



THE TEXAS CAVER

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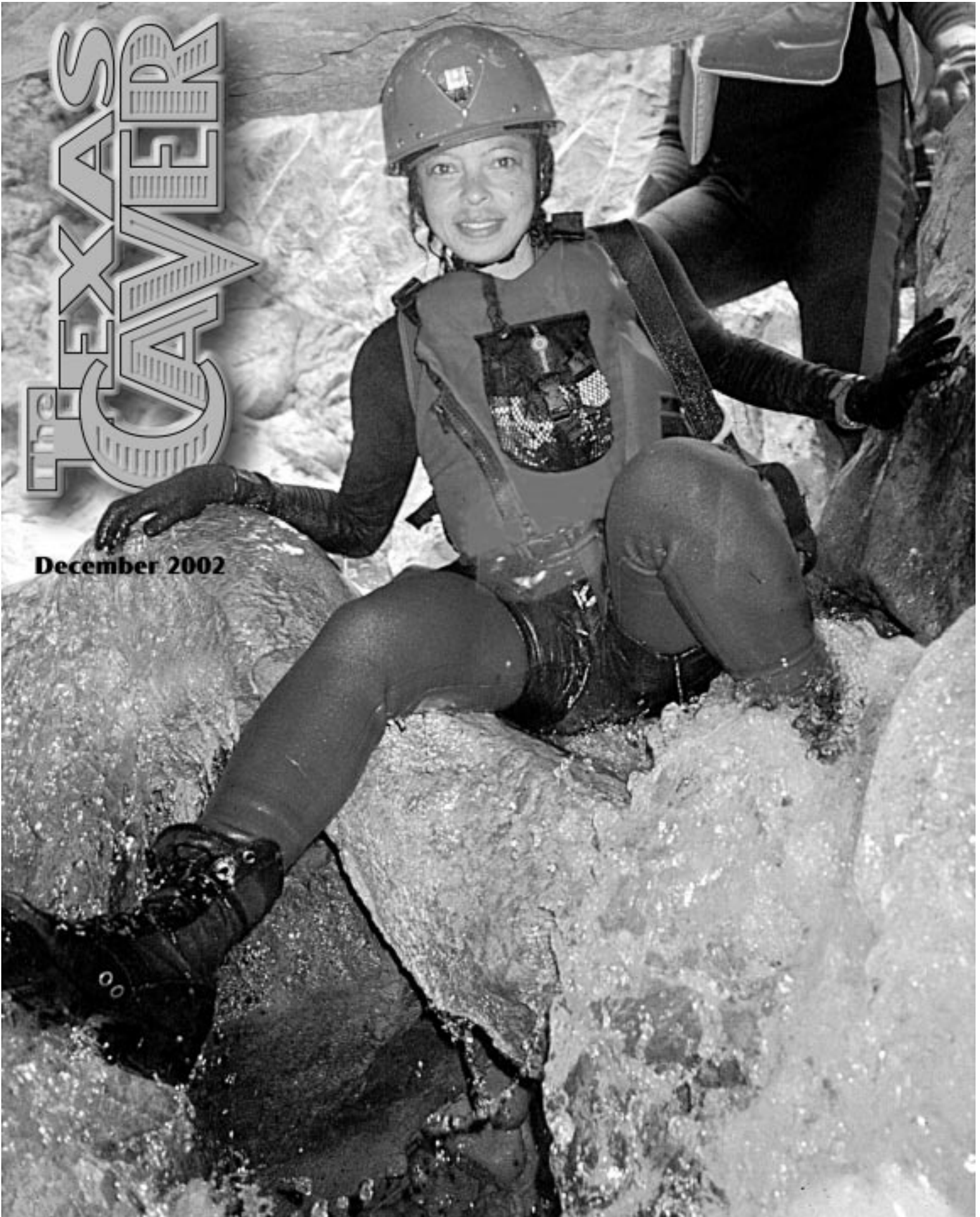
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THE COVERS:

FRONT COVER: Photo of Terri Sprouse in Matacanes

BACK COVER: Mike Moore by Matt Colson at William's Cave in Hays County, TX.

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CAVE GIRLS!

Grace your wall with caves all next year with the "Texas Women, Texas Caves" calendar. Available in October for \$15. Proceeds from this year's sales will benefit the Cave Acquisition Fund of the TCMA. Contact Kate Walker (912) 695-1758 or yovimpa@hotmail.com



TSA Elections

If you are interested in running or know someone interested in running for any position, please nominate them. Nominations for 2003 Executive Council Candidates closed Monday September 30, 2002. Ballots will be mailed to the TSA membership after the fall meeting (October 20, 2002). Officers begin their term effective January 1, 2003.

Texas Caver Reunion

The 25th Annual Texas Cavers Reunion is scheduled for the 18th-20th of October at Horseshoe Ranch, named for a large bend in the San Marcos river about 10.4 miles southeast of Luling. It is roughly 8.6 river miles downstream from Palmetto State Park. The site is a private ranch so this year's access is a unique opportunity to see a part of the state nearby, but unknown to most.

See the TSA Website at www.cavetexas.org/tcr.htm for more info

Next Issue

Bustamante • Election Info • Government Canyon

by Cindy Lee

Mike Moore passed away April 24, 2002 after a brief battle with lymphoma. For those of us who were close to Mike it was devastating to see one who was so full of life succumb so quickly. It was also unimaginable that he was leaving us.

Mike was a lot of things. First and for most he was a caver. Mike started caving in the middle 1970's as a teenager with the Balcones Grotto. His favorite cave was Airman's Cave. Most recently, Mike led the Hays County Project, a TSS project.

Mike was also an artist. He drew cartoons, cave maps, and he did chip art, which are sculptures made of computer chips. He wrote essays and political viewpoints.

Mike Moore 1967-2002



Mike was passionate about what he believed in. When he took on a cause he put everything he had into the cause. Cavers saw his passion in the effort he put in as the editor of the Texas Caver.

Mike had a heart of gold. He would give you the shirt off his back. He was very generous. If he knew you really liked something or enjoyed something he would get it for you as a gift.

Mike had a great sense of humor and loved a good practical joke.

Mike is survived by his wife of 21 years, Margo, their two cats, his immediate family of his mother, brothers, sisters, nieces and nephews. He also left behind many friends, cavers and non cavers alike.

By Cindy Lee

I didn't know Mike very long, a year and a half. It seems like a lifetime though. He, Joy Kennedy and I would go caving together nearly every weekend during most of that time. In that time we would look for caves, sometimes driving around in the car for hours chasing down an obscure lead in Hays County, sometimes finding the lead but always ending up at the Kismet restaurant in San Marcos for lunch. Each time we found a cave it was like finding buried treasure. Though most of the caves in Hays County are known and were visited by cavers so many years ago, they were new to us. We would explore, map, and photograph them. They became ours.

And we would talk. We would talk about everything. The usual stuff you talk about, likes, dislikes, hopes and dreams, politics, movies, scary things in the dark, heart's desire, etc, etc, etc. But we also opened doors to each other that aren't opened to just anyone. We saw each other, as others haven't. I saw Mike as generous, talented, artistic, and compassionate. Late one night a wrong

Mike Moore, A Remembrance

number woke him up. A young girl at her wits end had dialed his number by mistake. She was in serious trouble, crying, and had no one to turn to. In spite of the late hour and being a wrong number, Mike sat up with her, talking, listening, and reassuring her. By the end of the conversation (hours later) the young girl was feeling better about herself and had options she never knew existed.

And Mike LOVED cats. He would play for hours with a cat. Once I was late getting home and Mike was waiting for me. He chose to stay outside in the yard and play with one of our cats rather than wait inside the house. He and Margo always had cats. Whenever we met at their apartment for the weekly caving adventures, Mike wouldn't leave until he showed us how Tex would retrieve a wadded up piece of paper.

This is how I remember Mike. He left way too soon on a journey he will travel alone. Mike, Joy and I did take one last caving trip together. It seemed only fitting that he spend eternity in a cave. If you can't go caving you might as well be in a cave.

By Joy Kennedy

Mike taught me many life skills: how to roller skate backwards (badly) in Sewell Park, how to master the perfect peanut throwing trajectory at an Ice Bats game, and how to order crab Rangoon at the Rose Garden restaurant. Important stuff, really. But probably one of the most important lessons was how to take to the main road . . . and then ditch it.

For those of you who drove with Mike, you know he would find every unknown alley and trail. He would hit mud puddles dead on, at dizzying speeds, for the biggest splash effect (once with my window rolled down, to his delight). Mike compared his curiosity of back roads to his love for exploring caves ñ it was the thrill of the unknown that pushed him to explore both. If it wasn't on a map, you could be sure that Mike would be trying to find it, with GPS, files, papers, cell phone, and every appurtenance available. He explained part of his curiosity in an essay

Mike and the Open Road

*Afoot and light-hearted I take to the open road,
Healthy, free, the world before me,
The long brown path before me leading wherever I
choose.*

(Walt Whitman "Song of the Open Road")

he once shared with me:

Even when it means going far out of my way, I find both exuberance and peacefulness in exploring where unknown roads lead . . . As I drive, I am often in awe at the thought of the stories and memories of others who have shared the same places as I, at different times . . . Was life as fun and exciting for them as it has been for me?

(Geographic Memories)

On April 24th Mike explored a final road too early, a road that leads to the grandest and most thought about human adventure ever. It's not on any map. We can't follow him, at

least not yet. And that's part of the overwhelming sadness many of us feel. As cavers, we're taught to take every trip with a group and to look out for each other. Mike has gone on ahead and left us too soon.

This time, there won't be any trip reports back.

Prospecting in Purificación

Mark Minton

Convinced that major cave might still lie beyond the northern and western limits of Sistema Purificación's lower entrance at Infiernillo, our diverse group from across the US gathered in Austin for the Christmas caving season of 2001-2. Mike Frazier (CO), Randy Macan (CO), R. D. Milhollin (TX), Mark Minton (and his white shepherd Luz) (NM), Karen Olson (MN), Monte Paulsen (MD), Brian Pease (CT), Pete Penczer (VA), and Bill and Rob Stone (MD) left Bill Mixon's house on Saturday, December 22, in three trucks headed for the recently acclaimed Los Indios border crossing south of Harlingen. After clearing a bit of slow traffic en route to San Antonio we made good time to the border, stopping only for a major salad bar feed in Alice. Things didn't look bad as we pulled into Mexican customs at 8:30 PM. There was nobody in the tourist card office, and we were processed through efficiently. Then we got to the vehicle sticker office, and the world seemed to shut down. There were only about 30 people

in front of us, but the line didn't seem to be moving. Fortunately they were passing out numbers, so we didn't have to actually stand in line the whole time. While we waited a young man approached and asked if we were cavers! It was Jaime Wright, a caver and PEP veteran from Ciudad Victoria. Finally our turns came and we seemed to be processed much more rapidly than the long wait would have indicated. Blearily we headed south at 1 AM and got a very funky hotel room in San Fernando for what remained of the night.

The following day we bought our last-minute supplies and headed toward the mountains from El Carmen, stopping at the canal for water and a brisk swim for the hearty. We made good time to the Pass of Death, where Mike threw a Frisbee that looked like it would go forever until it mysteriously destabilized and began tumbling straight down. One wonders how many Frisbees there must be down there, and what the locals must think if they ever hike through that relatively inaccessible canyon. When we arrived at the turnoff to Infiernillo we found that the road had been recently improved due to renewed logging on the upper slopes. This was welcome news because we were concerned about a



Pondering Levitation. Bill Stone admires a hanging remnant of a ledge in Sótano del Camino de los Pinos. by Yvonne Droms



Infiernillo. The massive entrance to Cueva del Infiernillo. Covers on the ledge are dwarfed by the dimensions of the entrance. by Bill Stone

washout that gave us pause last spring, and about which Bill was especially concerned with his huge new double cab F350. In fact the repair was so well done, we weren't even sure we had passed the bad spot until we got nearly to camp. The lower half of the road had not been touched, however, and there were numerous fallen rocks and trees to clear. After rebuilding the last arroyo crossing, we arrived at the usual camp spot and settled in, complete with a tarp strung between two trucks and decorated with twelve-volt Christmas lights I had brought for the occasion.

On Monday, December 24th we split into teams to begin checking leads. Primary among them was a prominent geologic fold Bill called The Arch. A trail there had been started last spring, and got Bill's team close enough to finish the job. Unfortunately there was no cave there, and we came to discover later that Louise Hose had checked the same feature years ago while doing her thesis research. Another team of Mike and Randy began climbing the prominent scree slide west of Infiernillo, visible even from the main road. Mike discovered how spiny the local vegetation could be, returning with legs that garnered the nickname Pincushion. My team followed the small arroyo by camp down into the main arroyo where we discovered a fine flowing stream with beautiful swimming holes. Unbeknownst to us Jerry Atkinson and Sherry Engler had found this area over ten

years before. So much for our mistaken idea that Infiernillo resurged much farther down canyon. Suddenly the great potential we had assumed to exist in the area seemed to evaporate.

Over the following several days we checked many more leads. Near The Arch was a vertical series of holes in a cliff face that Bill led several climbing trips to. Most didn't go, although one had an interesting, short cave associated with it. Inside were unusual formations that looked like cave pearls with crystals growing on the surface. Thus the name Cueva de Bolas de Nieve. Among the better leads we had were some entrances in the same face as Infiernillo, but accessed via the major side arroyo that comes in half a kilometer before at a huge U-turn in the main arroyo. These had been located by Carlos Nasby some years before but not explored. We managed to find them remarkably easily even in dense fog, on our only bad-weather day. Unfortunately nothing went very far, in spite of the fact that they looked good at the entrances. One even carried a small stream that sank at the entrance. While locating these Brian spied another hole higher up on the cliff that would require a return trip with aid to enter. It turned out to be the best of the lot, with actively dripping formations, delicate rimstone dams, and scalloped walls. It ended disappointingly after a little over 100 meters at a flowstone choke where it began sloping downward. We called it Cueva de las Polillas Negras after the black moths inhabiting the entrance. While checking leads above and just west of Infiernillo we discovered that it was possible to follow ledges around to the valley above the big entrance. It would probably be possible to walk from there all the way up to the main road high on the mountain above. During all of these field days the teams were able to keep in touch using FRS radios. Every hour on the hour we would all tune in and find out what the other teams had found. We used the



The Arch. Large geologic feature that turned out not to be an entrance. by Bill Stone



Fog. A river of fog descends into the Arroyo Luna valley.
by Yvonne Droms

monikers we had adopted during the drive down: Big Red for Bill, Jalapeño for R. D. (both named for their truck colors), and White Dog for me.

After several days of disappointing results, we opted for a tour of Infiernillo, to remind ourselves of what was possible in the area. First we visited Camp I and the sumps, which were quite high. Bolts set last spring for the rope drop to the Left Hand Sump were now only a meter or two above water! We made a small diversion to the Sand Room where we played Murderer in the dark. In this amusing game one person is designated as the murderer and one as the sheriff. Everyone else is a potential victim. With lights off the murderer tries to locate people and whispers into their ear, "You're dead!" After he moves on the victim lets out a moan. Meanwhile the sheriff tries to locate people and asks if they are the murderer, in which case they're captured. The game is over when everyone is dead or the killer has been caught. After several rounds we returned to the main passage and headed out the West Loop. There was good airflow blowing into the cave, drying the rocks and making for better footing over the ubiquitous breakdown. After passing under a massive natural bridge we climbed into an overhead cross tunnel. The wind became especially obvious in the smaller confines of the breakdown choke leading down into Moria. I remembered an old lead at the bottom of this basement of Infiernillo, but the last drop was half-full of

water, and access to the lead was probably submerged and inaccessible. After looking around unsuccessfully for other leads, we headed up out of the muddy lower passage and checked a higher lead that slowly pinched. Satisfied with our tour we headed out, reaching camp around 8 PM to a huge spaghetti dinner prepared by Mike, who had left earlier with Karen.

Having depleted our leads around Infiernillo, we were ready for something new. I knew of a very high area of sinks halfway across the mountains toward Zaragoza that I thought was essentially unchecked. (It turned out it had been briefly checked a couple of times, but nothing significant was found.) Going high was appealing because the clouds were moving in the morning we pulled out. We drove all day through alternating clouds and blue sky, depending on elevation. From Infiernillo camp below 1000 m we climbed to over 1850 m above Caballos, then plunged down into Arroyo Luna dropping back to 1400 m. A steady climb from then on led us to the turnoff to LeOadero back at 1850 m and a considerably worse road. Ever upward we climbed, stopping once to clear about 40 logs out of the way that seemed to have been abandoned in the road for quite some time. (With considerable effort we carefully stood them on end, leaning against the uphill berm so they could be easily retrieved should the loggers return.)



Leñadero Burn. Charred forests at about 2800 meters elevation on the way to Sótano del Camino de los Pinos. Low shrubs, yuccas, and agave are now taking over. by Yvonne Droms

By late afternoon, after a bit of route finding and clearing of fallen trees (love that chain saw!), we arrived at the spectacular campsite in a llano at over 2700 m elevation, a mile higher than where we started! The chill was already in the air as we set up camp and gathered plentiful pitchpine firewood. Freezing temperatures hurried us off to bed before we could ring in the New Year on local time, so we had an honorary east coast celebration.

The next day dawned clear for us, but we could see the clouds we had escaped hovering over the lower terrain all around us. Only the top of El Viejo stuck out to the west. Somewhere below in those clouds was Peter Sprouse's Cretaceous Park group. We split into three or four groups and fanned out to check the sinkholes and surrounding hills. Much of the area had burned about five years before, yielding an unforgiving flora of cactus, lechuguilla, and yucca over bare karst. On the other hand, the unburned areas were very pleasant pine-oak forest. Unfortunately the area produced little in the way of interesting leads, with a few fissures up to 20 m deep being about all that was found. As Pete, R. D., and I were heading back to camp we crested out the highest hill and made radio contact with the Stones, who were also on the same ridge. We soon rendezvoused and followed a very old logging road through a beautiful stand of pines. R. D. spied an entrance at the base of a tree, and it looked good! A 23-m drop led to a room with a fissure and a pool with stream gravel below.

Having lugged ropes around with us all day to little avail, we were happy to leave it rigged for a return to survey and push. In spite of this last find, the general impression was that the area wasn't very cavey.

Clouds still shrouded the lands below us on January 2. Stones and I headed off to check an area I had found the day before that seemed more promising. Indeed it had some very good-looking sinks and a couple of pits. The best was a 70-m drop that had remarkably diverse fauna at the bottom. Unfortunately it was blind, and in fact appeared to fill about five meters deep with water at times, based on organic debris perched on ledges overhead. This was 12-year-old Rob's deepest drop ever, and he did great. We called it Sótano del Madrò after the large tree at the lip. Brian, Monte, Pete, and R. D. returned to the cave on the ridge, dubbed Cueva del Camino de los Pinos. The fissure route had looked promising but after bashing away ledges, it was found not to go. However, behind some formations high on the side of the main chamber Brian found a blowing crawl that the others had missed. It led into a tall canyon sloping down with short drops. With renewed interest the survey was taken into this lead, and it went! When 6 PM rolled around the crew climbed out and called

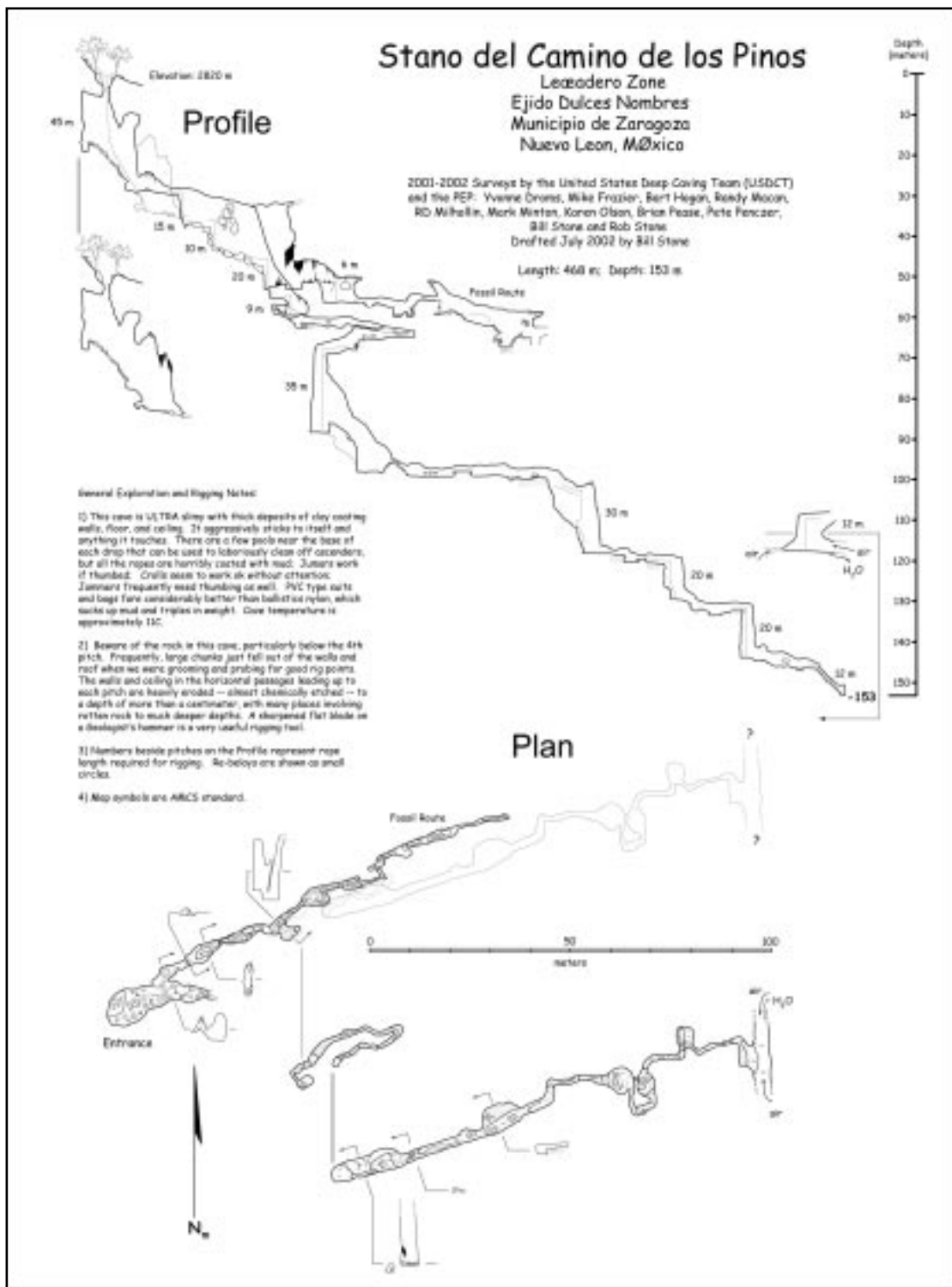
back to camp on their radio, to see if group consensus favored sticking around another day. Some people were anxious to spend our last couple of days touring big cave elsewhere (Calenturas, El Hundido, or Tecolote), but when they heard the description of a good going lead, they agreed to stay. It was even colder that night: 24° by 9:30, and much frostier.

Brian and I had to leave the next day because Brian had an early flight home. Monte joined us, since he was in considerable pain from a toothache that had been getting steadily worse. For the first time since we had left Infiernillo the low cloud cover was gone, giving us spectacular views as we descended from our high camp. It was thirty miles to the base of the mountains, and it took us six and a half hours to drive. The final twenty miles to the highway took only one hour. That's pretty remote!

Meanwhile the seven left in camp geared up for a serious push on Camino de los Pinos. They formed two teams, one to survey and one to push and rig ahead. If it went well, the latter would eventually turn around and survey back to meet the first team. It didn't go well. Only ten meters beyond the previous end of exploration, the cave ended in a flowstone choke! It only took a couple of shots to link the surveys. Everyone scrambled high and low looking for a continuation. When Bill opened his pack to get a bright flashlight, there was a resounding BOOM! His spent carbide had generated a substantial amount of acetylene, which ignited when he looked into the bag. His face was burned and his shirt was tattered by the blast. People came to his aid, and determined that he would be okay with a bit of first aid. Pete climbed down into a pothole to get water for Bill's burns, and spied a low lead. Brian had

said the pothole didn't go, but Pete pushed the crawl anyway, feeling bad about luring everyone back for a big scoop that didn't seem to be happening. It went! After meandering fifty meters in crawls and stoopwalking passage he came to a drop that looked deep. A grinning Pete returned to the others, who were heading out. Karen also had a mishap, slipping and cutting her arm on sharp popcorn, right where she had a bad poison ivy outbreak. They derigged and headed back to camp at dark, leaving the usual last day good lead.

Around the campfire Pete noted that they weren't actually leaving until morning, and there was still time to see if the cave was worth returning to. Mike took up the challenge and by ten they were suited up and heading back up the hill, laden with rope.



The map of Sótano del Camino de los Pinos shows all of the passage scooped in January 2002, as well as two additional drops explored in April by Yvonne Droms, Bart Hogan, Mark Minton, and Bill Stone. The cave continues as tight fissures with air in two directions, although we suspect the routes will converge again soon.




Top: Close up view of the unusual snowball formations in Cueva de Bolas de Nieve

Left: A wider view of the passage where they are found
Photos by Randy Macan

The new pit was thirty meters deep, belling out to eight meters wide at the bottom. Sixty-five meters of mostly walking passage led to another drop, this one 20 meters deep and free after passing through a tight slot. There was extra rope on the bottom, so Mike cut it off and they pressed on. Fifteen meters later they used that last bit of rope on a ten-meter drop. After another fifteen meters they were stopped at yet another drop, their seventh, estimated at fifteen meters deep. This cave was going down fast! With an entrance at over 2800 m elevation, it must be one of the highest going leads in the entire Purificaciòn area, with great depth potential. The two intrepid explorers stage derigged and returned to camp before dawn, covered with mud. They got a couple of hours sleep before it was time to pack and head down the mountain. The cave is estimated to be 150 to 200 m deep, with airflow. You can bet we'll be back next year!





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2002 RECON of Tinian and Rota (Luta), CNMI



Curt standing next to a large Japanese gun positioned in modified FM cave, Rota. Photo by John Mylroie

A reconnaissance expedition was undertaken in June 2002 to the Mariana Islands in order to conduct a preliminary investigation of karst features on the Islands of Tinian and Rota (Luta), as part of a USGS grant to study the water resources of the Mariana Islands. This region is located approximately 5000 kilometers southwest of Hawaii and is composed of a series of islands located along the crest of the Mariana submarine ridge. This ridge is 200 kilometers to the west of the Mariana trench where the Pacific Plate is subducting.

Tinian and Rota are located in the southern half of the Mariana chain between the islands of Guam and Saipan. Tinian is 5 kilometers south of Saipan and Rota is an additional 90 kilometers south of Tinian. Tinian has a surface area of 105 square kilometers with a maximum elevation of 178 meters on its southern plateau. Rota is smaller but reaches a maximum elevation of 496



Photo 1: Danko, John J. and Aubry in Beehive Cave, Saipan. Photo by John Mylroie

meters on the central plateau making it the tallest island in the Southern Marianas. At this tropical location, the annual temperature fluctuates very little, with nighttime averages in the mid 70's and daytime averages in the mid 80's, while annual rainfall averages 200 centimeters with the majority falling between July and September.

The trip began on June 12, when Joan and John Mylroie and I departed from Starkville, Mississippi for a 20 hour flight to Guam, after having just returned two days prior from a six day conference trip to San Salvador, Bahamas for The 11th Symposium on the Geology of the Bahamas and other Carbonate Regions. We all arrived in Guam late in the evening of the 13th and the next two days were spent with John Jenson at WERI (Water and Environmental Research Institution) on the University of Guam campus. Here we organized for the trip, reviewed some of the previous work, and attended several presentations on current work being performed on Guam and Saipan.

Once things were in order, we departed for Saipan on the 15th with John Jenson, Aubry Jenson (John's daughter), and Danko Taborosi; a Croatian who studied the karst of Guam for his Masters Thesis and is now studying in Japan for his Doctorate. That evening we met up with Curt Wexel, who is currently working on Saipan as part of a Masters Thesis at the University of Guam. Here, we spent the next 3 days looking at some of the interesting features that Curt had discovered in his studies, giving me a general idea of what island karst would be like.

We visited a series of flank margin (FM) caves, which are formed by mixing zone dissolution on the perimeter of islands where mixing of saline and fresh water is most active, due to the proximity of vadose development. FM caves are generally described as 'beads on a string' because they develop as numerous spherical chambers parallel to the coast but are usually not connected. The ones that were visited on Saipan consisted of caves with medium sized chambers near the town of San Vicente, a large cave towards the center of the island that was home to a large colony of endangered Swiftlets, and yet larger caves on the northern portion of the island. Of these larger caves, two (El Torro I and El Torro II) are located on the northwest coast and are accessed by traversing the coastal phytokarst. They contain numerous large spherical chambers that connect by short climbs and downclimbs, through several hundred meters of passage. In the north-central area we visited the Beehive Cave complex area, which contains numerous features. The one we visited is a large chamber, which descends steeply and intersects lower chambers through numerous large formations that made me think of the Guadalupe Mountains, although on a smaller scale (photo 1). Another feature, locally named The Grotto, is located on the northeast coast and may be another FM cave (photo 2). It is a large amphitheatre-shaped chamber that is breached on the inland side and connects to the ocean several meters below water. It is a



Photo 2: View looking out of the "Grotto," Saipan. Photo by Danko Taborosi



Photo 4: Suicide cliffs, Tinian. Photo by John Mylroie

favorite diving place for locals and tourists, because it allows access to the open ocean and reefs from a completely protected chamber that harbors numerous fish and sea life.

In addition to the FM caves, we visited another cave near the town of San Vicente that appears to be a stream cave (photo 3). It has an arroyo, which when active flows into it the upper entrance, continues through a short climbdown and large walking passage before it is terminated by a collapse sink that is being used locally for garbage disposal. In the north-central area we visited Kalabera cave, which contains a 30-meter phreatic shaft. This feature has been described as a lift tube where water was forced upward because of a nearby fault that acted as a barrier. The cave is reported to have several hundred meters of passage at its base and is one of the more interesting karst features on Saipan.

On the 19th of June, we departed from Saipan on the morning ferry to Tinian, which is a 50-minute ride due to the location of harbors, although Tinian is only 5 kilometers south of Saipan from Puntan Naftan to Puntan Tahgong. Upon arriving on Tinian, we spent the afternoon meeting with the Mayor, members of the Commonwealth Utilities Corporation (CUC) and other government officials. Evening was spent settling in and preparing for the next week of work on Tinian, which would include visits to FM caves, fracture caves, collapse caves, stream caves, and one significant pit.

On the southern end of Tinian is an extensive interior cliff line referred to as Suicide Cliffs because numerous Japanese citizens and soldiers leaped to their deaths during WWII so that the U. S.

soldiers could not capture them. This cliff contains countless cave entrances in its wall approximately 50 meters above the lower bench (photo 4). An initial investigation of these features revealed that they are classic FM caves with spherical chambers and all developed along the same horizon. On top of the southern plateau is a large FM cave (Liyang Mohlang) that consists of a huge chamber, which is split up into 3 smaller chambers by collapse and formations (photo 5). The chamber is estimated to be 20 meters deep and 50 to 80 meters in diameter, creating roughly 200 meters of passage due to the obstacles in the chamber. It contains numerous formations and archaeological material including Japanese gas masks. According to locals, this cave was the location where 75 Japanese soldiers were killed or captured during the Tinian Campaign.

Continuing the FM theme, we visited the largest cave on the island (as reported by locals), which is located on the eastern side of the island just inland of Long Beach (photo 6). This cave starts as a 10-meter drop into a large chamber, which continues as a 5-meter climbdown into the main chamber. The cave extends in all directions as ellipsoidal rooms that merely intersect one another in the classic FM style. A rough estimate would place the cave at 500 meters long, but there is potential for more than what was seen on the initial investigation. Standing in this impressive cave, it is easy to see how mixing zone dissolution carves out complex caves that resemble intersecting spheres, which forced me to question how many other large chambers were only centimeters away through the bedrock walls where the spheres did not join.



Photo 3: Kurt standing in dry stream passage at San Vicente, Saipan. Photo by John Mylroie

Photo 5: FM Cave (Liyang Mohlang) on upper plateau, Tinian. Photo by John Mylroie





Photo 6: Local guide entering the large FM cave at Long Beach, Tinian. Photo by Joan Mylroie

measured ~150 meters in length with a maximum width of 3 meters and depth of 5 meters. On the east coast, roughly 5 km south of Long Beach, is a very extensive fracture system that measures at least 600 meters long. The majority of this fracture is uncovered, but towards its southern extension a large cave has developed which is over 20 meters deep (photo 8). Unfortunately this cave was not bottomed due to lack of time and equipment, but it appears to have significant development and was used more heavily by the Japanese than most of the other fracture caves we visited. A final fracture was visited immediately south of Long beach and is very similar to the first one visited, except it is 10 meters deep and is reported to connect to the ocean to the south.



Photo 7: Unexploded WWII ordnance (mortars) in FM cave, Tinian. Photo by John Mylroie

Other FM caves were seen throughout the island, including some with large stockpiles of live mortars (photo 7), small caliber ammunition and other archaeological material left over from WWII.

In addition to numerous FM caves, we visited several fracture caves that are developed parallel to the coast lines where failure along the islands margin has created long fracture systems. These caves are generally roofed with breakdown, but have been stable for a significant amount of time as is evident by the speleothem development. They of course contain more Japanese archeological material, which appears every time a site is found that provided natural protection. One of these fracture systems was located on the southern end of the island on the high plateau. It

Yet again, due to time constraints this feature was not completely explored.

A cave located on the southwest coast is a classic collapse cave, which reaches the water table. It consists of a series of passages that stair step down approximately 15 meters to the lower chamber, which contains many speleothems, a small lake and numerous WWII artifacts ranging from gas cans and mess kits to Japanese helmets and cartridges of ammunition (photo 10). This cave is reported to have once had a larger entrance, which enabled the Japanese to store large items like 50 gallon drums inside (photo 11), but the entrance was blasted shut by U. S. troops during the war to prevent its use. Subsequently, 50



Photo 8: John M. and Danko in large fracture cave south of Long Beach, Tinian. Photo by Kevin Stafford

years of erosion and subsidence have opened up two smaller entrances.

At several locations on the island, where we could gain coastal access easily, we conducted coastal traverses to look for possible FM caves and springs. On the west coast several features were found that appear to be developed along joints and extend 10 to 30 meters inward at sea level, but much care must be taken when entering them due to tidal fluctuations. Because of this, not all of these features were entered due to strong surf and even the ones that were entered had to be done cautiously because air space would become highly reduced with each wave pulse. On the east side of the island, just south of Long Beach we located two classic coastal spring caves developed along fractures (photo 12). Both caves extended for approximately 30 meters inland and in the distal portions water that was potable and only slightly saline could be seen discharging. These two spring caves are the first documented features of this type to be found on Tinian, possibly due to their remote location.

The other two major features visited on Tinian are located near the Lasso Shrine in the north central portion of the island. One feature is located just east of the shrine and 50 meters lower in elevation. It consists of several low, wide chambers that interconnect and are partially stacked on top of one another (photo 13). The



Photo 10: Japanese artifacts; helmets, stove, mess kits, and gas masks, Tinian. Photo by Kevin Stafford

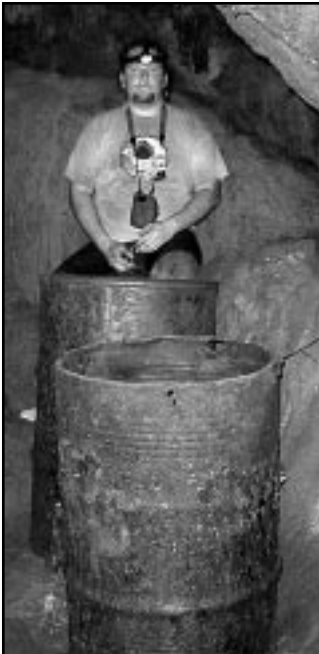


Photo 11: Kevin sitting next to 50 gallon drums in the collapse cave, Tinian. Photo by John Mylroie

cave appears to be a combination of a FM and collapse cave, with the lower levels formed by collapse. The other feature is approximately 1.5 kilometers due south of the shrine and is a small cave developed on the eastern edge of the largest outcrop of volcanics on the island. It is a point source recharge feature that extends as a short crawl before becoming clogged with sediment and turning into an impassable 15-centimeter wide fracture.

On June 27, we departed in the late afternoon for a short flight from Tinian to Rota (Luta) via Saipan. The short flight gave us a great opportunity to get a brief aerial view of all three islands, which revealed some interesting coastlines that will need to be investigated for possible spring caves.

In addition, it allowed us to get an overview of some of the major faults (photo 14) that bisect the islands, giving us a better general idea of what we were working with. Hopefully, in the future we will be able to charter a small plane at some point so that a more thorough aerial investigation can be conducted and major features can be photo documented.

On the morning of June 28, we began with meetings at the Mayors Office, the CUC and the Fish and Wildlife Department, enabling us to establish the initial groundwork for good political relations on the island. This gave us the opportunity to hear their concerns of water quality and management, because Rota is in a unique situation from the rest of the Islands in the Marianas. The islands primary water supply comes from a spring cave located at 350 meters elevation on the southern side of the island. This cave is fed by the large catchment area on the upper plateau at elevations close to 500 meters where volcanic rocks are exposed at the surface and channel water to the periphery to drain into the overlying limestone.

The Water Cave (photo 15), as locals refer to this spring cave, appears to be a FM cave that in more recent times was breached by conduit flow, which enters the large chamber at several places through small infeeders (photo 16). The cave produces a significant



Photo 13: Aubry inside cave near Lasu Shrine, Tinian. Photo by John Mylroie

amount of water with a daily output average of 1.8 million gallons. This cave currently produces more water than is used by the population of Rota and there are proposals for a bottling program to be implemented on Rota to utilize the excess water as a marketable product for other nearby islands who do not have ample supplies of fresh water, instead of allowing excess water to drain to the ocean. This has the potential for added revenue for the island if managed properly, especially with Saipan's need for drinking water after overpumping on that island has created salt-water intrusions into their aquifer.

Other features on the Island of Rota include extensive areas of coastal discharge along the west and north coasts. Several areas were located where water emerges as diffuse flow through beach sand deposits as well as conduit flow through bedding plane springs along the coastal margin. In one location on the northern coast, locally referred to as "The Swimming Hole," a caleta has formed which measures 4 by 8 meters in diameter and is fed by significant discharge from one of the bedding plane conduits (photo 18). These features attest to the extensive network of conduit and diffuse flow that exists on Rota.

Scattered around the island in various other locations are numerous remnants of FM caves where cliff retreat has exposed and in numerous cases virtually removed the caves entirely.



Photo 12: Joan inside a fracture controlled spring cave, Tinian. Photo by Kevin Stafford



Photo 14: Aerial view showing the fault at Puntan Chiget, Tinian. Photo by John Mylroie.



Photo 15: John J. at the entrance to the "Water Cave," Rota. Photo by John Mylroie

However, two FM caves were visited on the western portion of the island, which contain large chambers that measure up to 50 meters in width and over 20 meters tall. The curious aspect of these two features is that one of them contained extensive speleothem



Photo 18: Locals at the "Swimming Hole," Rota. Photo by John Mylroie

deposits throughout the main chamber (photo 19), while the other contained only a few small stalactites but was effectively devoid of any speleothems. At this point in time it is still unclear why two caves that are in the same relative area do not exhibit similar hydrologic behavior after they were isolated above their initial mixing zone development.

The island tour then ended on July 30th when we departed from Rota and returned to Guam for final debriefings at WERI. I stayed in Guam until July 4th, which enabled me to access the document collections at the Micronesian Area Research Center at the University of Guam to search for past research performed on the islands of Tinian and Rota, while John and Joan Mylroie returned to Mississippi on July 2nd.

This reconnaissance trip to Tinian and Rota allowed us to get a general idea of how some of the karst and cave features are behaving on these islands and to begin theorizing on their hydrological development.



Photo 19: Joan in large FM cave, Rota. Photo by John Mylroie

Photo 16: Intercepted conduit flow entering the "Water Cave," Rota. Photo by Kevin Stafford



ing characteristics on each island that differed. The presence of extensive fracture caves created by cliff margin failure and the coastal, fracture spring caves on Tinian have not yet been seen on Rota. The water cave and extensive diffuse and bedding plane discharge on Rota has not yet be discovered on Tinian and the location of point source recharge features on Rota appear to be more developed. It is hoped that future work will help to unravel the complexities of these two islands, so that the local populations can better evaluate and manage their natural resources such that these resources are not over-exploited to the point that their aquifers become contaminated by salt water intrusion or surface contaminants as has happened on so many other islands. A proper management system with island aquifers is important not only from an environmental standpoint, but from an economic standpoint because the importation of potable water or the installation of desalination plants can be a major drain on the local economy.

This trip has enabled us to set the groundwork for the field-work portions of two thesis projects that will be conducted on Tinian and Rota Islands in May and June of 2003. At this time, P. J. Moore will be working on a modeling project looking at the hydrologic aspects of fluid flow on Rota, while I will be investigating the effects of structural controls on mega-porosity development on both islands. It is hoped at this time that a full island caving expedition can be organized to correspond with our thesis



Entrance to coastal pit cave, Tinian. Photo by Kevin Stafford



View looking out of El Torro II, Saipan. Photo by John Mylroie

work including members from the Texas caving community and elsewhere. If all goes well, we will have an extremely exciting and productive season next year that will allow us to further expand our knowledge base of the cave and karst development on tectonically active carbonate islands and hence expand yet further on the CIKM (Carbonate Island Karst Model), which Dr. John Mylroie first described from his work in the Bahamas in the 80's and 90's.

If you have any questions about this reconnaissance trip or the

work that we are hoping to conduct next year, inquiries can be directed to me (Kevin Stafford) at kwstafford@juno.com or kws33@msu.edu.



Fortified FM cave, Tinian. Photo by John Mylroie



Kevin standing in the entrance of a FM cave at "the Cliffs," Rota. Photo by John Mylroie



Currier's Cave

8 June 2002

Sean J. Vincent

Karen Delk, James Lopez, Sean Vincent traveled to Eagle Ridge Ranch near Rocksprings in Edwards County to visit a 100-acre tract purchased by Houston area resident Mark Currier.

Mr. Currier noticed a hole that took substantial amounts of water. Based on an article in the Texas Coop Power Monthly magazine, he contacted the TSA in 2001 to visit. Sean Vincent, Jeanette Joost, and Terry Holsinger visited the location during August 2001. The hole was less than a meter in diameter and filled with rocks to within 1m of the surface. It was determined that the rocks were most likely pushed in an attempt to fill the hole and prevent cattle from entering. Rocks were removed to a depth of 2.1m and a dirt "floor" was found.

During a rainstorm in January 2002, the hole took substantial run-off that did not stand in any observable areas. In the spring of 2002, the owner's wife investigated and noted that there was a 15m diameter space, 17cm above a dirt floor.

8 June 2002, more rocks were removed from the entrance area and excavation began. Due to recent rains, the soil in the cave had turned to mud. A 0.3m hole was dug into the floor, more rocks were removed, but larger rocks prevented further depth excavation.

A relationship has been established with the landowner and cavers are welcome to return for further digging and site survey. There are potentially other caves in the area. Sean Vincent is the designated contact and has the combo to the gate and permission of the owner to access the property any time except turkey and deer season. Anyone interested in visiting the ranch, should contact Sean via email at sean.vincent@alumni.utexas.net

Why the Wire Wiggle is still a wiggle

by Bill Russell

In the September 2002 Caver, the Schumachers implied that the Wire Wiggle, a dug passage in Airman's Cave, could be somewhat more spacious. Well, there are historical reasons for the passage being the way it is.

In digging, the most efficient size is usually a hands-and-knees crawl, so material can be moved efficiently though the dig. And in any case, most diggers try to leave "nice" passages whenever possible.

Unfortunately, the Wire Wiggle situation was unusual as, after a difficult start, the dig turned out to be a body-sized space half filled with small rocks. It was possible to extend the dig by removing these small rocks up to more solid walls and ceiling, without really deciding on a size. Moreover, since the dig was just exploratory and might not have been the best way to go, it was enlarged only as a body-sized wiggle until (we hoped) it would emerge into going cave.

At the point when that actually happened, even the diggers realized the continuation should be enlarged but then it still was not obvious what to enlarge. There was a low upper level above the

Wire Wiggle that looked like less trouble to enlarge as a possibly better connection into the new extension than the Wire Wiggle itself was. While we were deciding which passage to enlarge, we crawled ahead, following the air, to check the next dig -- to find where the cave really did continue beyond our not-yet-cleaned-up Wiggle. Alas, there was no obvious spot. The air disappeared along about 200 feet of passage, with no obvious continuations. We lost incentive to clean up the Wire Wiggle because there was no obvious dig that would require many trips to the back of the cave. And so, after a few minor attempts, the Airman's digging project was abandoned, and the tools removed. From a digger's perspective, the small size of the Wire Wiggle is especially bad, since it forms a barrier to access promising digs in the back of the cave. Air flow indicates much more cave.

This situation also illustrates the continuing need for a comprehensive, long-term philosophy of digging. Most current cave discoveries are made by digging, and after discovery, the diggers customarily extend the cave by enlarging connections too small to traverse, until finally, the cave is finished and ready to be turned over to the preservationists. Tidying up can be neglected (but shouldn't be) if there isn't a rule of thumb to "dig-to-size" as you go (my philosophy, based on such experiences). Otherwise the the constrictions left behind, like Crucifixion Rock (note the proper spelling!), or the traditional "Fat Man's Misery," will likely become celebrated landmarks, which then can only be removed by overcoming considerable opposition, no matter that their removal would make the cave easier for exploration. So it should always be the responsibility of diggers to make at least their own digs large enough so that they do not become barriers to exploration in an unknown future.

Correcting Cave Maps-Plan B

by Bill Russell

Unfortunately errors creep into many cave maps, and are usually not fixed until the next revision of the map, likely years after the error is found. This "fix the revised map" method has another obvious disadvantage, it doesn't correct the copies of the map that already exist. Cavers might use the old map and be misled -- Thus Plan B: correct the cave. Plan B solves the incorrect map problem, all the old maps are now correct and no one will go astray.

This is not just theory. Plan B was used in the Austin area to correct Airman's Cave. The map of Airman's Cave, the longest cave in the county, was too large to print with all the floor detail, so a silhouette map was prepared by reducing the size of the map to a printable size and filling in the "cave" with black ink. On the original map there were two passages that ended in breakdown within a few feet of each other. When the greatly reduced map was inked the gap between the ends of the passages was not noticed, and the passages were connected. Cavers tried to follow this passage and complained; so when out of state cavers stopped by Austin for a demonstration of digging techniques, Mark Minton and I seized the opportunity. We removed the blocking breakdown and corrected the cave. All the maps are now correct. There is a moral in this story: If you are told your idea is not realistic, you can either change your idea or reality.

Texas Cave Conservancy Newsletter #3

September 4, 2002

This has been a busy caving summer for the Texas Cave Conservancy. Our TCC Summer Splash -Weekend, August 16-18, out at Camp Wood was well attended. After touring Palace Cave, we visited the Blue Hole for swimming. Jerry Fant found a new cave under the creek bed. On Saturday, we had a great meal with the cave owners, Tom & Anne Masterson. While in the area, Christi Bennett was introduced to several of the local cavers. Next year, she will be contacting cave owners in West Texas. We will have additional cave access following deer season.

On the 24th of August, the Bexar Grotto came to Round Rock to build a wood mulch loop trail at the Tres Amigos Cave Preserve. We will be placing signage at the preserve in the near future. Two caves were visited following the work. They were impressed with the formations in the future educational show cave, Avery Ranch Sanctuary Cave. Thank you, San Antonio cavers.

The following weekend, on August 31, Donna Mosesmann of the Greater Houston Grotto returned to the restoration work at Beck Ranch Cave. Twelve cavers worked on the project. The work has removed most of the writing on the ceiling and walls in the left hand passage. Check out the TCC work project photos on George Nincehelsers web site at www.nincehelsers.com/cave We are waiting to work on the right hand passage where most of the bats live. The bats should be in their winter caves by November. Good work, Houston!

We will attempt to post information on as many of the TCC events as possible. Often, events come together on short notice so contact us and let us know you are available. We will to post information on our activities using three codes. FULL, LIMITED, OPEN. Many of the activities listed as FULL will be on- going events so call the contact person and let them know you are available to assist. On the LIMITED trips, contact us as soon as possible to get on the list or to be on stand by. On the OPEN trips, contact us and let us know you plan to attend. This will assist us.

Texas Cave Conservancy - October Events

October 5

Texas Cave Conservancy Associate's Meeting. Several cavers have told us that they would like to attend the meetings but were unable to attend during the week., Good news! The meetings will be held at a work project so it will be easier to attend. This weekend we will be working on the TCC Campground. Contact: Mike Walsh 512-804-2158 TCCaus@cs.com OPEN.

October 12

We will be working on Trail building - Buttercup Creek Preserve. When complete, we plan to have several miles of nature trail. Following five hours of trail work, we will visit the ex-commercial cave, Cobb Caverns. This project and cave visit is limited to 14 cavers. Sign up ASAP. Contact: Mike Walsh 512-804-2158 TCCaus@cs.com LIMITED.

October 12

We will be starting the TCC Boerne Project The work will be on a restricted access real estate development that has 75 to 100 caves. Our goal is to dig; explore and collect information for the data-base. We will attempt to make contact with the lot owners in order to build long-term cave access agreements. For information on future trips, contact Joe Ranzau 210-289-6839 bigjoe@hotmail.com FULL.

October 18-20

Texas Cavers Reunion. We will have a Texas Cave Conservancy table, come and visit with us. Talk with us about our future cave management

and cave visitation activities. Contact: Old Man Wisdom Somewhere out in West Texas caving. OPEN.

October 26

Cave Until You Drop Saturday. Williamson County caves. This will be another opportunity to assist us and to check out as many caves that you can visit in one day. Contact Scott Serur 512-970-8337 back2scoolagn@hotmail.com OPEN.

Several cavers are working on other projects. Often the trip is planned at the last minute or must be limited on the number of cavers involved. The best way to get involved with these projects is to contact the caver involved and let them know you want to help.

Texas Cave Conservancy Projects

West Texas Cave Access

Christi Bennett-Travis Scott-Mike Walsh.

Falling Waters Ranch

Christi Bennett

Avery Ranch Cave & TCC Campground

Walsh

Beck Ranch Cave Survey &

Avery Ranch Sanctuary Cave Map

Robin Barber

Beck Ranch Restoration

Donna Mosesmann

Texas Bat Cave Owner's Publication

Raymond Hertel

TCC Web Site

Travis Kinchen

TCC Photo Site

George Nincehelsers

(temporary)

TCC Data Base & Cave Diving

Jerry Fant

We are making arrangements for our November-December events. How can you get involved? Contact us at TCCaus@cs.com and ask to be added to our electronic newsletter. Write us at the address below and we can provide more information. You may join the Texas Cave Conservancy as a regular Associate for \$25 dollars a year or join for \$5 and work with us. When you volunteer 40 hours, you are eligible for our Lifetime Associates status. Cavers working together for cave access and for the long- term protection of caves; That is the future.

The Texas Cave Conservancy is a non-profit 501 (c)(3)Texas corporation.

Texas Cave Conservancy

Post Office Box 153034

Austin, Texas 78715

512-804-2158

TCCaus@cs.com

If you would like a copy of the TCC Associate's List send an e-mail request with your name and we will send it out as an attachment.

That Warm Fuzzy Feeling

By Jonathan Wilson
Texas Independent Cover

The Farmer's Almanac is calling for a cold harsh winter this year. While this is an issue of importance for folks in places like Askov, Minnesota, we of the Texas underground should take heed. Since the height of the Mexican caving season is fast approaching, and many trips south have already moved into the planning stages, perhaps it's time for a short discussion on one of the staples of life: warmth. I may not be the foremost expert in this area, but growing up a northern Yankee and freezing my ass off on the side of a Mexican mountain more than once has provided some experience to draw upon.

Nature has deemed the brain to be the most important part of the human body and while this may not be true for some of our species, the brain does receive it's fair share of warm blood from the core of our body. Needless to say, most of body heat loss occurs at the head. Keep a warm hat handy, it's hell having cold ears.

My boss in Idaho used to say 'Cotton Kills'. For keeping warm cotton is just about the most useless fabric in the closet next to your fishnet stockings. Cotton tends to keep moisture near the skin, which robs the body of heat. If you are going to cave in the clouds, leave the cotton at home. Thanks to the petroleum industry we now have many synthetic fabrics with which to battle the bite of old man winter. Try a nice heavy weight Polartec fleece or a trusty thick wool sweater. Layering is key, because warm air is trapped between the layers and adds to the insulating properties of your caving fashion statement. The outer shell of your layering system should block the wind. Gore-Tex is breathable, waterproof, and wind resistant but will make a very nice dent in the bank account. Wet suits tend to be heavy and have started to fall from favor with some expedition cavers. Unless you're planning on swimming during your visit underground you may consider wearing a 'furry' suit or polypro. The combination of polypro long johns and pack Nylon/Cordura cave pants keeps me toasty warm in most caves.

So there you are, you have just ascended from a 14-hour trip that started yesterday. Your watch reads five in the morning, the sky has been misting all night, the your boots crunch the frost on the ground. The temperature at this altitude makes every breath visible and there are still five people behind you climbing rope. The need for one of mankind's earliest tools has fallen upon you this morning: it's time for a fire. A carbide caver is one step ahead of the game at this point. With the helmet in a clearing, one can construct a small tepee style fire over top. The flame of the carbide should dry out some fuel until you have the making of a small fire. The key to this affair is remov-

ing the helmet before it becomes part of the fire.

A trick piece of gear found at most outdoors stores is a fire starter. This is a bar of Magnesium with a section of flint epoxyed in place. Make a small clearing and drop in small flat leaves. Shave off some of the magnesium in a little pile then ignite the Magnesium with the flint using your trusty pocket knife. Have some kindling ready because this 1800° fire burns fast. I've seen this little set up start a wet pine cone on fire. Practice this one at home first under the supervision of irresponsible adults. High on most Mexican mountains one of nature's best fuel sources is readily available; pitch pine is the heart of a pine tree and is saturated with an oil-like substance known as pitch. Pitch pine will burn hot, even when wet, with little smoke. Pick some up on your hike to the cave and stash it near the entrance. You should have plenty of fuel for that long wait as your friends make their way up the nylon highway.

My good friend Charlie Savvas showed me this trick when I was a wee pup: Charlie keeps a 4ft by 4ft sheet of construction plastic in his cave duff. It's packed in right on top for easy access. Wrapped around the body the plastic becomes a 'vapor barrier', which holds in body heat. It also protects against the evaporation effects of the wind. An added bonus: lay the sheet on the ground and dump your pack out on it. Now you can organize your gear with losing anything in the dirt! I tried using a 'space blanket' like this but the Mylar could not handle the abuse that a heavy gauge sheet of PVC could withstand.

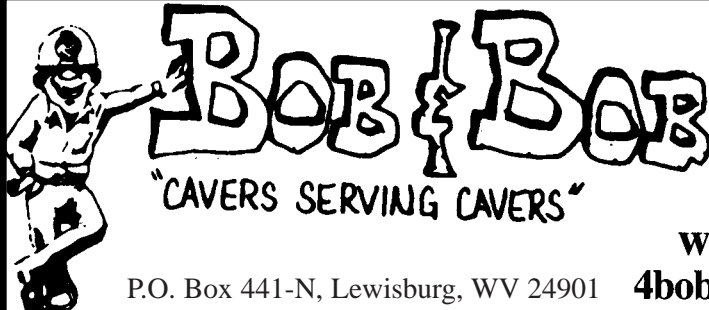
A nice lofty sleeping bag will keep you warm on a chilly winter night. Remember not to store you bag in the compression sack between trips. The bag will lose loft and it's insulating properties. If you have a limp bag, try tossing it into a commercial dryer with some tennis balls. A bag with zipper and neck baffles help to keep the warm air inside your bag for escaping. Avoid breathing inside the bag. Moisture from exhalation will condense inside the bag and make for a clammy morning.

The cold, hard ground you are sleeping on is giant heat sink, draining the warmth away from your slumber. Compliment your sleeping bag with a pad. The pad will do two things for you; smooth out the bumps on mother earth, and insulate your dreams from her heat stealing tendencies.

Eating before bedtime helps too, as the processes of digestion releases energy from food, especially fats. This keeps the metabolism high though the night. Don't forget the warm wool socks.

Of course there is my favorite method of keeping warm during those long high alpine nights: The buddy system.

Stay warm.



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Alpine Caving Techniques: A Complete Guide to Safe and Efficient Caving.

Georges Marbach and Bernard Tourte, translated from French by Melanie Alspaugh. Speleo Projects, Allschwil, Switzerland; 2002. 17 by 24 cm, 320 pp, hardbound. ISBN 3-908495-10-5. \$34.50.

This is a translation, with some slight revisions appropriate for an international audience, of the third, 2000 edition of *Techniques de la Spéléologie Alpine*. By alpine is meant cold and vertical, although everything except the material on clothing will be applicable to caves everywhere. Coverage of caving techniques is comprehensive, except for really specialized things like diving, photography, rescue, and mapping, although the last two are touched on briefly. The bulk of the book is devoted to vertical rigging and techniques, of course, and that part is very French, with only token mention of techniques other than European rigging and frog SRT. The book is un-American in another way: The authors demand more conformity than is likely to appeal to American cavers. Everybody must use the same type of expansion bolt and learn, at least initially, only the standard frog system with a non-stop spool descender. It even appears that all French cavers are right-handed. Such conformity does have its advantages, such as eliminating the possibility that a caver who uses a rope-walker rig will find himself caving with a clown who wants to put six rebelay and four deviations in a two-hundred-foot pit. One thing new to me is that some French cavers have apparently started to add a foot ascender to their frog systems, turning them into something a bit more like a rope-walker rig. The newness of this is indicated by the fact that there is not yet an official French doctrine about which foot the ascender goes on. The sections on rigging cover, as specialties, light rigging with ropes of 8- or even 7-millimeter diameter, the precautions for which are pretty much like those in standard European rigging, only more so, and ultra-light rigging, in which specially prepared ropes are replaced on pitches after

descent with strings that can be used to pull the ropes back up from below on the way back out. The section on emergencies is limited, reasonably, to things cavers may need to do immediately: many varieties of pick-offs for removing a person stuck, perhaps unconscious, on rope and making emergency substitutions for lost or broken gear. Things like patient packaging and transport are left to rescue teams or at least specialized books on rescue.

The translation by an expat Texas caver is very good for what must have been difficult material. She has preserved a chatty style that frequently veers into first or second person, but she did have some difficulty with technical terms, traction for tension, for instance. The hundreds of drawings by Jean-Yves Decottignies are beautifully clear, though they sometimes differ from what the text says in minor ways. The design and typesetting are excellent, though I'm not sure what has been bought by the cost of printing the entire book in two colors. There are good conservation messages scattered throughout. I noted a number of minor things that are not quite right; the dangerous gas given off by gasoline-powered drills is carbon monoxide, not oxides of nitrogen, for instance. But the only real safety problems I saw were the unfortunately common suggestion that a space blanket be carried inside the helmet, where it messes up the carefully calibrated space required for the liner to stretch to absorb a blow, and suggesting that an advantage of rebelay is that several people can climb the resulting segments of the pit at the same time, without pointing out the risk to the lower cavers from falling objects. The authors even suggest putting rebelay in a deep pit solely for this reason. As I said, very French.

The various editions of "Marbach" have been the bible of French caving for nearly thirty years. The third French edition, twenty years after the second, had all new text and illustrations. Speleo Projects has performed a valuable service by making an English translation available at last. Despite some quirks, *Alpine Caving Techniques* might be the best book, overall, on caving techniques available. How many cavers want a thirty-five-dollar, hundred-thousand-word book on caving techniques remains to be seen. --Bill Mixon



Caving with the Future in Mind

Meeting Report

A diverse group of people met at Kartchner Cavern State Park in Arizona for this one-day workshop on cave conservation, restoration and management. The workshop was organized by Jerry Trout of the USFS and led by such celebrities as George Veni and Jim Werker and Val Hildreth-Werker of the NSS. The take-home messages from the day were that when cave conservation is successful, restoration is unnecessary and that managing caves is actually about managing people in caves.

Through presentations, video and the karst groundwater model,

we learned about the geology of karst landscapes and about threats to water quality that are specific to karst. Project Underground presented their range of educational materials (video, posters, activity guides). Then we moved on to restoration and case studies of successful and not-so-successful restoration efforts. The motto for the afternoon was "Erase Your Trace" and Val and Jim showed us many slides of their techniques for doing just that in beautiful and fragile caves.

The workshop concluded with an untimed tour through Kartchner, including the newly-trailed Strawberry Room. We took turns viewing a 22-foot soda straw through binoculars, and enjoyed the music-and-lights show despite ourselves.