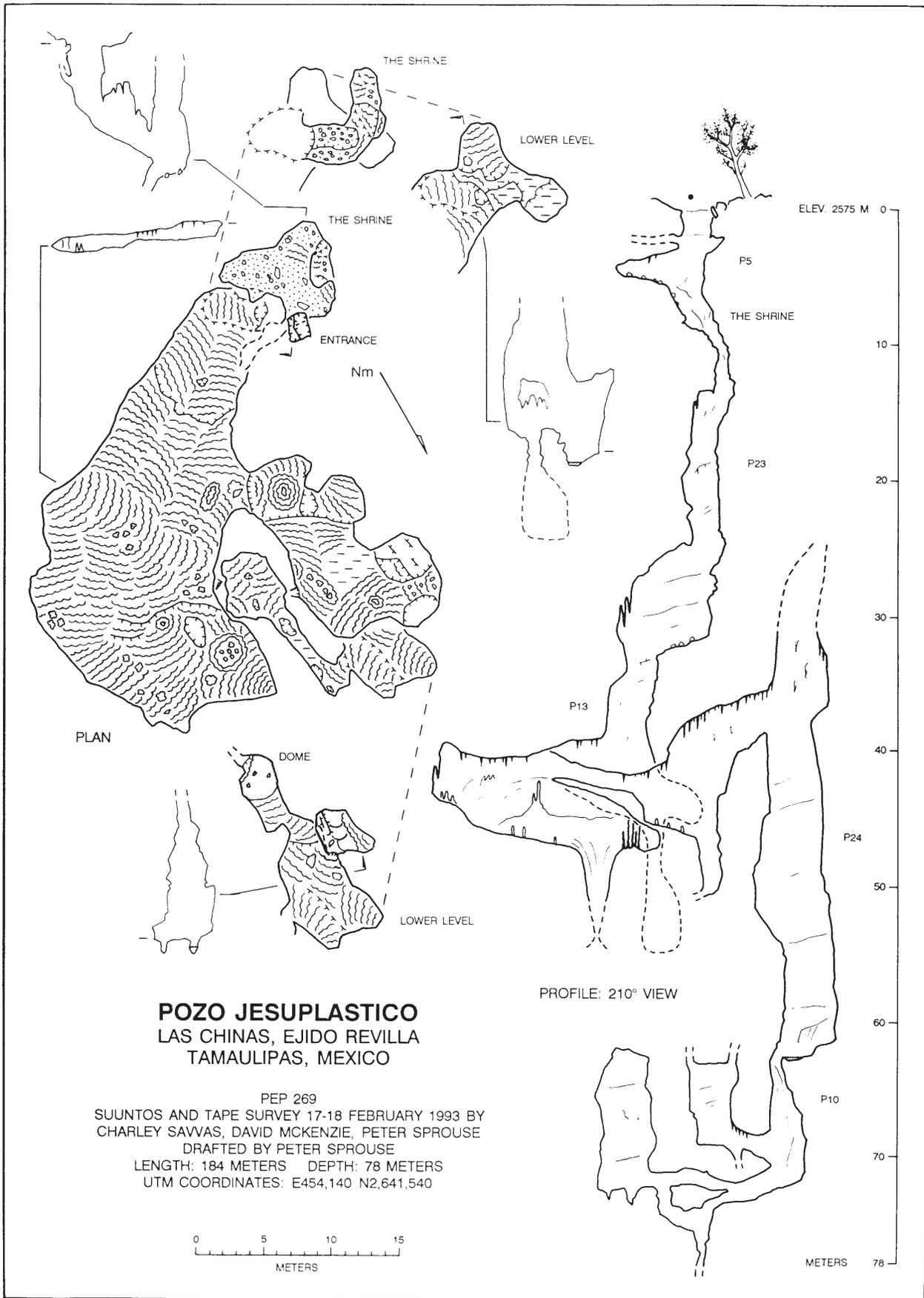
16 Feb.- David was up early to look for new caves. Peter and I geared up for the survey of Pozo Pozole, with Cathy going along on the surface. We photographed in and started the survey at the bottom. I hammered on a lead in the crawl but it didn't go. So we surveyed out, I was in the lead with tape and instruments. The cave was about 60 meters deep.

We hiked back to camp for a snack and break, then about 5 pm went back into Pozo Tetrico to check our blast from the night before. Rappelling the series of five drops was really enjoyable. A brief examination revealed that more blasting was needed. Setting off another 1-lb pouch, we exited immediately, arriving back at camp to a crisp warm fire. David arrived with us, having found more pits for us to check.

17 Feb.- Peter and I planned to check our blast at the bottom of Pozo Tetrico. Before that we all took a hike to look at some entrances that David had found the day before. One looked really good. On the way back I found a nice pit, probably about 30 meters deep. Peter and I entered Tetrico just after noon. At the bottom we dug and hammered awhile, gaining about 10 meters. We finally gave up when the rift got very narrow, and started the de-rig. When I reached the top of the entrance drop, I called "off rope" to Peter and got a reply from Cathy, who had been a bit lost in the woods. Back at camp, we decided to check a small pit right in camp. I dropped the short entrance pit to a rubble slope. At the base of the slope I dug a bit and opened up a pit, about 50 meters deep from the sound of it. Peter and Cathy joined me. Peter went on down, prepared to set deviations. While we waited for news from Peter, Cathy remarked on a small arch on the wall by the rope, saying it looked kind of like a shrine, but missing its plastic Jesus. Therefore we named this cave **Pozo Jesuplástico**.



Peter Sprouse rappels into Pozo Tetrico. 1992 photo by Susie Lasko

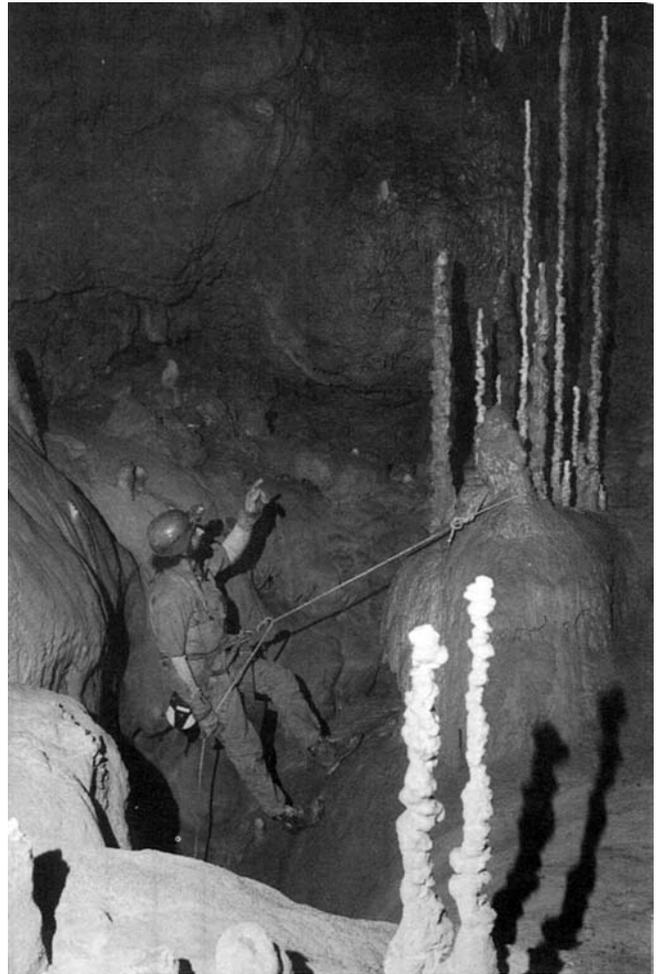


Cathy was heading out when Peter called up for more rope. Cathy passed a coil and down I went, forgetting the survey tape in my excitement. I passed one deviation and then a rebelay at a ledge. The last part ended in a fantastically decorated room with three different pit leads. We left it for the day, Peter collecting biology while I climbed out.

18 Feb.- Peter and I shot some photos on the way into Pozo Jesuplástico, then began the survey of the main level. We shot five stations to a small room that I had checked the previous day. I looked up and noticed a promising alcove which might go. Peter went back for rope, then I lassoed a formation. I climbed up to find walking passage to another drop, about 25 meters deep. I called down to Peter and he joined me. We pulled up the lasso rope and rigged the next pit with it. I rappelled in, bashing off sharp projections with a hammer to protect the rope for the first five meters. I reached a ledge, then offset for two meters to continue to the bottom. It was clean-washed and jagged, with a body-sized hole continuing down. Peter came down and we rebelayed the rope for the next part. I went on down and checked three leads while Peter rappelled the 10-meter drop. One lead went up a slope to a 10-meter-high dome. Another also led to a 10-meter dome, and a lead in the floor led back to the previous lead and also dropped down about 5 meters and pinched. With all leads checked we continued our survey, stopping occasionally for photos. We got out of the cave about 6:00 pm. It's really nice to walk 15 meters after a long survey and be in camp. Nice warm fire, excellent friends, beautiful caves - it just doesn't get much better than this.

19 Feb.- Peter played Reveille early and soon the truck was rolling for Revilla to check out a lead there. From the village we hiked east down the arroyo. It turned out to be only a small one-room cave, **Cueva de Punto las Calaveras**. While surveying, one of the stations (a stalactite) broke off and smashed Cathy's finger. Poor Cathy, that was about her sixth injury of the trip. Peter suggested that David and I could walk a short cut to Conrado Castillo while they drove the truck around. It was a beautiful day, the hike was nice, and I had an interesting chat with David. We reached the fieldhouse and sat in the shade talking about **Sistema Purificación**. When Peter and Cathy drove up, we unloaded the gear and cleaned out the houses. We cooked up a feast with fresh food from the village, then set off to push a possible connection cave which Peter had been in 14 years before.

Cueva del Viento Baja was a meandering fissure with many barely maneuverable restrictions. We



Charley Savvas rappels off totems in Pozo Jesuplástico. 1993 photo by Peter Sprouse

spidered over various pools to the low constriction at the end. It was hopeless to blast so we decided to trench in a mud-floored overpass. The first two meters went fairly easily, then it started going up a rocky slope. Soon we were pulling rocks out over our heads, retreating quickly to avoid the numerous rockfalls. It was getting dangerous, I had a rock roll down the slope after me and cut me just below the left eye.

We decided to try something different. Peter would leave the cave and go into the **Cueva del Vapor** entrance to **Sistema Purificación** and try to make voice contact. I waited for several hours until past the agreed time, then started out chilled. At the entrance I headed for the house, but where was it? I walked in the general direction until I saw Peter's light. It turned out that the Vapor entrance was blocked with trash.

20 Feb.- We awoke early and packed up for the trip down the mountain. At the bottom we stopped to bathe at the canal. It felt good to wash all the mud out of my hair.

Destination: Cerro el Viejo, Zaragoza, Nuevo León

Date: 20-25 May 1992

Personnel: Michael Crawford, Susie Lasko, Peter Sprouse

Reported by: Peter Sprouse

20 May- Michael Crawford, Susie, and I set off on a planned trip to Las Chinas. Drove south through Texas in the rain.

21 May- We slogged to the base of the mountains and found that the arroyo was flooding to 32 inches deep, too deep for an Isuzu Trooper. So we retreated via the Santa Engracia road, and were stopped again by a flooded crossing before we reached the pavement. Finally we were back at the highway and Cd. Victoria. We decided to head west through Linares Canyon and camped near Cieneguillas.

22 May- We awoke to a crisp, clear highland morning. We drove on to Zaragoza and up to La Escondida, where we arrived just in time for a karst-crack chicken rescue. We gave up on that quickly enough when Cliofas Rosales (brother of our previous guide Jovito) offered to take us to a cave in a valley just to the east. Contrary to his grandiose claims, it appeared to be quite short. A number of pits were nearby, including one I'd seen in 1987. After setting up camp, Susie and I returned to the valley and dropped the 1987 lead, **Pozo Repisa**. Despite indications of drainage catchment, it filled 10 meters down. Susie found two more just up the valley flank to the south, and we picked the higher of the two to check. I dropped **Pozo Cedro** to find the bottom 18 meters down.

Next we headed back to the road near camp, in the vicinity of where it crests over from Zaragoza. In a sink adjacent to **Cueva de los Frijoles**, we found a small cave which we called **Cueva Contacto**. While only 7 meters long, it did have a blowing pinch which could well lead to the breezy back of Frijoles. On the other (south) side of the road, we mapped a more intriguing cave, **Cueva Microsalamanquesa**. This small cave sloped north down the dip for 18 meters to a blowing pinch. This takes water but would be awkward to enlarge. Susie and I returned to camp after dark to find Michael entertaining Cliofas and family.

23 May- Cliofas came by in the morning to guide us to pits. We went east up the valley from our camp and over a rocky divide, from which we could see the coastal plain away off to the east. On the 200 hectares which Cliofas owns are a number of pits, the first 3 of which we passed on. Adjacent to his wheatfield was a 7 meter wide, 6 meter deep pit with obvious passage

going off, so we dropped it. Unfortunately, **Pozo de las Amapolas** quickly ended. Above his field was another shaft about 15 meters deep which we didn't do, and below it in the arroyo was another, semi-plugged. After that, we hopped back over to the drainage to the north, downstream from Pozo Repisa. There we were shown **Pozo del Calvario**, which looked decent due to catchment. But again we found the end only 12 meters down. Hiking down the valley we saw another good-looking pit, but passed on it to visit yet another. This one, **Pozo de Lucino**, seemed deeper and some cascading water could be heard below. We tied two lengths of KMIII together and I rappelled the first 30-meter pitch to the knot. After some searching I found a thread to rebelay to and continued to the bottom, another 14 meters down. Here at -44 meters was a deep mud fill with a sawn log mostly buried from a plunge. Michael came down and we surveyed out. On the way back west up the valley, Cliofas showed us one Susie wanted to do, **Pozo de la Mesita de Yerbaníz**. A horizontal entrance led to a sloping drop. She ran out of rope 4 meters off the floor, but it appeared blind. A sprinkle of rain accompanied us back to camp. That evening we hosted Cliofas and family for an Italian dinner.

24 May- We set off to the east to see some caves near Las Trojas, where Cliofas' brother Reymundo lives. On the hike down the valley we saw several shafts, and explored one. **Pozo de la Rincón de la Virgen** was only 9 meters deep, but had looked good on a steep bedding dip. The reputed cave at Las Trojas turned out to be nothing, but we did get to see some pits in the valley to the southeast. Out of six pits, we chose two. **Pozo con Huevos** was 19 meters deep and blind. **Pozo de los Pateros** was explored by Michael down two shafts to a depth of 64 meters. After that, it was time for us to go. We hiked back to the trucks and bade farewell to our new friends. On the drive down, we gave a ride to a schoolboy going to Zaragoza for the week's studies. We bathed at El Salto and ate in town, then drove north through the rain to Saltillo, where we stayed in a hotel for the night.

25 May- Returned to Austin via Monclova and Piedras Negras.

Destination: Sierra Madre northwest of Cd. Victoria.

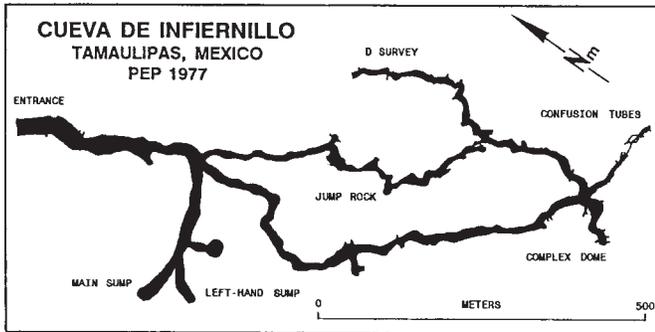
Date: 7-15 May 1977

Personnel: Ralph Batsche, Mike Connolly, Carmina Gaither, Charles Fromén, Peter Sprouse, Terri Treacy, Harry Walker.

Reported by: Charles Fromén

The first day of the trip in the mountains we had good weather, clear with no rain. Almost every day thereafter, the mornings were clear, by noon clouds started to build up, and the rain would usually start by 1 p.m. and last until midnight. The rain did slow cave exploration, but we still made some real progress. In the future, cave exploration should end in late April and start again after the summer rains are over.

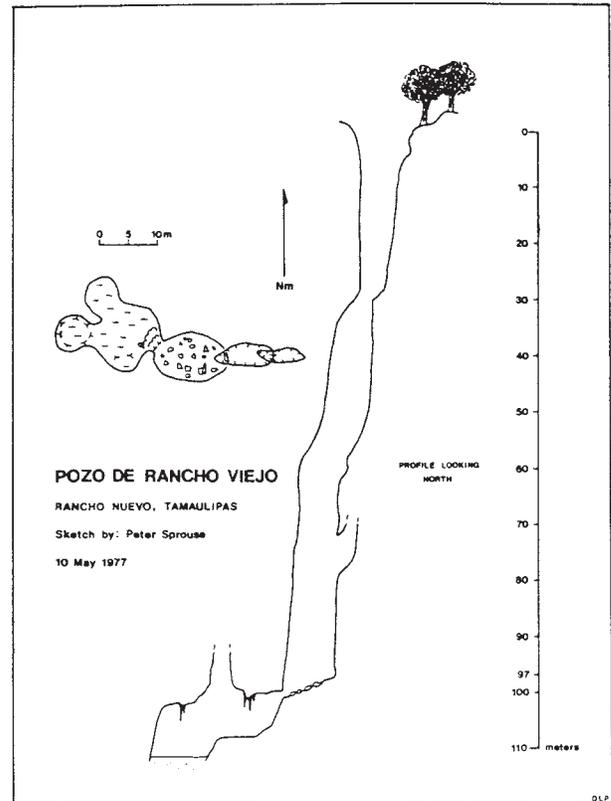
The cave we discovered last year, and called Gruta de Purificación, was renamed **Cueva de Infiernillo** after some discussion with Don Antonio Grimaldo, the local expert on the area.



The first cave we visited was Infiernillo. Three days were spent in the cave and many new passages were found. A total of 654 meters were added to the map making the total surveyed passage 1812 meters. Except for the entrance, no rope has been necessary inside of the cave. No end is in sight. There is some speculation that a connection may someday be made between **Cueva del Brinco** 820 meters above and 4 kilometers to the southeast of Infiernillo. Terri Treacy, Peter Sprouse, and others from the University of Texas Grotto are working on a map of Brinco. The main passage is heading toward the north and a strong wind is found here. A strong wind also exits from Infiernillo and can be felt in the passages we have explored.

After the visit to Infiernillo, we headed south along the top of the range toward Rancho Nuevo. Along the way, we visited the wreck of a twin engine airplane that hit the mountain just 60 meters below the top of the ridge. The plane was used for dropping specially treated screw-worm flies on the mountains of northern México. After reaching Rancho Nuevo, we found all but two families had left the town and moved to Revilla where there is water and other factors which make for a good life. Señor Agustín Luna and his wife still lived there and the señor was happy to show us the very deep pit which he talked about on our last visit.

Peter Sprouse entered the pit, called **Pozo de**



Rancho Viejo, and found it to be just short of 100 meters (not very deep).

We made our way back toward Brinco after making a short visit to **Cueva de California**. We left Peter and Terri at Brinco since they were going to stay another week working with others from the U.T. Grotto on the exploration of Brinco. Some of the group made a visit to **Cueva del Borrego**, after which we left for home and dry weather.



Peter Sprouse gears up to explore Pozo de Rancho Viejo. 1977 photo by Terry Treacy



